

## Physical Interfaces



---

Published: 2013-02-14

Juniper Networks, Inc.  
1194 North Mathilda Avenue  
Sunnyvale, California 94089  
USA  
408-745-2000  
www.juniper.net

This product includes the Envoy SNMP Engine, developed by Epilogue Technology, an Integrated Systems Company. Copyright © 1986-1997, Epilogue Technology Corporation. All rights reserved. This program and its documentation were developed at private expense, and no part of them is in the public domain.

This product includes memory allocation software developed by Mark Moraes, copyright © 1988, 1989, 1993, University of Toronto.

This product includes FreeBSD software developed by the University of California, Berkeley, and its contributors. All of the documentation and software included in the 4.4BSD and 4.4BSD-Lite Releases is copyrighted by the Regents of the University of California. Copyright © 1979, 1980, 1983, 1986, 1988, 1989, 1991, 1992, 1993, 1994. The Regents of the University of California. All rights reserved.

GateD software copyright © 1995, the Regents of the University. All rights reserved. Gate Daemon was originated and developed through release 3.0 by Cornell University and its collaborators. Gated is based on Kirton's EGP, UC Berkeley's routing daemon (routed), and DCN's HELLO routing protocol. Development of Gated has been supported in part by the National Science Foundation. Portions of the GateD software copyright © 1988, Regents of the University of California. All rights reserved. Portions of the GateD software copyright © 1991, D. L. S. Associates.

This product includes software developed by Maker Communications, Inc., copyright © 1996, 1997, Maker Communications, Inc.

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.

Products made or sold by Juniper Networks or components thereof might be covered by one or more of the following patents that are owned by or licensed to Juniper Networks: U.S. Patent Nos. 5,473,599, 5,905,725, 5,909,440, 6,192,051, 6,333,650, 6,359,479, 6,406,312, 6,429,706, 6,459,579, 6,493,347, 6,538,518, 6,538,899, 6,552,918, 6,567,902, 6,578,186, and 6,590,785.

#### *Physical Interfaces*

Copyright © 2013, 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 . . . . .	xv
	Documentation and Release Notes . . . . .	xv
	Supported Platforms . . . . .	xv
	Using the Examples in This Manual . . . . .	xvi
	Merging a Full Example . . . . .	xvi
	Merging a Snippet . . . . .	xvii
	Documentation Conventions . . . . .	xvii
	Documentation Feedback . . . . .	xix
	Requesting Technical Support . . . . .	xix
	Self-Help Online Tools and Resources . . . . .	xix
	Opening a Case with JTAC . . . . .	xx
<b>Part 1</b>	<b>Overview</b>	
<b>Chapter 1</b>	<b>Physical Interfaces . . . . .</b>	<b>3</b>
	Physical Interface Configuration Statements Overview . . . . .	3
	Clock Source Overview . . . . .	13
	Receive and Transmit Leaky Bucket Properties Overview . . . . .	14
	Understanding Unidirectional Traffic Flow on Physical Interfaces . . . . .	15
<b>Part 2</b>	<b>Configuration</b>	
<b>Chapter 2</b>	<b>Physical Interfaces . . . . .</b>	<b>19</b>
	Physical Interfaces Properties Statements List . . . . .	19
	Interface Ranges . . . . .	35
	Configuring Interface Ranges . . . . .	36
	Expanding Interface Range Member and Member Range Statements . . . . .	40
	Configuration Inheritance for Member Interfaces . . . . .	41
	Member Interfaces Inheriting Configuration from Configuration Groups . . . . .	42
	Interfaces Inheriting Common Configuration . . . . .	43
	Configuring Inheritance Range Priorities . . . . .	43
	Configuration Expansion Where Interface Range Is Used . . . . .	44
	Specifying an Aggregated Interface . . . . .	45
	Configuring 4-Port OC192 PIC to Operate in OC768-over-OC192 Mode . . . . .	45
	Adding an Interface Description to the Configuration . . . . .	46
	Example: Adding an Interface Description to the Configuration . . . . .	47
	Configuring the Link Characteristics . . . . .	48
	Configuring the Media MTU . . . . .	48
	Media MTU Overview . . . . .	49
	How to Configure the Media MTU . . . . .	50
	Encapsulation Overhead by Encapsulation Type . . . . .	51

Media MTU Sizes by Interface Type for M5 and M7i Routers with CFEB, M10 and M10i Routers with CFEB, and M20 and M40 Routers . . . . .	52
Media MTU Sizes by Interface Type for M40e Routers . . . . .	52
Media MTU Sizes by Interface Type for M160 Routers . . . . .	54
Media MTU Sizes by Interface Type for M7i Routers with CFEB-E, M10i Routers with CFEB-E, and M320 and M120 Routers . . . . .	54
Media MTU Sizes by Interface Type for MX Series Routers . . . . .	55
Media MTU Sizes by Interface Type for T320 Routers . . . . .	56
Media MTU Sizes by Interface Type for T640 Platforms . . . . .	56
Media MTU Sizes by Interface Type for J2300 Platforms . . . . .	57
Media MTU Sizes by Interface Type for J4300 and J6300 Platforms . . . . .	57
Media MTU Sizes by Interface Type for J4350 and J6350 Platforms . . . . .	58
Media MTU Sizes by Interface Type for EX Series Switches and ACX Series Routers . . . . .	60
Media MTU Sizes by Interface Type for PTX Series Packet Transport Switches . . . . .	60
Configuring Interface Encapsulation on Physical Interfaces . . . . .	60
Configuring the Encapsulation on a Physical Interface . . . . .	61
Encapsulation Capabilities . . . . .	64
Example: Configuring the Encapsulation on a Physical Interface . . . . .	65
Configuring the PPP Challenge Handshake Authentication Protocol . . . . .	66
Assigning an Access Profile to an Interface . . . . .	67
Configuring a Default CHAP Secret . . . . .	67
Configuring the Local Name . . . . .	67
Configuring Passive Mode . . . . .	68
Example: Configuring the PPP Challenge Handshake Authentication Protocol . . . . .	68
Configuring the PPP Password Authentication Protocol . . . . .	68
Configuring the Local Name . . . . .	70
Configuring the Local Password . . . . .	70
Configuring Passive Mode . . . . .	71
Example: Configuring PAP Authentication Protocol . . . . .	71
Monitoring a PPP Session . . . . .	72
Tracing Operations of the pppd Process . . . . .	73
Configuring PPP Address and Control Field Compression . . . . .	74
Configuring the PPP Protocol Field Compression . . . . .	76
Configuring the Interface Speed . . . . .	77
Configuring the Speed of Management Ethernet Interfaces on M Series and T Series Routers . . . . .	77
Configuring the Speed of Gigabit Ethernet Interfaces on J Series Routers . . . . .	78
Configuring the Speed of Fast Ethernet Interfaces . . . . .	78
Configuring the Speed of Tri-Rate Ethernet Copper Interfaces . . . . .	79
Configuring the Speed of SONET/SDH Interfaces . . . . .	79
Configuring Keepalives . . . . .	81
Configuring the Clock Source . . . . .	83
Configuring the Router as a DCE with Frame Relay Encapsulation . . . . .	84
Configuring Receive and Transmit Leaky Bucket Properties . . . . .	85

	Configuring Accounting for the Physical Interface . . . . .	86
	Applying an Accounting Profile to the Physical Interface . . . . .	86
	Example: Applying an Accounting Profile to the Physical Interface . . . .	86
	Configuring Multiservice Physical Interface Properties . . . . .	87
	Damping Interface Transitions . . . . .	88
	Enabling or Disabling SNMP Notifications on Physical Interfaces . . . . .	89
	Enabling Unidirectional Traffic Flow on Physical Interfaces . . . . .	89
	Disabling a Physical Interface . . . . .	90
	Example: Disabling a Physical Interface . . . . .	91
<b>Chapter 3</b>	<b>Network Interfaces Configuration Statements and Hierarchy . . . . .</b>	<b>93</b>
	[edit interfaces] Hierarchy Level . . . . .	93
	[edit logical-systems] Hierarchy Level . . . . .	109
	[edit protocols ppp] Hierarchy Level . . . . .	113
	[edit protocols pppoe] Hierarchy Level . . . . .	114
<b>Chapter 4</b>	<b>Statement Summary . . . . .</b>	<b>115</b>
	802.3ad . . . . .	115
	access-profile . . . . .	116
	accounting-profile . . . . .	117
	acfc . . . . .	117
	acknowledge-retries . . . . .	118
	acknowledge-timer . . . . .	119
	action-red-differential-delay . . . . .	119
	advertise-interval . . . . .	120
	aggregated-ether-options . . . . .	121
	aggregate-ports . . . . .	122
	aggregated-sonet-options . . . . .	122
	aggregate (Gigabit Ethernet CoS Policer) . . . . .	123
	aggregate (SONET/SDH) . . . . .	123
	alarm (optics-options) . . . . .	124
	annex . . . . .	125
	aps . . . . .	126
	asynchronous-notification . . . . .	127
	atm-encapsulation . . . . .	127
	atm-options . . . . .	128
	authentication-key . . . . .	129
	auto-negotiation . . . . .	130
	auto-reconnect . . . . .	131
	backup-interface . . . . .	132
	bandwidth-limit (Policer for Gigabit Ethernet Interfaces) . . . . .	132
	bchannel-allocation . . . . .	133
	bert-algorithm . . . . .	134
	bert-error-rate . . . . .	136
	bert-period . . . . .	138
	buildout (E3 or T3 over ATM Interfaces) . . . . .	139
	buildout (T1 Interfaces) . . . . .	140
	burst-size-limit (Policer for Gigabit Ethernet Interfaces) . . . . .	141
	byte-encoding . . . . .	142
	bytes . . . . .	143

calling-number	144
cbit-parity	144
cbr	145
cell-bundle-size	146
chap	147
classifier	148
clock-rate	149
clocking	150
clocking-mode	151
compatibility-mode	152
compression (PPP Properties)	153
control-polarity	153
control-signal	154
core-dump	154
crc-major-alarm-threshold	155
crc-minor-alarm-threshold	156
cts	157
cts-polarity	157
current	158
data-input	159
dcd	160
dcd-polarity	160
dce	161
dce-options	161
default-chap-secret	162
description (Interfaces)	163
dialin	164
disable (Interface)	165
drop-timeout	166
ds0-options	167
dsr	168
dsr-polarity	168
dte-options	169
dtr-circuit	169
dtr	170
dtr-polarity	171
dump-on-flow-control	171
dynamic-profile (PPP)	172
e1-options	173
e3-options	174
encapsulation (Physical Interface)	175
encoding	179
epd-threshold (Physical Interface)	180
es-options	180
ethernet-policer-profile	181
ethernet-switch-profile	182
facility-override	183
fastether-options	184
fast-aps-switch	185

fcs	186
feac-loop-respond	187
flexible-vlan-tagging	188
flow-control	189
force	190
forwarding-class (ATM2 IQ Scheduler Maps)	190
forwarding-class (Gigabit Ethernet IQ Classifier)	191
fragment-threshold	191
framing (E1, E3, and T1 Interfaces)	192
gether-options	193
gratuitous-arp-reply	194
hello-timer	195
high-plp-max-threshold	195
high-plp-threshold	196
hold-time (APS)	196
hold-time (Physical Interface)	197
hold-time (SONET/SDH Defect Triggers)	198
host (Interfaces)	199
idle-cycle-flag	200
ieee802.1p	201
ignore-all	201
ignore-l3-incompletes	202
ilmi	202
inactivity-timeout	203
indication	203
indication-polarity	204
ingress-rate-limit	204
input-priority-map	205
interface (Hierarchical CoS Schedulers)	205
interfaces	206
interface-type (Interfaces)	207
invert-data	208
keepalives	209
lacp (Aggregated Ethernet)	210
line-encoding	211
line-protocol	212
line-rate	212
linear-red-profile	213
linear-red-profiles	214
link-layer-overhead	214
link-mode	215
link-protection	217
link-speed (Aggregated Ethernet)	218
link-speed (Aggregated SONET/SDH)	219
lmi (Frame Relay)	220
lmi-type	221
local-name	222
local-password	223
lockout	223

log-prefix (Interfaces) .....	224
long-buildout .....	224
loop-timing .....	225
loopback (ADSL, DS0, E1/E3, SONET/SDH, SHDSL, and T1/T3) .....	226
loopback (Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet) .....	228
loopback (Serial) .....	229
loss-priority .....	229
low-plp-max-threshold .....	230
low-plp-threshold .....	231
mac .....	232
mac-learn-enable .....	233
minimum-links .....	234
mlfr-uni-nni-bundle-options .....	235
modem-options .....	236
mpls (Interfaces) .....	236
mrru .....	237
mtu .....	238
multicast-statistics .....	240
multiservice-options .....	241
n391 .....	242
n392 .....	243
n393 .....	244
native-vlan-id .....	245
neighbor (Automatic Protection Switching for SONET/SDH) .....	246
no-gratuitous-arp-request .....	246
no-keepalives .....	247
non-revertive (Interfaces) .....	247
no-partition .....	248
no-termination-request .....	249
oam-liveness .....	250
oam-period .....	251
oc-slice .....	252
open-timeout .....	252
optics-options .....	253
output-priority-map .....	254
overflow (Receive Bucket) .....	254
overflow (Transmit Bucket) .....	255
paired-group .....	255
pap .....	256
partition .....	257
passive (CHAP) .....	258
passive (PAP) .....	258
passive-monitor-mode .....	259
path-trace .....	260
payload-scrambler .....	261
periodic .....	262
per-unit-scheduler .....	263
pfc .....	264
pic-type .....	264



plp1	265
plp-to-clp	266
policer (CoS)	267
pool	268
pop-all-labels	269
ppp-options	270
premium (Output Priority Map)	271
premium (Policer)	272
preserve-interface	273
primary (AS PIC or Multiservices PIC Interfaces)	273
priority (Schedulers)	274
promiscuous-mode	274
protect-circuit	275
queue-depth	275
queue-length	276
rate	277
receive-bucket	277
red-differential-delay	278
redundancy-options	279
remote-loopback-respond	280
request	281
required-depth	282
revert-time (Interfaces)	283
revertive	283
rfc-2615	284
rts	284
rts-polarity	285
rtvbr	286
scheduler-maps	287
secondary	287
serial-options	288
services (Priority Level)	289
services-options	290
shaping	291
shdsl-options	292
snext	293
snr-margin	294
sonet-options	295
source-address-filter	297
source-filtering	298
speed (Ethernet)	299
speed (MX Series DPC)	300
speed (SONET/SDH)	301
spid1	301
spid2	302
stacked-vlan-tagging	302
start-end-flag	303
static-tei-val	304
switching-mode	304

switch-options	305
switch-port	306
switch-type	307
syslog (Monitoring)	307
system-priority	308
t1-options	309
t310	310
t391	310
t392	311
t3-options	312
tag-protocol-id (TPIDs Expected to Be Sent or Received)	313
tei-option	313
threshold	314
timeslots	315
tm	316
tm-polarity	316
traceoptions (Individual Interfaces)	317
transmit-bucket	318
transmit-clock	319
transmit-weight (ATM2 IQ CoS Forwarding Class)	319
traps	320
trigger	321
trigger-link-failure	322
unframed	322
unidirectional	323
unit	324
vbr	331
vc-cos-mode	332
vlan-tagging	333
vlan-tags-outer	333
vlan-vci-tagging	334
vpi (ATM CCC Cell-Relay Promiscuous Mode)	334
vtmapping	335
warning	336
wavelength	337
working-circuit	340
yellow-differential-delay	341
z0-increment	341

## Part 3

### Chapter 5

## Administration

<b>Monitoring Commands</b>	<b>345</b>
show interfaces (10-Gigabit Ethernet)	346
show interfaces (ATM)	373
show interfaces (ATM-over-ADSL)	408
show interfaces (ATM-over-SHDSL)	416
show interfaces (Channelized DS3-to-DS0)	425
show interfaces (Channelized DS3-to-DS1)	436
show interfaces (Channelized E1 IQ)	439

	show interfaces (Channelized E1) . . . . .	444
	show interfaces (Channelized OC12 IQ and IQE) . . . . .	455
	show interfaces (Channelized OC12) . . . . .	459
	show interfaces (Channelized OC3 IQ and IQE) . . . . .	463
	show interfaces (Channelized STM1 IQ) . . . . .	482
	show interfaces (Channelized STM1) . . . . .	485
	show interfaces (Channelized T1 IQ) . . . . .	500
	show interfaces (Channelized T3 IQ) . . . . .	513
	show interfaces (Discard) . . . . .	515
	show interfaces (Fast Ethernet) . . . . .	521
	show interfaces (Gigabit Ethernet) . . . . .	538
	show interfaces (ISDN B-Channel) . . . . .	562
	show interfaces (ISDN BRI) . . . . .	568
	show interfaces (ISDN D-channel) . . . . .	573
	show interfaces (ISDN Dialer) . . . . .	579
	show interfaces (M Series and T Series Routers, and PTX Series Packet Transport Switches Management and Internal Ethernet) . . . . .	589
	show interfaces (SONET/SDH) . . . . .	608
	show interfaces (Serial) . . . . .	637
	show interfaces (T1, E1, or DS) . . . . .	651
	show interfaces (T3 or E3) . . . . .	676
<b>Chapter 6</b>	<b>Command Summaries . . . . .</b>	<b>695</b>
	ATM Interface Operational Mode Commands . . . . .	695
	Channelized E1 Interface Operational Mode Commands . . . . .	696
	Channelized OC Interface Operational Commands . . . . .	697
	Channelized STM1 Interface Operational Mode Commands . . . . .	697
	Channelized T1 and T3 Interface Operational Mode Commands . . . . .	698
	Discard Interface Operational Mode Commands . . . . .	699
	Ethernet Interface Operational Mode Commands . . . . .	699
	ISDN Interface Operational Mode Commands . . . . .	704
	Loopback Interface Operational Mode Commands . . . . .	705
	Management Ethernet and Internal Ethernet Interface Operational Mode Commands . . . . .	706
	Serial Interface Operational Mode Commands . . . . .	707
	SONET/SDH Interface Operational Mode Commands . . . . .	707
<b>Part 4</b>	<b>Index . . . . .</b>	<b>711</b>



# List of Tables

	<b>About the Documentation</b> . . . . .	<b>xv</b>
	Table 1: Notice Icons . . . . .	xvii
	Table 2: Text and Syntax Conventions . . . . .	xviii
<b>Part 2</b>	<b>Configuration</b>	
<b>Chapter 2</b>	<b>Physical Interfaces</b> . . . . .	<b>19</b>
	Table 3: Statements for Physical Interface Properties . . . . .	20
	Table 4: Encapsulation Overhead by Encapsulation Type . . . . .	51
	Table 5: Media MTU Sizes by Interface Type for M5 and M7i Routers with CFEB, M10 and M10i Routers with CFEB, and M20 and M40 Routers . . . . .	52
	Table 6: Media MTU Sizes by Interface Type for M40e Routers . . . . .	52
	Table 7: Media MTU Sizes by Interface Type for M160 Routers . . . . .	54
	Table 8: Media MTU Sizes by Interface Type for M7i Routers with CFEB-E, M10i Routers with CFEB-E, and M320 and M120 Routers . . . . .	54
	Table 9: Media MTU Sizes by Interface Type for MX Series Routers . . . . .	55
	Table 10: Media MTU Sizes by Interface Type for T320 Routers . . . . .	56
	Table 11: Media MTU Sizes by Interface Type for T640 Platforms . . . . .	56
	Table 12: Media MTU Sizes by Interface Type for J2300 Platforms . . . . .	57
	Table 13: Media MTU Sizes by Interface Type for J4300 and J6300 Platforms . . . . .	57
	Table 14: Media MTU Sizes by Interface Type for J4350 and J6350 Platforms . . . . .	58
	Table 15: Media MTU Sizes by Interface Type for EX Series Switches and ACX Series Routers . . . . .	60
	Table 16: Media MTU Sizes by Interface Type for PTX Series Packet Transport Switches . . . . .	60
	Table 17: Type 1 PIC Mode Combinations . . . . .	79
	Table 18: Type 2 PIC Mode Combinations . . . . .	80
<b>Part 3</b>	<b>Administration</b>	
<b>Chapter 5</b>	<b>Monitoring Commands</b> . . . . .	<b>345</b>
	Table 19: show interfaces Gigabit Ethernet Output Fields . . . . .	347
	Table 20: Gigabit Ethernet IQ PIC Traffic and MAC Statistics by Interface Type . . . . .	361
	Table 21: ATM show interfaces Output Fields . . . . .	373
	Table 22: ATM-over-ADSL show interfaces Output Fields . . . . .	408
	Table 23: ATM-over-SHDSL show interfaces Output Fields . . . . .	417
	Table 24: Channelized DS3 show interfaces Output Fields . . . . .	425
	Table 25: Channelized E1 and Channelized E1 IQ show interfaces Output Fields . . . . .	444
	Table 26: Channelized OC show interfaces Output Fields . . . . .	464

	Table 27: Channelized STM1 show interfaces Output Fields . . . . .	485
	Table 28: Channelized T1 IQ and T3 IQ show interfaces Output Fields . . . . .	500
	Table 29: Discard show interfaces Output Fields . . . . .	515
	Table 30: show interfaces Fast Ethernet Output Fields . . . . .	521
	Table 31: show interfaces Gigabit Ethernet Output Fields . . . . .	539
	Table 32: Gigabit Ethernet IQ PIC Traffic and MAC Statistics by Interface Type . . . . .	552
	Table 33: ISDN B-Channel show interfaces Output Fields . . . . .	562
	Table 34: ISDN BRI show interfaces Output Fields . . . . .	568
	Table 35: ISDN D-Channel show interfaces Output Fields . . . . .	573
	Table 36: ISDN Dialer show interfaces Output Fields . . . . .	579
	Table 37: M Series and T Series Router Management and Internal Ethernet show interfaces Output Fields . . . . .	590
	Table 38: SONET/SDH show interfaces Output Fields . . . . .	608
	Table 39: show interfaces (Serial) Output Fields . . . . .	637
	Table 40: T1 or E1 show interfaces Output Fields . . . . .	652
	Table 41: T3 or E3 show interfaces Output Fields . . . . .	676
<b>Chapter 6</b>	<b>Command Summaries . . . . .</b>	<b>695</b>
	Table 42: ATM Interface Operational Mode Commands . . . . .	695
	Table 43: Channelized E1 Interface Operational Mode Commands . . . . .	696
	Table 44: Channelized OC Interface Operational Mode Commands . . . . .	697
	Table 45: Channelized STM1 Interface Operational Mode Commands . . . . .	697
	Table 46: Channelized T1 and T3 Interface Operational Mode Commands . . . . .	698
	Table 47: Discard Interface Operational Mode Commands . . . . .	699
	Table 48: Ethernet Interface Operational Mode Commands . . . . .	699
	Table 49: ISDN Interface Operational Mode Commands . . . . .	704
	Table 50: Loopback Interface Operational Mode Command . . . . .	705
	Table 51: Management Ethernet and Internal Ethernet Interface Operational Mode Commands . . . . .	706
	Table 52: Serial Interface Operational Mode Commands . . . . .	707
	Table 53: SONET/SDH Interface Operational Mode Commands . . . . .	707

# About the Documentation

- [Documentation and Release Notes on page xv](#)
- [Supported Platforms on page xv](#)
- [Using the Examples in This Manual on page xvi](#)
- [Documentation Conventions on page xvii](#)
- [Documentation Feedback on page xix](#)
- [Requesting Technical Support on page xix](#)

## Documentation and Release Notes

---

To obtain the most current version of all Juniper Networks<sup>®</sup> 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](#)
- [J 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.xml;
    }
  }
}
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 xvii 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.

Table 2 on page xviii defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
<b>Bold text like this</b>	Represents text that you type.	To enter configuration mode, type the <b>configure</b> command:  user@host> <b>configure</b>
Fixed-width text like this	Represents output that appears on the terminal screen.	user@host> <b>show chassis alarms</b>  No alarms currently active
<i>Italic text like this</i>	<ul style="list-style-type: none"> <li>Introduces or emphasizes important new terms.</li> <li>Identifies book names.</li> <li>Identifies RFC and Internet draft titles.</li> </ul>	<ul style="list-style-type: none"> <li>A policy <i>term</i> is a named structure that defines match conditions and actions.</li> <li><i>Junos OS System Basics Configuration Guide</i></li> <li>RFC 1997, <i>BGP Communities Attribute</i></li> </ul>
<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@# <b>set system domain-name</b> <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"> <li>To configure a stub area, include the <b>stub</b> statement at the [edit <b>protocols ospf area area-id</b>] hierarchy level.</li> <li>The console port is labeled <b>CONSOLE</b>.</li> </ul>
< > (angle brackets)	Enclose optional keywords or variables.	<b>stub</b> <default-metric <i>metric</i> >;
(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.	<b>broadcast</b>   <b>multicast</b>  ( <i>string1</i>   <i>string2</i>   <i>string3</i> )
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	<b>rsvp { # Required for dynamic MPLS only</b>
[ ] (square brackets)	Enclose a variable for which you can substitute one or more values.	<b>community name members</b> [ <i>community-ids</i> ]
Indentation and braces ( { } )	Identify 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.	

## J-Web GUI Conventions

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

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

## Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can send your comments to [techpubs-comments@juniper.net](mailto:techpubs-comments@juniper.net), or fill out the documentation feedback form at <https://www.juniper.net/cgi-bin/docbugreport/>. If you are using e-mail, be sure to include the following information with your comments:

- Document or topic name
- URL or page number
- Software release 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 JNASC 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:  
<https://www.juniper.net/alerts/>
- 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

# Overview

- [Physical Interfaces on page 3](#)



## CHAPTER 1

# Physical Interfaces

- [Physical Interface Configuration Statements Overview on page 3](#)
- [Clock Source Overview on page 13](#)
- [Receive and Transmit Leaky Bucket Properties Overview on page 14](#)
- [Understanding Unidirectional Traffic Flow on Physical Interfaces on page 15](#)

## 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, T Series, and J 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 19](#).

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 93](#).

```
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);
      lcp {
```

```
(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);
  (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;
    }
  }
  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;
interface-set interface-set-name {
  interface ethernet-interface-name {
    (unit unit-number | vlan-tags-outer vlan-tag);
  }
}
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 | 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-interoperability 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 {
        current 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

## 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 System Basics Configuration Guide, 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 System Basics Configuration Guide, Synchronous Ethernet Overview and Configuring Clock Synchronization Interface for MX Series Routers.

**Related Documentation**

- Configuring an External Synchronization Interface
- [Configuring the Clock Source on page 83](#)
- 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 for MX Series Routers](#)

## 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 Policy Configuration Guide](#).

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](#).

### Related Documentation

- [Configuring Receive and Transmit Leaky Bucket Properties on page 85](#)
- [SONET/SDH Physical Interface Properties Overview](#)

- [receive-bucket on page 277](#)
- [transmit-bucket on page 318](#)

## 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, `giether-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 323](#)
- [Enabling Unidirectional Traffic Flow on Physical Interfaces on page 89](#)



## PART 2

# Configuration

- [Physical Interfaces on page 19](#)
- [Network Interfaces Configuration Statements and Hierarchy on page 93](#)
- [Statement Summary on page 115](#)



## CHAPTER 2

# Physical Interfaces

- [Physical Interfaces Properties Statements List on page 19](#)
- [Interface Ranges on page 35](#)
- [Specifying an Aggregated Interface on page 45](#)
- [Configuring 4-Port OC192 PIC to Operate in OC768-over-OC192 Mode on page 45](#)
- [Adding an Interface Description to the Configuration on page 46](#)
- [Configuring the Link Characteristics on page 48](#)
- [Configuring the Media MTU on page 48](#)
- [Configuring Interface Encapsulation on Physical Interfaces on page 60](#)
- [Configuring the PPP Challenge Handshake Authentication Protocol on page 66](#)
- [Configuring the PPP Password Authentication Protocol on page 68](#)
- [Monitoring a PPP Session on page 72](#)
- [Tracing Operations of the pppd Process on page 73](#)
- [Configuring PPP Address and Control Field Compression on page 74](#)
- [Configuring the PPP Protocol Field Compression on page 76](#)
- [Configuring the Interface Speed on page 77](#)
- [Configuring Keepalives on page 81](#)
- [Configuring the Clock Source on page 83](#)
- [Configuring the Router as a DCE with Frame Relay Encapsulation on page 84](#)
- [Configuring Receive and Transmit Leaky Bucket Properties on page 85](#)
- [Configuring Accounting for the Physical Interface on page 86](#)
- [Configuring Multiservice Physical Interface Properties on page 87](#)
- [Damping Interface Transitions on page 88](#)
- [Enabling or Disabling SNMP Notifications on Physical Interfaces on page 89](#)
- [Enabling Unidirectional Traffic Flow on Physical Interfaces on page 89](#)
- [Disabling a Physical Interface on page 90](#)

### Physical Interfaces Properties Statements List

---

Table 3 on page 20 lists statements that you can use to configure physical interfaces.

Table 3: Statements for Physical Interface Properties

Statement	Interface Types	Usage Guidelines
<a href="#">802.3ad</a> <a href="#">aex</a>	Aggregated Ethernet interfaces	Aggregated Ethernet Interfaces Overview
<a href="#">access-profile</a> <i>name</i>	Interfaces with Point-to-Point Protocol (PPP) encapsulation	<a href="#">“Configuring the PPP Challenge Handshake Authentication Protocol” on page 66</a>
<a href="#">accounting-profile</a> <i>name</i>	All	<a href="#">“Configuring Accounting for the Physical Interface” on page 86</a>
<a href="#">acfc</a>	Interfaces with PPP encapsulation	Configuring PPPoE
<a href="#">acknowledge-retries</a> <i>number</i>	Link services and voice services interfaces	Junos Services Interfaces Configuration Release 12.3
<a href="#">acknowledge-timer</a> <i>milliseconds</i>	Link services and voice services interfaces	Junos Services Interfaces Configuration Release 12.3
<a href="#">action-red-differential-delay</a> ( <a href="#">disable-tx</a>   <a href="#">remove-link</a> )	Link services and voice services interfaces	Junos Services Interfaces Configuration Release 12.3
<a href="#">advertise-interval</a> <i>milliseconds</i>	SONET/SDH interfaces	Configuring APS Timers
<a href="#">aggregate</a>	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)	Configuring Gigabit Ethernet Policers
<a href="#">aggregate</a> <a href="#">asx</a>	Aggregated SONET/SDH interfaces	Configuring Aggregated SONET/SDH Interfaces
<a href="#">aggregated-ether-options</a>	Aggregated Ethernet interfaces	Aggregated Ethernet Interfaces Overview
<a href="#">aggregate-ports</a>	SONET/SDH interfaces	<a href="#">“Configuring 4-Port OC192 PIC to Operate in OC768-over-OC192 Mode” on page 45</a>
<a href="#">aggregated-sonet-options</a>	Aggregated SONET/SDH interfaces	Configuring Aggregated SONET/SDH Interfaces
<a href="#">alarm</a> <i>alarm-name</i> ( <a href="#">syslog</a>   <a href="#">link-down</a> )	10-Gigabit Ethernet interfaces	Configuring 10-Gigabit Ethernet Link Down Notification for Optics Options Alarm or Warning
<a href="#">annex</a> ( <a href="#">annex-a</a>   <a href="#">annex-b</a> )	ATM interfaces on J Series routers  SONET interfaces using annex-b for MSP switching on M320 and M120 Routers	Configuring SHDSL Operating Mode on an ATM Physical Interface  Configuring Basic Automatic Protect Switching



Table 3: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>aps</code>	SONET/SDH interfaces	SONET/SDH Physical Interface Properties Overview
<code>atm-encapsulation</code> ( <code>direct</code>   <code>plcp</code> )	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
<code>authentication-key</code> <i>key</i>	SONET/SDH interfaces	SONET/SDH Physical Interface Properties Overview
<code>backup-interface</code>	E1, E3, T1, T3 and Fast Ethernet	Configuring ISDN Logical Interface Properties
<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>bchannel-allocation</code> ( <code>ascending</code>   <code>descending</code> )	J Series routers equipped with a Dual-Port Channelized T1/E1 PIM; for Integrated Services Digital Network Primary Rate Interfaces (ISDN PRI)	Allocating B-Channels for Dialout
<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)	Interface Diagnostics
<code>bert-error-rate</code> <i>rate</i>	E1, E3, T1, T3, and channelized interfaces (DS3, OC3, OC12, and STM1)	Interface Diagnostics
<code>bert-period</code> <i>seconds</i>	E1, E3, T1, T3, and channelized interfaces (DS3, OC12, and STM1)	Interface Diagnostics
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> ( <code>nx56</code>   <code>nx64</code> )	DS0 and T1 interfaces	Configuring T1 Byte Encoding
<code>bytes</code> [ <i>values</i> ]	SONET/SDH interfaces	Configuring SONET/SDH Header Byte Values

Table 3: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<b>cbit-parity</b>   no-cbit-parity	T3 interfaces	Disabling T3 C-Bit Parity Mode
<b>cbr rate</b>	ATM interfaces	Defining the ATM Traffic-Shaping Profile
<b>cell-bundle-size cells</b>	ATM2 IQ interfaces using ATM Layer 2 circuit cell-relay transport mode	Configuring the Layer 2 Circuit Cell-Relay Cell Maximum
<b>chap</b>	Interfaces with PPP encapsulation	<a href="#">“Configuring the PPP Challenge Handshake Authentication Protocol” on page 66</a>
cisco-interoperability send-lip-remove-link-for-link-reject	link services IQ (lsq) interfaces	Junos Services Interfaces Configuration Release 12.3
<b>classifier</b>	Gigabit Ethernet IQ interfaces	Configuring Gigabit Ethernet Policers
<b>clocking clock-source</b>	ATM, DS0, E1, E3, SONET/SDH, T1, and T3 interfaces	<a href="#">“Configuring the Clock Source” on page 83</a>
<b>clocking-mode</b> (dce   internal   loop)	Serial interfaces (EIA-530 and V.35)	Configuring the Serial Clocking Mode
<b>clock-rate rate</b>	Serial interfaces (EIA-530 and V.35)	Configuring the Serial Clocking Mode
<b>compatibility-mode mode</b>	E3 and T3 interfaces	Configuring the E3 CSU Compatibility Mode and Configuring the T3 CSU Compatibility Mode
<b>compression</b>	Interfaces with PPP encapsulation	<a href="#">“Configuring the PPP Protocol Field Compression” on page 76</a>
<b>control-polarity</b> (negative   positive)	Serial interfaces (X.21)	Configuring Serial Signal Polarities
<b>control-signal</b> (assert   de-assert   normal)	Serial interfaces (X.21)	Configuring the Serial Signal Handling
<b>core-dump</b>   no-core-dump)	Adaptive services, monitoring services, and collector interfaces	<a href="#">“Configuring Multiservice Physical Interface Properties” on page 87</a>
<b>cts</b> (ignore   normal   require)	Serial interfaces (EIA-530 and V.35)	Configuring the Serial Signal Handling
<b>cts-polarity</b> (negative   positive)	Serial interfaces (EIA-530 and V.35)	Configuring Serial Signal Polarities
<b>current margin</b>	ATM interfaces on J Series routers	Configuring SHDSL Operating Mode on an ATM Physical Interface
<b>dcd</b> (ignore   normal   require)	Serial interfaces (EIA-530 and V.35)	Configuring the Serial Signal Handling
<b>dcd-polarity</b> (negative   positive)	Serial interfaces (EIA-530 and V.35)	Configuring Serial Signal Polarities

Table 3: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>dce</code>	Interfaces with Frame Relay encapsulation	<a href="#">“Configuring the Router as a DCE with Frame Relay Encapsulation” on page 84</a>
<code>dce-options</code>	Serial interfaces (EIA-530, V.35, and X.21) on J Series routers	Configuring the Serial Signal Handling
<code>default-chap-secret name</code>	Interfaces with Point-to-Point Protocol (PPP) encapsulation	<a href="#">“Configuring a Default CHAP Secret” on page 67</a>
<code>description text</code>	All	<a href="#">“Adding an Interface Description to the Configuration” on page 46</a>
<code>dialer-options</code>	ISDN interfaces	Configuring ISDN Physical Interface Properties
<code>disable</code>	All	<a href="#">“Disabling a Physical Interface” on page 90</a> and <a href="#">Tracing Operations of an Individual Router Interface</a>
<code>dot1x</code>	802.1x Port-Based Network Access Control	IEEE 802.1x Port-Based Network Access Control Overview
<code>down-count</code>	ATM interfaces	Configuring the ATM OAM F5 Loopback Cell Threshold
<code>drop-timeout milliseconds</code>	Multilink, link services, and voice services interfaces	Junos Services Interfaces Configuration Release 12.3
<code>ds0-options</code>	DS0 interfaces	Channelized Interfaces Overview
<code>dsr (ignore   normal   require)</code>	Serial interfaces (EIA-530 and V.35)	Configuring the Serial Signal Handling
<code>dsr-polarity (negative   positive)</code>	Serial interfaces (EIA-530 and V.35)	Configuring Serial Signal Polarities
<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
<code>dtr signal-handling-option</code>	Serial interfaces (EIA-530 and V.35)	Configuring the Serial Signal Handling
<code>dtr-circuit (balanced   unbalanced)</code>	Serial interfaces (EIA-530 and V.35)	Configuring the Serial DTR Circuit
<code>dtr-polarity (negative   positive)</code>	Serial interfaces (EIA-530 and V.35)	Configuring Serial Signal Polarities
<code>e1-options</code>	E1 interfaces	E1 Interfaces Overview
<code>e3-options</code>	E3 interfaces	E3 Interfaces Overview
<code>encapsulation type</code>	All interfaces, except loopback and multicast tunnel	<a href="#">“Configuring Interface Encapsulation on Physical Interfaces” on page 60</a>

Table 3: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>encoding (nrz   nrzi)</code>	Serial interfaces (EIA-530, V.35, and X.21)	Configuring Serial Line Encoding
<code>epd-threshold cells</code>	ATM2 interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<code>es-options</code>	ES interfaces	Junos Services Interfaces Configuration Release 12.3
<code>ethernet-policer-profile</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)	Configuring Gigabit Ethernet Policers
<code>ethernet-switch-profile</code>	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)	Configuring Gigabit Ethernet Policers, Configuring MAC Address Filtering, and Configuring the Management Ethernet Interface
<code>facility-override facility-name</code>	Adaptive services interfaces	Junos Services Interfaces Configuration Release 12.3
<code>fastether-options</code>	Fast Ethernet interfaces	Ethernet Interfaces Overview
<code>fcs (16   32)</code>	E1/E3, SONET/SDH, and T1/T3 interfaces	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
<code>feac-loop-respond   no-feac-loop-respond</code>	T3 interfaces	Configuring the T3 FEAC Response
<code>flow-control   no-flow-control</code>	Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces	Configuring Flow Control
<code>force</code>	SONET/SDH interfaces	Configuring Switching Between the Working and Protect Circuits
<code>forwarding-class class-name</code>	ATM2 IQ interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<code>forwarding-class class-name</code>	Gigabit Ethernet IQ interfaces	Configuring Gigabit Ethernet Policers
<code>fragment-threshold bytes</code>	Multilink, link services, and voice services interfaces	Junos Services Interfaces Configuration Release 12.3

Table 3: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>framing framing-type</code>	E1, E3, and T1 interfaces	Configuring E3 and T3 Parameters on ATM Interfaces, Configuring E1 Framing, and Configuring T1 Framing
<code>framing framing-type</code>	10-Gigabit Ethernet interfaces	10-Gigabit Ethernet Framing Overview
<code>framing framing-type</code>	SONET interfaces	Configuring SONET/SDH Framing Mode
<code>gigether-options</code>	Gigabit Ethernet and Tri-Rate Ethernet copper interfaces	Ethernet Interfaces Overview
<code>(gratuitous-arp-reply   no-gratuitous-arp-reply)</code>	Ethernet interfaces	Configuring Gratuitous ARP
<code>hello-timer milliseconds</code>	Link services and voice services interfaces	Junos Services Interfaces Configuration Release 12.3
<code>high-plp-max-threshold</code>	ATM2 interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<code>high-plp-threshold percent</code>	ATM2 interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<code>hold-time milliseconds</code>	SONET/SDH interfaces	SONET/SDH Physical Interface Properties Overview
<code>hold-time up milliseconds down milliseconds</code>	All interfaces, except aggregated SONET/SDH, generalized routing encapsulation (GRE) tunnel, and IP tunnel	Configuring SONET/SDH Defect Triggers
<code>host hostname</code>	Adaptive services interfaces	Junos Services Interfaces Configuration Release 12.3
<code>ieee802.1p premium [values]</code>	Gigabit Ethernet IQ interfaces	Configuring Gigabit Ethernet Policers
<code>idle-cycle-flag value</code>	E1, E3, T1, and T3 interfaces	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
<code>ignore-all</code>	Serial interfaces (EIA-530, V.35, and X.21)	Configuring the Serial Signal Handling
<code>ilmi</code>	ATM interfaces	Configuring Communication with Directly Attached ATM Switches and Routers
<code>inactivity-timeout seconds</code>	Adaptive services interfaces	Junos Services Interfaces Configuration Release 12.3
<code>indication (ignore   normal   require)</code>	Serial interfaces (X.21)	Configuring the Serial Signal Handling

Table 3: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<a href="#">indication-polarity</a> (negative   positive)	Serial interfaces (X.21)	Configuring Serial Signal Polarities
<a href="#">ingress-rate-limit</a> <i>rate</i>	8-port, 12-port, and 48-port Fast Ethernet interfaces	Configuring the Ingress Rate Limit
<a href="#">input-priority-map</a>	Gigabit Ethernet IQ interfaces	Configuring Gigabit Ethernet Policers
<a href="#">interface-type</a> <i>type</i>	Channelized IQ and IQE interfaces, ISDN interfaces	Channelized Interfaces Overview and Configuring ISDN Physical Interface Properties
<a href="#">invert-data</a>	DSO, E1, E3, and T1 interfaces	Configuring E1 Data Inversion, Configuring E3 Data Inversion, and Configuring T1 Data Inversion
<a href="#">isdn-options</a>	ISDN interfaces	Configuring ISDN Logical Interface Properties
<a href="#">keepalives</a> <down-count <i>number</i> <interval <i>seconds</i> > <up-count <i>number</i> >	Aggregated SONET/SDH, DSO, E1, E3, SONET/SDH, T1, and T3 interfaces	<a href="#">“Configuring Keepalives” on page 81</a>
<a href="#">lACP</a> <i>mode</i>	Aggregated Ethernet interfaces	Configuring Aggregated Ethernet LACP
<a href="#">line-encoding</a> (ami   b8zs)	T1 interfaces	Configuring T1 Line Encoding
<a href="#">line-protocol</a> <i>protocol</i>	Serial interfaces (EIA-530, V.35, and X.21)	Configuring the Serial Line Protocol
<a href="#">line-rate</a> <i>line-rate</i>	ATM interfaces on J Series routers	Configuring SHDSL Operating Mode on an ATM Physical Interface
<a href="#">linear-red-profile</a> <i>profile-name</i>	ATM2 interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<a href="#">linear-red-profiles</a> <i>profile-name</i>	ATM2 interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<a href="#">link-layer-overhead</a> <i>percent</i>	AS PIC link services IQ interfaces ( <b>lsq</b> )	Junos Services Interfaces Configuration Release 12.3
<a href="#">link-mode</a> <i>mode</i>	Management Ethernet ( <b>fxp0</b> or <b>em0</b> ) and Fast Ethernet interfaces	<a href="#">“Configuring the Link Characteristics” on page 48</a> , Understanding Management Ethernet Interfaces
<a href="#">link-speed</a> <i>speed</i>	Aggregated Ethernet interfaces	Configuring Aggregated Ethernet Link Speed

Table 3: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>link-speed speed</code>	Aggregated SONET/SDH interfaces	Configuring Aggregated SONET/SDH Interfaces
<code>lmi lmi-options</code>	Interfaces with Frame Relay encapsulation	Configuring Frame Relay Keepalives and Junos Services Interfaces Configuration Release 12.3
<code>lmi</code>	OAM CFM Ethernet Local Management Interface	Configuring Ethernet Local Management Interface
<code>lmi-type (ansi   itu   c-lmi)</code>	Link services interfaces and interfaces with Frame Relay encapsulation	Configuring Frame Relay Keepalives
<code>local-name name</code>	Interfaces with PPP encapsulation	<a href="#">"Configuring the PPP Challenge Handshake Authentication Protocol" on page 66</a>
<code>lockout</code>	SONET/SDH interfaces	Configuring Annex B Option
<code>log-prefix prefix-number</code>	Adaptive services interfaces	Junos Services Interfaces Configuration Release 12.3
<code>(long-buildout   no-long-buildout)</code>	T3 interfaces	Configuring the T3 Line Buildout
<code>(loop-timing   no-loop-timing)</code>	Channelized IQ interfaces	Configuring the Channelized T3 Loop Timing
<code>loopback mode</code>	DS0, E1, E3, T1, T3, SHDSL on ATM and ATM interfaces on J Series routers, and SONET/SDH interfaces	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, and Configuring Ethernet Loopback Capability
<code>loopback mode</code>	Ethernet and 10-Gigabit Ethernet interfaces in WAN PHY mode	Configuring Ethernet Loopback Capability
<code>loopback mode</code>	Serial interfaces	Configuring Serial Loopback Capability
<code>(loopback   no-loopback)</code>	Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces	Configuring Ethernet Loopback Capability
<code>loss-priority (high   low)</code>	Gigabit Ethernet IQ interfaces	Configuring Gigabit Ethernet Policers
<code>lowest-priority-defect (all-defects   err-xcon   mac-rem-err-xcon   no-defect   rem-err-xcon   xcon)</code>	Configuring IEEE 802.1ag OAM connectivity-fault management	Configuring a Maintenance Endpoint

Table 3: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>low-plp-max-threshold percent</code>	ATM2 interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<code>low-plp-threshold percent</code>	ATM2 interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<code>lsq-failure-options</code>	Link services IQ (lsq) interfaces	Junos Services Interfaces Configuration Release 12.3
<code>mac mac-address</code>	Management Ethernet interface ( <b>fxp0</b> or <b>em0</b> )	Configuring the MAC Address on the Management Ethernet Interface, Understanding Management Ethernet Interfaces
<code>(mac-learn-enable   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)	Configuring Gigabit Ethernet Policers
<code>master-only;</code>	Management Ethernet ( <b>fxp0</b> or <b>em0</b> ) and Fast Ethernet interfaces	Configuring a Consistent Management IP Address, Understanding Management Ethernet Interfaces
<code>maximum-vcs maximum-vcs</code>	ATM interfaces	Configuring the Maximum Number of ATM1 VCs on a VP
<code>mc-ae</code>	Aggregated Ethernet interfaces	Configuring Multichassis Link Aggregation
<code>minimum-links number</code>	Multilink, link services, and voice services interfaces	Junos Services Interfaces Configuration Release 12.3
<code>mip-half-function</code>	Connectivity Fault Management	Configuring IEEE 802.3ah OAM Link-Fault Management
<code>mlfr-uni-nni-bundle-options bundle-options</code>	Link services and voice services interfaces	Junos Services Interfaces Configuration Release 12.3
<code>mpls</code>	10-Gigabit Ethernet interfaces in WAN PHY mode and ATM and SONET/SDH interfaces in passive monitoring mode	Removing MPLS Labels from Incoming Packets, Enabling Passive Monitoring on SONET/SDH Interfaces, and SONET/SDH Physical Interface Properties Overview
<code>mrru bytes</code>	Link services and voice services interfaces	<i>Junos Services Interfaces Configuration Guide</i>
<code>mtu bytes</code>	All interfaces, except management Ethernet ( <b>fxp0</b> or <b>em0</b> ), loopback, multilink, and multicast tunnel	<a href="#">“Configuring the Media MTU” on page 48</a> , Understanding Management Ethernet Interfaces



Table 3: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<a href="#">multicast-statistics</a>	Ethernet, SONET, aggregated Ethernet, and aggregated SONET interfaces.	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
<a href="#">multiservice-options</a>	Adaptive services, monitoring services, and collector interfaces	<a href="#">“Configuring Multiservice Physical Interface Properties” on page 87</a>
<a href="#">n391 number</a>	Link services and voice services interfaces	Junos Services Interfaces Configuration Release 12.3
<a href="#">n392 number</a>	Link services and voice services interfaces	Junos Services Interfaces Configuration Release 12.3
<a href="#">n393 number</a>	Link services and voice services interfaces	Junos Services Interfaces Configuration Release 12.3
<a href="#">neighbor address</a>	SONET/SDH interfaces	SONET/SDH Physical Interface Properties Overview
<a href="#">no-gratuitous-arp-request</a>	Ethernet interfaces	Configuring Gratuitous ARP
<a href="#">no-keepalives</a>	Interfaces with PPP, Frame Relay, or Cisco High-level Data Link Control (HDLC) encapsulation	<a href="#">“Configuring Keepalives” on page 81</a>
<a href="#">no-partition</a>	Channelized IQ interfaces	Channelized Interfaces Overview
<a href="#">no-termination-request</a>	Link Services IQ (LSQ) interfaces	Junos Services Interfaces Configuration Release 12.3
<a href="#">oam-liveness</a>	ATM interfaces	Configuring the OAM F4 Cell Flows
<a href="#">oam-period (seconds   disable)</a>	ATM interfaces	Defining the ATM OAM F5 Loopback Cell Period
<a href="#">oc-slice oc-slice-range</a>	Channelized OC12 IQ interfaces	Channelized OC12/STM4 IQ and IQE Interfaces Overview
<a href="#">open-timeout seconds</a>	Adaptive services interfaces	Junos Services Interfaces Configuration Release 12.3
<a href="#">optics-options</a>	Gigabit Ethernet dense wavelength-division multiplexing (DWDM) interfaces	10-Gigabit Ethernet DWDM Interface Wavelength Overview

Table 3: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<a href="#">output-priority-map</a>	Gigabit Ethernet IQ interfaces	Configuring Gigabit Ethernet Policers
<a href="#">overflow</a> (discard   tag) (Receive bucket)	All interfaces, except ATM, channelized E1, E1, Fast Ethernet, Gigabit Ethernet, and channelized IQ interfaces	<a href="#">“Configuring Receive and Transmit Leaky Bucket Properties” on page 85</a>
<a href="#">overflow</a> (discard) (Transmit bucket)		
<a href="#">paired-group</a> <i>group-name</i>	SONET/SDH interfaces	Configuring APS Load Sharing
<a href="#">partition</a> <i>partition-number</i>	Channelized IQ interfaces	Channelized Interfaces Overview
<a href="#">passive</a>	Interfaces with PPP encapsulation	<a href="#">“Configuring the PPP Challenge Handshake Authentication Protocol” on page 66</a>
<a href="#">passive-monitor-mode</a>	SONET/SDH interfaces	Enabling Passive Monitoring on SONET/SDH Interfaces
<a href="#">path-trace</a> <i>trace-string</i>	10-Gigabit Ethernet interfaces in WAN PHY mode and SONET/SDH interfaces	Configuring the SONET/SDH Path Trace Identifier
( <a href="#">payload-scrambler</a>   no-payload-scrambler)	E3, SONET/SDH, and T3 interfaces	Configuring E3 and T3 Parameters on ATM Interfaces, Configuring E3 HDLC Payload Scrambling, Configuring SONET/SDH HDLC Payload Scrambling, and Configuring T3 HDLC Payload Scrambling
<a href="#">periodic</a> <i>interval</i>	Aggregated Ethernet interfaces	Configuring Aggregated Ethernet LACP
<a href="#">per-unit-scheduler</a>	IQ interfaces	Junos Services Interfaces Configuration Release 12.3
<a href="#">pfc</a>	Interfaces with PPP encapsulation	<a href="#">“Configuring the PPP Protocol Field Compression” on page 76</a>
<a href="#">pic-type</a> (atm1   atm2)	ATM2 IQ interfaces	Configuring the ATM PIC Type
<a href="#">plp1</a> <i>cells</i>	ATM2 interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<a href="#">plp-to-clp</a>	ATM2 IQ interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<a href="#">policer</a> <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)	Configuring Gigabit Ethernet Policers

Table 3: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>pop-all-labels</code>	ATM and SONET/SDH interfaces in passive monitoring mode	Removing MPLS Labels from Incoming Packets and Enabling Passive Monitoring on SONET/SDH Interfaces
<code>ppp-options</code>	Interfaces with PPP encapsulation	<a href="#">“Configuring the PPP Challenge Handshake Authentication Protocol” on page 66</a>
<code>premium</code>	Enhanced Intelligent Queuing (IQE) interfaces (hierarchical policer)	Applying Policers and Junos OS Class of Service Configuration Guide
<code>premium</code>	Gigabit Ethernet IQ interfaces (policer)	Configuring Gigabit Ethernet Policers
<code>premium</code>	Gigabit Ethernet IQ interfaces (output priority map)	Configuring Gigabit Ethernet Policers
<code>primary sp-fpc/pic/port</code>	Redundant interfaces for adaptive services interfaces ( <code>rsp-</code> )	Junos Services Interfaces Configuration Release 12.3
<code>priority (high   low)</code>	ATM2 IQ interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<code>priority number</code>	Ethernet protocols (OAM CFM)	Configuring a Maintenance Endpoint
<code>promiscuous-mode</code>	ATM2 IQ interfaces	Configuring ATM Cell-Relay Promiscuous Mode
<code>protect-circuit group-name</code>	SONET/SDH interfaces	Configuring Switching Between the Working and Protect Circuits
<code>queue-depth cells</code>	ATM2 interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<code>queue-length number</code>	ATM1 interfaces	Configuring the ATM1 Queue Length
<code>rate percentage</code>	All interfaces, except ATM, channelized E1, E1, Fast Ethernet, Gigabit Ethernet, and channelized IQ	<a href="#">“Configuring Receive and Transmit Leaky Bucket Properties” on page 85</a>
<code>receive-bucket</code>	All interfaces, except ATM, Fast Ethernet, and Gigabit Ethernet	<a href="#">“Configuring Receive and Transmit Leaky Bucket Properties” on page 85</a>
<code>red-differential-delay milliseconds</code>	Link services and voice services interfaces	Junos Services Interfaces Configuration Release 12.3
<code>redundancy-options</code>	Redundant interfaces for adaptive services interfaces ( <code>rsp-</code> )	Junos Services Interfaces Configuration Release 12.3
<code>remote-loopback-respond</code>	T1 interfaces	Configuring the T1 Remote Loopback Response

Table 3: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>request</code>	SONET/SDH interfaces	Configuring Switching Between the Working and Protect Circuits
<code>required-depth</code> <i>number</i>	ATM and SONET/SDH interfaces in passive monitoring mode	Removing MPLS Labels from Incoming Packets and Enabling Passive Monitoring on SONET/SDH Interfaces
<code>revert-time</code> <i>seconds</i>	SONET/SDH interfaces	Configuring Revertive Mode
<code>rfc-2615</code>	SONET/SDH interfaces	Configuring SONET/SDH RFC 2615 Support
<code>rts</code> (assert   de-assert   normal)	Serial interfaces (EIA-530 and V.35)	Configuring the Serial Signal Handling
<code>rts-polarity</code> (negative   positive)	Serial interfaces (EIA-530 and V.35)	Configuring Serial Signal Polarities
<code>rtvbr</code> <i>peak rate sustained rate burst length</i>	ATM interfaces	Defining the ATM Traffic-Shaping Profile
<code>scheduler-maps</code> <i>map-name</i>	ATM2 interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<code>schedulers</code> <i>number</i>	Ethernet IQ2 and IQ2-E PICs port interfaces	Junos Services Interfaces Configuration Release 12.3
<code>secondary</code> <i>sp-fpc/pic/port</i>	Redundant interfaces for adaptive services interfaces ( <i>rsp-</i> )	Junos Services Interfaces Configuration Release 12.3
<code>services-options</code>	Services interfaces	Junos Services Interfaces Configuration Release 12.3
<code>serial-options</code>	Serial interfaces (EIA-530, V.35, and X.21)	Serial Interfaces Overview
<code>services</code> <i>priority-level</i>	Adaptive services interfaces	Junos Services Interfaces Configuration Release 12.3
<code>shdsl-options</code>	ATM interfaces on J Series routers	Configuring SHDSL Operating Mode on an ATM Physical Interface
<code>size</code>	All	Tracing Operations of the Interface Process
<code>shaping</code>	ATM interfaces	Defining the ATM Traffic-Shaping Profile
<code>shaping</code>	Circuit Emulation PICs	Configuring ATM QoS or Shaping
<code>snext</code> <i>margin</i>	ATM interfaces on J Series routers	Configuring SHDSL Operating Mode on an ATM Physical Interface

Table 3: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<code>snr-margin</code>	ATM interfaces on J Series routers	Configuring SHDSL Operating Mode on an ATM Physical Interface
<code>sonet-options</code>	SONET/SDH interfaces	SONET/SDH Physical Interface Properties Overview
<code>source-address-filter mac-address</code>	Aggregated Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, and Gigabit Ethernet interfaces	Enabling Ethernet MAC Address Filtering
<code>(source-filtering   no-source-filtering)</code>	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)	Enabling Ethernet MAC Address Filtering
<code>speed (10m   100m   1g   auto)</code>	Management Ethernet interface ( <code>fxp0</code> or <code>em0</code> ), Tri-Rate Ethernet copper interfaces, and 12-port and 48-port Fast Ethernet interfaces	Configuring the Interface Speed on Ethernet Interfaces, Understanding Management Ethernet Interfaces
<code>speed (oc3   oc12   oc48)</code>	SONET/SDH PICs with SFP	Configuring SONET/SDH Interface Speed
<code>spid1spid2</code>	ISDN interfaces	Configuring ISDN Physical Interface Properties and Configuring ISDN Logical Interface Properties
<code>stacked-vlan-tagging</code>	Gigabit Ethernet IQ interfaces	Stacking and Rewriting Gigabit Ethernet VLAN Tags Overview
<code>start-end-flag (filler   shared)</code>	DS0, E1, E3, T1, and T3 interfaces	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
<code>switching-mode (bidirectional   unidirectional)</code>	Unchannelized OC3, OC12, and OC48 SONET/SDH interfaces on T Series routers	Configuring Switching Mode
<code>syslog</code>	Adaptive services interfaces	Junos Services Interfaces Configuration Release 12.3
<code>(syslog   no-syslog)</code>	Adaptive services, monitoring services, and collector interfaces	<a href="#">“Configuring Multiservice Physical Interface Properties” on page 87</a>
<code>t1-options</code>	T1 interfaces	T1 Interfaces Overview
<code>t3-options</code>	T3 interfaces	T3 Interfaces Overview

Table 3: Statements for Physical Interface Properties (*continued*)

Statement	Interface Types	Usage Guidelines
<b>t310</b>	ISDN interfaces	Configuring ISDN Physical Interface Properties
<b>t391 seconds</b>	Link services and voice services interfaces	Junos Services Interfaces Configuration Release 12.3
<b>t392 number</b>	Link services and voice services interfaces	Junos Services Interfaces Configuration Release 12.3
<b>tei-option</b> (first-call   power-up)	ISDN interfaces	Configuring ISDN Physical Interface Properties
<b>threshold bytes</b>	All interfaces, except ATM, channelized E1, E1, Fast Ethernet, Gigabit Ethernet, and channelized IQ	<a href="#">“Configuring Receive and Transmit Leaky Bucket Properties” on page 85</a>
<b>timeslots time-slot-range</b>	Channelized T1 IQ and channelized E1 IQ interfaces	Channelized Interfaces Overview
<b>tm</b> (ignore   normal   require)	Serial interfaces (EIA-530)	Configuring the Serial Signal Handling
<b>tm-polarity</b> (negative   positive)	Serial interfaces (EIA-530)	Configuring Serial Signal Polarities
<b>traceoptions</b>	All	Tracing Operations of an Individual Router Interface
<b>traceoptions</b>	All	Tracing Operations of the Interface Process
<b>transmit-bucket</b>	All interfaces, except ATM, Fast Ethernet, Tri-Rate Ethernet copper, and Gigabit Ethernet	<a href="#">“Configuring Receive and Transmit Leaky Bucket Properties” on page 85</a>
<b>transmit-clock</b> invert	Serial interfaces (EIA-530, V.35, and X.21)	Configuring the Serial Clocking Mode
<b>transmit-weight</b> (cells <i>number</i>   percent <i>number</i> )	ATM2 IQ interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<b>(traps   no-traps)</b>	All	<a href="#">“Enabling or Disabling SNMP Notifications on Physical Interfaces” on page 89</a>
<b>trigger defect</b> ignore   <b>defect hold-time</b> 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	Configuring SONET/SDH Defect Triggers
<b>(unframed   no-unframed)</b>	E3 IQ interfaces	Configuring E3 IQ and IQE Unframed Mode

Table 3: 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"> <li>MX960 4-Port 10-Gigabit Ethernet DPC</li> <li>T Series 10-Gigabit Ethernet IQ2 PIC</li> <li>T Series 10-Gigabit Ethernet IQ2E PIC</li> </ul>	<a href="#">“Enabling Unidirectional Traffic Flow on Physical Interfaces” on page 89</a>
<code>vbr peak rate sustained rate burst length</code>	ATM interfaces	Defining the ATM Traffic-Shaping Profile
<code>vc-cos-mode (alternate   strict)</code>	ATM2 interfaces	Configuring ATM2 IQ VC Tunnel CoS Components
<code>vlan-tagging</code>	Fast Ethernet, Tri-Rate Ethernet copper, and Gigabit Ethernet interfaces	802.1Q VLANs Overview
<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
<code>vpi vpi-identifier</code>	ATM interfaces	Configuring ATM Cell-Relay Promiscuous Mode and Configuring the Maximum Number of ATM1 VCs on a VP
<code>vtmapping</code>	Channelized STM1 interfaces	Configuring Channelized STM1 Interfaces
<code>warning warning-name (syslog   link-down)</code>	10-Gigabit Ethernet interfaces	Configuring 10-Gigabit Ethernet Link Down Notification for Optics Options Alarm or Warning
<code>wavelength nm</code>	Gigabit Ethernet dense wavelength-division multiplexing (DWDM) interfaces	10-Gigabit Ethernet DWDM Interface Wavelength Overview
<code>working-circuit group-name</code>	SONET/SDH interfaces	Configuring Switching Between the Working and Protect Circuits
<code>yellow-differential-delay milliseconds</code>	Link services and voice services interfaces	Junos Services Interfaces Configuration Release 12.3
<code>(z0-increment   no-z0-increment)</code>	SONET/SDH interfaces	Configuring an Incrementing STM ID

## Interface Ranges

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 36](#)
- [Expanding Interface Range Member and Member Range Statements on page 40](#)
- [Configuration Inheritance for Member Interfaces on page 41](#)
- [Member Interfaces Inheriting Configuration from Configuration Groups on page 42](#)
- [Interfaces Inheriting Common Configuration on page 43](#)
- [Configuring Inheritance Range Priorities on page 43](#)
- [Configuration Expansion Where Interface Range Is Used on page 44](#)

## 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 bpd-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 the 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 below:

```
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.

## 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

## Configuring 4-Port OC192 PIC to Operate in OC768-over-OC192 Mode

The T Series routers support OC768-over-OC192 mode on the 4-port OC192 PIC. In OC768-over-OC192 mode, four OC192 links are aggregated into one OC768 link with one logical interface. This single interface achieves data rates of approximately 40 Gbps. OC768 optics are expensive, and most long-distance networks currently use fiber optics and regenerators that cannot carry OC768 SONET. When you create an OC768 pipe as a large data pipe running over existing infrastructures, you transfer network traffic without link bonding or load sharing over parallel links. Load sharing is automatically accomplished in the Junos OS using a proprietary method, and does not need to be manually configured.

The following limitations apply to OC768-over-OC192 mode:

- The maximum difference in delay between all links in the bundle is 8  $\mu$  (microseconds), equivalent to approximately 1.5 km maximum difference in length between the longest and shortest fiber pairs.
- If a single link in the bundle fails, the whole bundle fails. If link redundancy is required, implement an aggregated SONET/SDH bundle instead.
- Only routers that contain 4-port OC192 PICs can operate in OC768-over-OC192 mode.

To configure the 4-port OC192 PIC to operate in OC768-over-OC192 mode:

1. In the configuration mode go to **[edit chassis]** hierarchy level.

```
[edit]
user@host# edit chassis
```

2. Configure the aggregate-ports.

- On T640 router, include the **aggregate-ports** statement at the **[edit chassis fpc slot-number pic pic-number]** hierarchy level.

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

For example:

```
[edit chassis]
user@host# edit fpc 1 pic 0
user@host# set aggregate-ports
```

- On TX Matrix router, configure the **aggregate-ports** statement at the **[edit chassis lcc lcc-number fpc slot-number pic pic-number]** hierarchy level.

```
[edit chassis]
user@host# edit lcc lcc-number fpc slot-number pic pic-number
user@host# set aggregate-ports
```

For example:

```
[edit chassis]
user@host# edit lcc 0 fpc 1 pic 0
user@host# set aggregate-ports
```

3. To verify the configuration, use the operational mode command **show interfaces so-fpc/pic/port extensive**. When this command is used for the 4-port OC192 PIC configured for OC768-over-OC192 mode, only port 0 (**so-fpc/pic/0**) is displayed. This port is displayed as **OC768**.



**NOTE:** When you configure the 4-port OC192 PIC for OC768-over-OC192 mode, only port 0 (the first port) needs be configured as the OC768 port.

Related Documentation

- [aggregate-ports on page 122](#)

---

## Adding an Interface Description to the Configuration

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. To add a text description, include the **description** statement at the **[edit interfaces interface-name]** hierarchy level:

```
[edit interfaces interface-name]
description text;
```

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 *Enabling and Disabling Insertion of Option 82 Information in the Junos OS Subscriber Management*, Release 13.1.

For information about describing logical units, see *Adding a Logical Unit Description to the Configuration*.

### Example: Adding an Interface Description to the Configuration

Add a description to a Fast Ethernet interface:

```
[edit interfaces]
user@host#

set fe-0/0/1 description "Backbone connection to PHL01"
[edit interfaces]
user@host#

show
fe-0/0/1 {
  description "Backbone connection to PHL01";
  unit 0 {
    family inet {
      address 192.168.0.1/30;
    }
  }
}
```

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.ifHCOutOctets.23 = Counter64: 42
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCOutUcastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCOutMulticastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHCOutBroadcastPkts.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
```

---

## 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 and J Series router Gigabit 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);
```

---

## Configuring the Media MTU

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

This topic contains the following sections:

- [Media MTU Overview on page 49](#)
- [How to Configure the Media MTU on page 50](#)

- [Encapsulation Overhead by Encapsulation Type on page 51](#)
- [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 52](#)
- [Media MTU Sizes by Interface Type for M40e Routers on page 52](#)
- [Media MTU Sizes by Interface Type for M160 Routers on page 54](#)
- [Media MTU Sizes by Interface Type for M7i Routers with CFEB-E, M10i Routers with CFEB-E, and M320 and M120 Routers on page 54](#)
- [Media MTU Sizes by Interface Type for MX Series Routers on page 55](#)
- [Media MTU Sizes by Interface Type for T320 Routers on page 56](#)
- [Media MTU Sizes by Interface Type for T640 Platforms on page 56](#)
- [Media MTU Sizes by Interface Type for J2300 Platforms on page 57](#)
- [Media MTU Sizes by Interface Type for J4300 and J6300 Platforms on page 57](#)
- [Media MTU Sizes by Interface Type for J4350 and J6350 Platforms on page 58](#)
- [Media MTU Sizes by Interface Type for EX Series Switches and ACX Series Routers on page 60](#)
- [Media MTU Sizes by Interface Type for PTX Series Packet Transport Switches on page 60](#)

## Media MTU Overview

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. For details about encapsulation overhead, see [“Encapsulation Overhead by Encapsulation Type” on page 51](#).



**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:

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

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.

---

## How to Configure the Media MTU

To modify the default media MTU size for a physical interface, include the `mtu` statement at the [edit interfaces *interface-name*] hierarchy level:

```
[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.



**NOTE:** Changing the media MTU or protocol MTU causes an interface to be deleted and added again.

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*]

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, as described in Setting the Protocol MTU.

## Encapsulation Overhead by Encapsulation Type

Table 4: 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
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

## 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 5: 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 6: 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



Table 6: Media MTU Sizes by Interface Type for M40e Routers (*continued*)

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
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 7: 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 8: 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 8: 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 9: 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 9: 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 10: 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 11: 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)

**Table 11: Media MTU Sizes by Interface Type for T640 Platforms (*continued*)**

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
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 J2300 Platforms

**Table 12: Media MTU Sizes by Interface Type for J2300 Platforms**

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
Fast Ethernet (10/100)	1514	9192	1500
G.SHDSL	4482	9150	4470
ISDN BRI	1504	4092	1500
Serial	1504	9150	1500
T1 or E1	1504	9150	1500

### Media MTU Sizes by Interface Type for J4300 and J6300 Platforms

**Table 13: Media MTU Sizes by Interface Type for J4300 and J6300 Platforms**

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
ADSL2+ PIM	4482	9150	4470
Dual-port Fast Ethernet (10/100) PIM	1514	9192	1500
Dual-port Serial PIM	1504	9150	1500
Dual-port T1 or E1 PIM	1504	9150	1500
Dual-port Channelized T1/E1 PIM (channelized to DS0s)	1504	4500	1500

**Table 13: Media MTU Sizes by Interface Type for J4300 and J6300 Platforms (*continued*)**

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
Dual-port Channelized T1/E1 PIM (clear channel T1 or E1)	1504	9150	1500
Fast Ethernet (10/100) built-in interface	1514	9192	1500
G.SHDSL PIM	4482	9150	4470
4-port ISDN BRI PIM	1504	4092	1500
T3 (DS3) or E3 PIM	4474	9192	4470

#### Media MTU Sizes by Interface Type for J4350 and J6350 Platforms

**Table 14: Media MTU Sizes by Interface Type for J4350 and J6350 Platforms**

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
4-port ISDN BRI PIM	1504	4092	1500
ADSL2+ PIM	4482	9150	4470
Dual-port Fast Ethernet (10/100) PIM	1514	9192	1500
Dual-port Serial PIM	1504	9150	1500
Dual-port T1 or E1 PIM	1504	9150	1500
Dual-port Channelized T1/E1 PIM (channelized to DS0s)	1504	4500	1500
Dual-port Channelized T1/E1 PIM (clear channel T1 or E1)	1504	9150	1500
4-port Fast Ethernet (10/100) ePIM	1518	1518	1500

**Table 14: Media MTU Sizes by Interface Type for J4350 and J6350 Platforms** (*continued*)

Interface Type	Default Media MTU (Bytes)	Maximum MTU (Bytes)	Default IP Protocol MTU (Bytes)
Gigabit Ethernet (10/100/1000) built-in interface	1514	9018	1500
Gigabit Ethernet (10/100/1000) Enhanced Physical Interface Module (ePIM)	1514	9018	1500
Gigabit Ethernet (10/100/1000) SFP ePIM	1514	9018	1500
G.SHDSL PIM	4482	9150	4470
T3 (DS3) or E3 PIM	4474	9192	4470



**NOTE:** On Gigabit Ethernet ePIMs in J4350 and J6350 Services Routers, you can configure a maximum transmission unit (MTU) size of only 9018 bytes even though the CLI indicates that you can configure an MTU of up to 9192 bytes. If you configure an MTU greater than 9018 bytes, the router does not accept the configuration and generates a system log error message similar to the following:

```
/kernel: ge-0/0/0: Illegal media change. MTU invalid: 9192. Max MTU supported on this PIC: 9018
```

On 4-port Fast Ethernet ePIMs in J4350 and J6350 Services Routers, you can configure a maximum transmission unit (MTU) size of only 1518 bytes even though the CLI indicates that you can configure an MTU of up to 9192 bytes. If you configure an MTU greater than 1518 bytes, the router does not accept the configuration and generates a system log error message similar to the following:

```
/kernel: fe-3/0/1: Illegal media change. MTU invalid: 9192. Max MTU supported on this PIC: 1518
```

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

**Table 15: 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)

## Media MTU Sizes by Interface Type for PTX Series Packet Transport Switches

**Table 16: Media MTU Sizes by Interface Type for PTX Series Packet Transport Switches**

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)
40-Gigabit Ethernet	1514	9500	1500 (IPv4), 1488 (MPLS), 1497 (ISO)
100-Gigabit Ethernet	1514	9500	1500 (IPv4), 1488 (MPLS), 1497 (ISO)

### Related Documentation

- [Configuring Interface Encapsulation on Physical Interfaces on page 60](#)
- [Setting the Protocol MTU](#)

## Configuring 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. For more information about logical interface encapsulation, see [Configuring Interface Encapsulation on Logical Interfaces](#).

For information about encapsulation overhead, see [Table 4 on page 51](#).



This section contains the following topics:

- [Configuring the Encapsulation on a Physical Interface on page 61](#)
- [Encapsulation Capabilities on page 64](#)

## 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:

```
[edit interfaces interface-name]
encapsulation (atm-ccc-cell-relay | atm-pvc | cisco-hdlc | cisco-hdlc-ccc | cisco-hdlc-tcc
| ethernet-ccc | ethernet-over-atm | ethernet-tcc | ethernet-vpls |
extended-frame-relay-ccc | extended-frame-relay-ether-type-tcc |
extended-frame-relay-tcc | 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 | multilink-frame-relay-uni-nni | ppp | ppp-ccc | ppp-tcc | vlan-ccc |
vlan-vpls);
```

The physical interface encapsulation can be one of the following:

- ATM CCC cell relay—Connects two remote virtual circuits or ATM physical interfaces with a label-switched path (LSP). Traffic on the circuit is ATM cells.

You can configure an ATM1 Physical Interface Card (PIC) to use cell-relay accumulation mode (CAM). In this mode, the incoming cells (1 to 8 cells) are packaged into a single packet and forwarded to the LSP. Cell-relay accumulation mode is not supported on ATM2 PICs. You configure CAM as shown in the following example:

```
[edit chassis]
fpc 1 {
  pic 0 {
    atm-cell-relay-accumulation;
  }
}
```

For more information, see the Junos OS System Basics Configuration Guide.

- ATM PVC—Defined in RFC 2684, *Multiprotocol Encapsulation over ATM Adaptation Layer 5*. When you configure physical ATM interfaces with ATM PVC encapsulation, an RFC 2684-compliant ATM Adaptation Layer 5 (AAL5) tunnel is set up to route the ATM cells over a Multiprotocol Label Switching (MPLS) path that is typically established between two MPLS-capable routers using the Label Distribution Protocol (LDP).
- Cisco HDLC—E1, E3, SONET/SDH, T1, and T3 interfaces can use Cisco HDLC encapsulation. Two related versions are supported:
  - CCC version (**cisco-hdlc-ccc**)—The logical interface does not require an encapsulation statement. When you use this encapsulation type, you can configure the **ccc** family only.
  - TCC version (**cisco-hdlc-tcc**)—Similar to CCC and has the same configuration restrictions, but used for circuits with different media on either side of the connection.

- Ethernet over ATM—As defined in RFC 1483, *Multiprotocol Encapsulation over ATM Adaptation Layer 5*, this encapsulation type allows ATM interfaces to connect to devices that support only bridged-mode protocol data units (BPDUs). The 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 logical link control (LLC)/SNAP frames with IP or Address Resolution Protocol (ARP) in the payload, and drops the rest. For packets destined to the Ethernet local area network (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 media access control (MAC) header, and the packet is forwarded to the ATM interface.
- Ethernet cross-connect—Ethernet interfaces without VLAN tagging can use Ethernet CCC encapsulation. Two related versions are supported:
  - CCC version (**ethernet-ccc**)—Ethernet interfaces with standard Tag Protocol ID (TPID) tagging can use Ethernet CCC encapsulation. When you use this encapsulation type, you can configure the **ccc** family only.
  - TCC version (**ethernet-tcc**)—Similar to CCC, but used for circuits with different media on either side of the connection.

For 8-port, 12-port, and 48-port Fast Ethernet PICs, TCC is not supported.

- VLAN CCC (**vlan-ccc**)—Ethernet interfaces with VLAN tagging enabled can use VLAN CCC encapsulation. VLAN CCC encapsulation supports TPID 0x8100 only. When you use this encapsulation type, you can configure the **ccc** family only.
- Extended VLAN cross-connect—Gigabit Ethernet interfaces with VLAN 802.1Q tagging enabled can use extended VLAN cross-connect encapsulation. (Ethernet interfaces with standard TPID tagging can use VLAN CCC encapsulation.) Two related versions of extended VLAN cross-connect are supported:
  - CCC version (**extended-vlan-ccc**)—Extended VLAN CCC encapsulation supports TPIDs 0x8100, 0x9100, and 0x9901. When you use this encapsulation type, you can configure the **ccc** family only.
  - TCC version (**extended-vlan-tcc**)—Similar to CCC, but used for circuits with different media on either side of the connection.

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 and extended VLAN TCC are not supported.

- Ethernet VPLS (**ethernet-vpls**)—Ethernet interfaces with VPLS enabled can use Ethernet VPLS encapsulation. For more information about VPLS, see the Junos OS VPNs Configuration Guide and the Junos OS Feature Guides.
- Ethernet VLAN VPLS (**vlan-vpls**)—Ethernet interfaces with VLAN tagging and VPLS enabled can use Ethernet VLAN VPLS encapsulation. For more information about VPLS, see the Junos OS VPNs Configuration Guide and the Junos OS Feature Guides.
- Extended VLAN VPLS (**extended-vlan-vpls**)—Ethernet interfaces with VLAN 802.1Q tagging and VPLS enabled can use Ethernet Extended VLAN VPLS encapsulation.

(Ethernet interfaces with standard TPID tagging can use Ethernet VLAN VPLS encapsulation.) Extended Ethernet VLAN VPLS encapsulation supports TPIDs 0x8100, 0x9100, and 0x9901. For more information about VPLS, see the Junos OS VPNs Configuration Guide and the Junos OS Feature Guides.

- Flexible Ethernet services (**flexible-ethernet-services**)—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) can use flexible Ethernet services encapsulation. Aggregated Ethernet bundles can use this encapsulation type. You use this encapsulation type when you want to configure multiple per-unit Ethernet encapsulations. 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 (**flexible-frame-relay**)—IQ and IQE 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 data-link connection identifier (DLCI) value from 1 through 1022.
- Frame Relay (**frame-relay**)—Defined in RFC 1490, *Multiprotocol Interconnect over Frame Relay*. E1, E3, link services, SONET/SDH, T1, T3, and voice services interfaces can use Frame Relay encapsulation. Five related versions are supported:
  - CCC version (**frame-relay-ccc**)—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.
  - 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.

- Frame Relay Ether Type (**frame-relay-ether-type**)—Physical interfaces can use Frame Relay ether type encapsulation for compatibility with Cisco Frame Relay. IETF frame relay encapsulation identifies the payload format using NLPID and SNAP formats. Cisco-compatible Frame Relay encapsulation uses the Ethernet type to identify the type of payload. Two related versions are supported:
  - TCC version (**frame-relay-ether-type-tcc**)—Cisco-compatible Frame Relay for DLCIs 0 through 511. DLCIs 512 through 1022 are dedicated to TCC. This encapsulation is used for circuits with different media on either side of the connection.
  - Extended TCC version (**extended-frame-relay-ether-type-tcc**)—This encapsulation allows you to dedicate Cisco-compatible Frame Relay TCC for DLCIs 1 through 1022. This encapsulation is used for circuits with different media on either side of the connection.
- Multilink Frame Relay (MLFR) UNI and NNI (**multilink-frame-relay-uni-nni**)—Link services and voice services interfaces functioning as FRF.16 bundles can use multilink Frame Relay UNI NNI encapsulation. This encapsulation is also used on link services and voice services interfaces' constituent T1, E1, or NxDS0 interfaces.
- PPP—Defined in RFC 1661, *The Point-to-Point Protocol (PPP) for the Transmission of Multiprotocol Datagrams over Point-to-Point Links*. PPP is the default encapsulation type for physical interfaces. E1, E3, SONET/SDH, T1, and T3 interfaces can use PPP encapsulation. Two related versions are supported:
  - Circuit cross-connect (CCC) version (**ppp-ccc**)—The logical interface does not require an encapsulation statement. When you use this encapsulation type, you can configure the **ccc** family only.
  - Translational cross-connect (TCC) version (**ppp-tcc**)—Similar to CCC and has the same configuration restrictions, but used for circuits with different media on either side of the connection.



**NOTE:** When the encapsulation type is set to Cisco-compatible Frame Relay encapsulation, ensure that the LMI type is set to ANSI or Q933-A.

---

## Encapsulation Capabilities

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.

### **Example: Configuring the Encapsulation on a Physical Interface**

---

Configure PPP encapsulation on a SONET/SDH interface. The second and third **family** statements allow Intermediate System-to-Intermediate System (IS-IS) and MPLS to run on the interface.

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

- Related Documentation**
- [Configuring Interface Encapsulation on Logical Interfaces](#)
  - [Configuring the Media MTU on page 48](#)

---

## Configuring the 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.

To configure a CHAP access profile, include the **profile** statement and specify a profile name at the **[edit access]** hierarchy level:

```
[edit access]
profile profile-name {
  client name chap-secret data;
}
```

For more information about configuring access profiles, see the Junos OS System Basics Configuration Guide.

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 configure PPP CHAP on an interface with PPP encapsulation, include the **chap** statement at the **[edit interfaces *interface-name* ppp-options]** hierarchy level:

```
[edit interfaces interface-name ppp-options]
```

```

chap {
  access-profile name;
  default-chap-secret name;
  local-name name;
  passive;
}

```

On each interface with PPP encapsulation, you can configure the following PPP CHAP properties:

- [Assigning an Access Profile to an Interface on page 67](#)
- [Configuring a Default CHAP Secret on page 67](#)
- [Configuring the Local Name on page 67](#)
- [Configuring Passive Mode on page 68](#)
- [Example: Configuring the PPP Challenge Handshake Authentication Protocol on page 68](#)

When you configure PPP over ATM or Multilink PPP over ATM encapsulation, you can enable CHAP on the logical interface. For more information, see [Configuring PPP over ATM2 Encapsulation](#).

## Assigning an Access Profile to an Interface

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]
  access-profile name;

```

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. For information about configuring the default CHAP secret, see [“Configuring a Default CHAP Secret” on page 67](#).

## Configuring a Default CHAP Secret

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]
  default-chap-secret name;

```

The default CHAP secret is used when no matching CHAP access profile exists, or if the CHAP name changes during PPP link negotiation.

## Configuring the Local Name

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.

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]
local-name name;
```

The local name is any string from 1 to 250 characters in length, starting with an alphanumeric or underscore character, and including only the following characters:

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

## Configuring Passive Mode

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

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]
passive;
```

## Example: Configuring the PPP Challenge Handshake Authentication Protocol

Configure CHAP:

```
[edit access]
profile pe-A-ppp-clients;
client cpe-1 chap-secret "$1$dQYsZ$B5ojUeUjDsUo.yKwcCZ0";
    # SECRET-DATA
client cpe-2 chap-secret "$1$kdAsfaDAfkDjDsASxfafdKdFKJ";
    # SECRET-DATA
[edit interfaces so-1/2/0]
encapsulation ppp;
ppp-options {
    chap {
        access-profile pe-A-ppp-clients;
        default-chap-secret "$9$mPafafhdsaiufhyrv1Rxd";
        local-name "pe-A-so-1/1/1";
    }
}
[edit interfaces so-1/1/2]
encapsulation ppp;
ppp-options {
    chap {
        access-profile pe-A-ppp-clients;
        default-chap-secret "$9$mPafafhdsaiufhyrv1Rxd";
        local-name "pe-A-so-1/1/2";
    }
}
```

---

## Configuring the 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.

Both CHAP and PAP authentication can be configured on a PPP interface. If both are configured, CHAP is negotiated first. If CHAP authentication fails, PAP authentication is negotiated.

To enable PAP, you must create an access profile, and you must configure the interfaces to use PAP.

To configure a PAP access profile, include the **profile** statement and specify a profile name at the **[edit access]** hierarchy level:

```
[edit access]
profile profile-name {
  client name;
  pap-password password;
}
```

For more information about configuring access profiles, see the Junos OS System Basics Configuration Guide.

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. For information about configuring the default PAP password, see Configuring PPP PAP Authentication.

To configure PPP PAP on a physical interface with PPP encapsulation, include the **pap** statement at the **[edit interfaces *interface-name* ppp-options]** hierarchy level:

```
[edit interfaces interface-name ppp-options]
pap {
```

```
access-profile name;  
local-name name;  
local-password password;  
passive;  
}
```

To configure PPP PAP on a logical interface with PPP encapsulation, include the **pap** statement with options:

```
pap {  
  default-pap-password password;  
  local-name name;  
  local-password password;  
  passive;  
}
```

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 more information about configuring PAP for logical interfaces, see [Configuring PPP PAP Authentication](#). For information about configuring tracing operations for PPP, see [“Tracing Operations of the pppd Process” on page 73](#).

On each physical interface with PPP encapsulation, you can perform one of the following tasks:

- [Configuring the Local Name on page 70](#)
- [Configuring the Local Password on page 70](#)
- [Configuring Passive Mode on page 71](#)
- [Example: Configuring PAP Authentication Protocol on page 71](#)

## Configuring the Local Name

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.

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]  
local-name name;
```

## Configuring the Local Password

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]  
local-password password;
```

## Configuring 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.

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]
passive;
```

## Example: Configuring PAP Authentication Protocol

Configure a PAP access profile, the physical and logical interfaces, and tracing operations for PPP.

For PAP authentication, a username and password for the peer is configured in the access profile, along with a PAP password. Each user can have either a PAP password or a CHAP secret.

```
[edit access]
profile userlist1;
client {
  papuser {
    pap-password "#%@^***"; # SECRET-DATA;
  }
  chapuser {
    chap-secret "#%@^***"; # SECRET-DATA;
  }
}
```

To configure the same name for the PAP password and the CHAP secret, configure the client with two different access profiles:

```
[edit access]
profile chap-profile;
client {
  sjcrouter {
    chap-secret "#%@^***"; # SECRET-DATA;
  }
  boston {
    chap-secret "#%@^***"; # SECRET-DATA;
  }
}
profile pap-profile;
client {
  sjcrouter {
    pap-password "#%@^***"; # SECRET-DATA;
  }
  boston {
```

```
    pap-password "%%@^***"; # SECRET-DATA;
  }
}
```

Configure the physical interface, including the access profile name to be used for PPP authentication:

```
[edit interfaces so-0/0/0]
ppp-options {
  pap {
    access-profile "pap-profile";
    local-name "rtrnum1";
    local-password "XXXXXXX"; #SECRET-DATA
    passive;
  }
}
```

Configure the logical interface, including the default PAP password to be used, should the access profile not be located during authentication:

```
[edit interfaces so-0/0/0]
encapsulation frame-relay;
unit 0 {
  dlci 100;
  encapsulation frame-relay-ppp;
  ppp-options {
    pap {
      local-name "rtrnum1";
      local-password "XXXXXXX"; #SECRET-DATA
      default-pap-password "XXXXXX"; #SECRET-DATA
      passive;
    }
  }
}
```

Include the **pap** statement to trace PPP protocol operations:

```
[edit protocols]
ppp {
  traceoptions {
    flag {
      pap;
    }
  }
}
```

---

## 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

## 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

---

## 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: 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, mp1s:
  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 270](#)
- [compression on page 153](#)
- [acfc on page 117](#)

## 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 270](#)
- [compression on page 153](#)
- [pfc on page 264](#)

## Configuring the Interface Speed

You can configure the interface speed on the following interfaces:

- [Configuring the Speed of Management Ethernet Interfaces on M Series and T Series Routers on page 77](#)
- [Configuring the Speed of Gigabit Ethernet Interfaces on J Series Routers on page 78](#)
- [Configuring the Speed of Fast Ethernet Interfaces on page 78](#)
- [Configuring the Speed of Tri-Rate Ethernet Copper Interfaces on page 79](#)
- [Configuring the Speed of SONET/SDH Interfaces on page 79](#)

### Configuring the Speed of Management Ethernet Interfaces on M Series and T Series Routers

M Series routers, MX Series routers, T Series routers, and TX Series routers use one of two management Ethernet interface types, either **em** or **fxp**, dependent on the installed Routing Engine model. For information about management Ethernet interfaces and to determine the management Ethernet interface type for your router, see *Understanding Management Ethernet Interfaces and Supported Routing Engines by Chassis*.

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, as described in the Junos OS System Basics Configuration Guide).

To configure the management Ethernet interface to operate at 10 Mbps or 100 Mbps, include the **speed** statement at the **[edit interfaces fxp0]** or **[edit interfaces em0]** hierarchy level:

```
[edit interfaces (fxp0 | em0)]
speed (10m | 100m);
```

For information about configuring the link mode, see *Configuring the Link Characteristics on Ethernet Interfaces*.

## Configuring the Speed of Gigabit Ethernet Interfaces on J Series Routers

By default, Gigabit Ethernet interfaces (both built-in and PIMs) for J Series routers autonegotiate whether to operate at 10 megabits per second (Mbps), 100 Mbps, or 1000 Mbps.

To configure a J Series Gigabit Ethernet interface to operate at 10 Mbps, 100 Mbps, or 1000 Mbps, include the **speed** statement at the **[edit interfaces ge-pim/0/port]** hierarchy level:

```
[edit interfaces ge-pim/0/port]
speed (10m | 100m | 1g);
```

For information about configuring the link mode, see *Configuring the Link Characteristics on Ethernet Interfaces*.

## Configuring the Speed of Fast Ethernet Interfaces

By default, both of the built-in Fast Ethernet ports on the M7i router FIC autonegotiate whether to operate at 10 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 at the **[edit chassis]** hierarchy level, as described in the *Junos OS System Basics Configuration Guide*).

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.



**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.

---

To configure a Fast Ethernet port on the FIC to operate at 10 Mbps or 100 Mbps, include the **speed** statement at the **[edit interfaces fe-fpc/pic/port]** hierarchy level:

```
[edit interfaces fe-fpc/pic/port]
speed (10m | 100m);
```

For information about configuring the link mode, see *Configuring the Link Characteristics on Ethernet Interfaces*.

## Configuring the Speed of Tri-Rate Ethernet Copper Interfaces

By default, the Tri-Rate Ethernet copper interfaces on MX Series routers operate at 1 Gbps. Tri-Rate Ethernet copper interfaces can also be configured to operate at 10 Mbps, 100 Mbps, or 1 Gbps.



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



**NOTE:** 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.

To configure a Tri-Rate Ethernet copper interface to operate at 10 Mbps, 100 Mbps, or 1 Gbps, include the `speed` statement at the `[edit interfaces ge-fpc/pic/port]` hierarchy level:

```
[edit interfaces ge-fpc/pic/port]
speed (10m | 100m | 1g);
```

For information about configuring the link mode, see [Configuring the Link Characteristics on Ethernet Interfaces](#).

## Configuring the Speed of SONET/SDH Interfaces

You can configure the speed of SONET/SDH interfaces on next-generation SONET/SDH Type 1 and Type 2 PICs with SFP. The speed you select is dependent upon whether the PIC is in concatenated or nonconcatenated mode. In concatenated mode, the bandwidth of the interface is in a single channel. In nonconcatenated mode, the PIC operates in channelized (multiplexed) mode.

[Table 17 on page 79](#) shows the mode combinations for the next-generation SONET/SDH Type 1 PICs with SFP.

**Table 17: Type 1 PIC Mode Combinations**

PIC	Mode	Speed Configuration	Default Mode
2-port OC3	2xOC3 concatenated	<code>fpc/pic/0 speed oc3</code>	concatenated
4-port OC3	1xOC12 concatenated	<code>fpc/pic/0 speed oc12</code>	—
	1xOC12 nonconcatenated	<code>fpc/pic/0:0 speed oc3</code>	nonconcatenated
	4xOC3 concatenated	<code>fpc/pic/port speed oc3</code>	concatenated

Table 17: Type 1 PIC Mode Combinations (*continued*)

PIC	Mode	Speed Configuration	Default Mode
1-port OC12	1xOC12 concatenated	<i>fpc/pic/0 speed oc12</i>	concatenated
	1xOC12 nonconcatenated	<i>fpc/pic/0:0 speed oc3</i>	nonconcatenated
	1xOC3 concatenated	<i>fpc/pic/0 speed oc3</i>	—

Table 18 on page 80 shows the mode combinations for the next-generation SONET/SDH Type 2 PICs with SFP.

Table 18: Type 2 PIC Mode Combinations

PIC	Mode	Speed Configuration	Default Mode
1-port OC48, IQ and IQE	1xOC48 concatenated	<i>fpc/pic/0 speed oc48</i>	concatenated
	1xOC48 nonconcatenated	<i>fpc/pic/0:0 speed oc12</i>	nonconcatenated
	1xOC12 concatenated	<i>fpc/pic/0 speed oc12</i>	—
	1xOC12 nonconcatenated	<i>fpc/pic/0 0 speed oc3</i>	—
	1xOC3 concatenated	<i>fpc/pic/0 speed oc3</i>	—
4-port OC12, IQ and IQE	1xOC48 concatenated	<i>fpc/pic/0 speed oc48</i>	—
	1xOC48 nonconcatenated	<i>fpc/pic/0:0 speed oc12</i>	nonconcatenated
	1xOC12 nonconcatenated	<i>fpc/pic/0 speed oc3</i>	—
	4xOC12 concatenated	<i>fpc/pic/port speed oc3 oc12</i>	concatenated
4-port OC3, IQ and IQE	1xOC12 concatenated	<i>fpc/pic/0 speed oc12</i>	—
	1xOC12 nonconcatenated	<i>fpc/pic/0:0 speed oc3</i>	nonconcatenated
	4xOC3 concatenated	<i>fpc/pic/port speed oc3</i>	concatenated

By default, SONET/SDH PICs operate in concatenated mode. To specify interface speed in concatenated mode, include the **speed** statement with options at the **[edit interfaces so-fpc/pic/port]** hierarchy level:

```
[edit interfaces so-fpc/pic/port]
speed (oc3 | oc12 | oc48);
```

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

To specify interface speed in nonconcatenated mode, include the **speed** statement at the **[edit interfaces so-fpc/pic/port.channel]** hierarchy level:

```
[edit interfaces so-fpc/pic/port.channel]
speed (oc3 | oc12);
```

To configure the PIC to operate in channelized (multiplexed) mode, include the **no-concatenate** statement at the **[edit chassis fpc slot-number pic pic-number]** hierarchy level.

For more information about using the **no-concatenate** statement, see the Junos OS System Basics Configuration Guide.

## 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 209](#)
- [no-keepalives on page 247](#)
- Configuring Frame Relay Keepalives
- Circuit and Translational Cross-Connects Overview
- Configuring PPP over ATM2 Encapsulation

## 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.

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 System Basics Configuration Guide, 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 System Basics Configuration Guide, Synchronous Ethernet Overview and Configuring Clock Synchronization Interface for MX Series Routers.

**Related  
Documentation**

- Configuring an External Synchronization Interface
- [clocking on page 150](#)
- [Clock Source Overview on page 13](#)
- 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 for MX Series Routers

---

## 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 161](#)

## Configuring Receive and Transmit Leaky Bucket Properties

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 14](#)
- [SONET/SDH Physical Interface Properties Overview](#)

- [receive-bucket on page 277](#)
- [transmit-bucket on page 318](#)

## Configuring Accounting for the Physical Interface

---

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 Configuration Guide.

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 Policy Configuration Guide.

## Applying an Accounting Profile to the Physical Interface

To enable accounting on an interface, include the **accounting-profile** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]  
  accounting-profile name;
```

You can also reference profiles by logical unit; for more information, see Configuring Accounting for the Logical Interface.

### Example: Applying an Accounting Profile to the Physical Interface

---

Configure an accounting profile for an interface and apply it to a physical interface:

```
[edit]  
accounting-options {  
  file if_stats {  
    size 4m files 10 transfer-interval 15;  
    archive-sites {  
      "ftp://login:password@host/path";  
    }  
  }  
  interface-profile if_profile {  
    interval 15;  
    file if_stats {
```

```

        fields {
            input-bytes;
            output-bytes;
            input-packets;
            output-packets;
            input-errors;
            output-errors;
        }
    }
}
[edit interfaces ge-1/0/1]
accounting-profile if_profile;

```

## 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 Services Interfaces Configuration Release 12.3.

## Damping 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 interface is not advertised to the rest of the system as being down until it has remained down for the hold-time period. Similarly when an interface goes from down to up, it is not advertised as being up until it has remained up for the hold-time period.

To damp interface transitions:

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

```
[edit]
user@host# edit interfaces interface-name-fpc-slot/pic-slot/port
```

For example:

```
[edit]
user@host# edit interfaces so-1/0/0
```

2. Configure the hold-time for link up and link down.

```
[edit interfaces so-1/0/0]
user@host# set hold-time up milliseconds down milliseconds;
```

For Example:

```
[edit interfaces so-1/0/0]
user@host# set hold-time up 100 down 100;
```

The 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 1-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

- SONET/SDH Defect Hold Times Overview
- Configuring SONET/SDH Defect Triggers

## 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
```



**NOTE:** Gigabit Ethernet interfaces on J Series routers do not support SNMP.

Related  
Documentation

- [traps on page 320](#)

## 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 323](#)
- [Understanding Unidirectional Traffic Flow on Physical Interfaces on page 15](#)

---

## Disabling a Physical Interface

You can disable a physical interface, marking it as being down, without removing the interface configuration statements from the configuration. To do this, include the **disable** statement at the `[edit interfaces interface-name]` hierarchy level:

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



**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.



**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

Disable a physical interface:

```
[edit interfaces]
so-1/1/0 {
  mtu 8000;
  clocking internal;
  encapsulation ppp;
  sonet-options {
    fcs 16;
  }
  unit 0 {
    family inet {
      address 172.16.0.0/12 {
        destination 172.16.0.4;
      }
    }
  }
}
[edit interfaces]
user@host# set so-1/1/0 disable
[edit interfaces]
user@host# show so-1/1/0
so-1/1/0 {
  disable;# Interface is marked as disabled
  mtu 8000;
  clocking internal;
  encapsulation ppp;
  sonet-options {
    fcs 16;
  }
  unit 0 {
    family inet {
      address 172.16.0.0 {
        destination 172.16.0.3;
      }
    }
  }
}
```





## CHAPTER 3

# Network Interfaces Configuration Statements and Hierarchy

- [\[edit interfaces\] Hierarchy Level on page 93](#)
- [\[edit logical-systems\] Hierarchy Level on page 109](#)
- [\[edit protocols ppp\] Hierarchy Level on page 113](#)
- [\[edit protocols pppoe\] Hierarchy Level on page 114](#)

### [\[edit interfaces\] 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);
}
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;
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;
    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;
gether-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 | 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);
drop-timeout milliseconds;
fragment-threshold bytes;
cisco-interopability 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 sn-vci-identifier;
psn-vpi 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 {
        current 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;
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);
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-vs-a-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*
- Junos® OS Ethernet Interfaces
- Junos® OS Network Interfaces

## [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 Configuration Guide.

```
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 {
```

**Related Documentation**

- *Junos OS Hierarchy and RFC Reference*
- Junos® OS Ethernet Interfaces
- Junos® OS Network Interfaces

---

Copyright © 2013, Juniper Networks, Inc. 113

- Related Documentation**
- [Junos OS Hierarchy and RFC Reference](#)
  - [Junos® OS Ethernet Interfaces](#)
  - [Junos® OS Network Interfaces](#)

---

## [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-expression;
    service-name regular-expression;
    underlying-interface interface-name;
  }
  flag flag;
  level (all | error | info | notice | verbose | warning);
  no-remote-trace;
}
```

## CHAPTER 4

# Statement Summary

### 802.3ad

---

Syntax	<pre>802.3ad {     aex (primary   backup);     lacp {         port-priority;     } }</pre>
Hierarchy Level	[edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ]
Release Information	Statement introduced before Junos OS Release 7.4. <b>primary</b> and <b>backup</b> options added in Junos OS Release 8.3.
Description	Specify aggregated Ethernet logical interface number.
Options	<b>aex</b> —Aggregated Ethernet logical interface number. <b>Range:</b> 0 through 15  <b>primary</b> —For link protection configurations, specify the primary link for egress traffic.  <b>backup</b> —For link protection configurations, specify the backup link for egress traffic.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"><li>• Configuring an Aggregated Ethernet Interface</li><li>• Configuring Aggregated Ethernet Link Protection</li></ul>

## access-profile

---

<b>Syntax</b>	<code>access-profile name;</code>
<b>Hierarchy Level</b>	<code>[edit interfaces <i>interface-name</i> auto-configure vlan-ranges],</code> <code>[edit interfaces <i>interface-name</i> auto-configure stacked-vlan-ranges],</code> <code>[edit interfaces <i>interface-name</i> <a href="#">ppp-options chap</a>],</code> <code>[edit interfaces <i>interface-name</i> <a href="#">ppp-options pap</a>],</code> <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">ppp-options chap</a>],</code> <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">ppp-options pap</a>],</code> <code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i></code> <code><a href="#">ppp-options chap</a>],</code> <code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i></code> <code><a href="#">ppp-options pap</a>]</code>
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Support for PAP added in Junos OS Release 8.3. 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> <p>For VLAN and stacked VLAN authentication, the access profile containing the RADIUS accounting and authentication information for the VLAN or stacked VLAN ranges.</p>
<b>Options</b>	<b>name</b> —Name of the access profile.
<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="#">Configuring the PPP Challenge Handshake Authentication Protocol on page 66</a></li><li>• <a href="#">Configuring the PPP Password Authentication Protocol on page 68</a></li><li>• <a href="#">default-chap-secret on page 162</a></li><li>• Junos OS System Basics Configuration Guide</li></ul>



## accounting-profile

<b>Syntax</b>	<code>accounting-profile <i>name</i>;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ], [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ], [edit interfaces interface-range <i>name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. 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>	<i>name</i> —Name of the accounting profile.
<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="#">Applying an Accounting Profile to the Physical Interface on page 86</a></li> <li>• <a href="#">Applying an Accounting Profile to the Logical Interface</a></li> </ul>

## acfc

<b>Syntax</b>	<code>acfc;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <a href="#">ppp-options compression</a> ], [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">ppp-options compression</a> ], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <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> unit <i>logical-unit-number</i>] hierarchy level.</p>
<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="#">Configuring PPP Address and Control Field Compression on page 74</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>	<b><i>number</i></b> —Number of retransmission attempts to be made following the expiration of the acknowledgment timer. <b>Range:</b> 1 through 5 <b>Default:</b> 2
<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>Junos Services Interfaces Configuration Release 12.3</li><li><a href="#">action-red-differential-delay on page 119</a></li><li><a href="#">hello-timer on page 195</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><b>milliseconds</b>—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>Junos Services Interfaces Configuration Release 12.3</li> <li>address, <a href="#">hello-timer on page 195</a></li> <li><a href="#">hello-timer on page 195</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>	<p><b>disable-tx</b>—Disable transmission on the bundle link.</p> <p><b>remove-link</b>—Remove bundle link from service.</p> <p><b>Default:</b> <b>disable-tx</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>Junos Services Interfaces Configuration Release 12.3</li> <li>remote</li> <li><a href="#">yellow-differential-delay on page 341</a></li> </ul>

## advertise-interval

---

<b>Syntax</b>	<code>advertise-interval <i>milliseconds</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>	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.
<b>Options</b>	<b><i>milliseconds</i></b> —Interval between advertisement packets. <b>Range:</b> 1 through 65,534 milliseconds <b>Default:</b> 1000 milliseconds
<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>Configuring APS Timers</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;
        link-speed speed;
        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);
        }
    }
}
```

Hierarchy Level [edit interfaces aex]

<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<b>Description</b>	Configure aggregated Ethernet-specific interface properties.  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>	<ul style="list-style-type: none"><li>• <a href="#">Ethernet Interfaces Overview</a></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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring 4-Port OC192 PIC to Operate in OC768-over-OC192 Mode on page 45</a></li></ul>

---

## aggregated-sonet-options

---

<b>Syntax</b>	aggregated-sonet-options { link-speed <i>speed</i> ; minimum-links <i>number</i> ; }
<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.  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>	<ul style="list-style-type: none"><li>• <a href="#">Configuring Aggregated SONET/SDH Interfaces</a></li></ul>

## aggregate (Gigabit Ethernet CoS Policer)

---

<b>Syntax</b>	aggregate { bandwidth-limit <i>bps</i> ; burst-size-limit <i>bytes</i> ; }
<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> <i>cos-policer-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<b>Description</b>	Define a policer to apply to nonpremium traffic.  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>	<ul style="list-style-type: none"> <li>Configuring Gigabit Ethernet Policers</li> <li>premium (Hierarchical Policer)</li> <li><a href="#">ieee802.1p on page 201</a></li> </ul>

## aggregate (SONET/SDH)

---

<b>Syntax</b>	aggregate <i>asx</i> ;
<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. <b>Range:</b> 0 through 15
<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>Configuring Aggregated SONET/SDH Interfaces</li> </ul>

## alarm (optics-options)

---

<b>Syntax</b>	alarm low-light-alarm { (link-down   syslog); }
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> optics-options]
<b>Release Information</b>	Statement introduced in Junos OS Release 10.0. 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> —Drops the 10-Gigabit Ethernet link and marks link as down.  <b>syslog</b> —Writes the optics information to the system log.
<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>Configuring 10-Gigabit Ethernet Link Down Notification for Optics Options Alarm or Warning</li></ul>



## annex

---

<b>Syntax</b>	<code>annex (annex-a   annex-b);</code>
<b>Hierarchy Level</b>	<code>[edit interfaces <i>interface-name</i> shdsl-options]</code> , <code>[edit interfaces <i>interface-name</i> sonet-options aps]</code> , <code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> shdsl-options]</code>
<b>Release Information</b>	Statement introduced in Junos OS Release 7.4.
<b>Description</b>	<p>For J Series Services Routers only, configure the type of SHDSL annex.</p> <p>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 <code>[edit interfaces <i>so-fpc/pic/port</i> sonet-options aps]</code> hierarchy level.</p>
<b>Default</b>	<b>annex-b</b>
<b>Options</b>	<p><b>annex-a</b>—Use for North American SHDSL network implementations.</p> <p><b>annex-b</b>—Use for European SHDSL network implementations.</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>• ATM-over-SHDSL Overview</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

## 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. Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.
<b>Description</b>	For all 10-Gigabit Ethernet interfaces, M120, M320, and T Series routers, configure support for notification of link down alarm generation and transfer. <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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• 10-Gigabit Ethernet Notification of Link Down Alarm Overview</li> </ul>

## atm-encapsulation

<b>Syntax</b>	atm-encapsulation (direct   plcp);
<b>Hierarchy Level</b>	[edit interfaces <i>at-fpc/pic/port</i> e3-options], [edit interfaces <i>at-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.  <b>plcp</b> —Use PLCP encapsulation.
<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>• Configuring E3 and T3 Parameters on ATM Interfaces</li> <li>• <a href="#">encapsulation (Physical Interface) on page 175</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
- multipoint-destination
- [shaping on page 291](#)
- vci

## authentication-key

**Syntax** authentication-key *key*;

**Hierarchy Level** [edit interfaces *interface-name* sonet-options [aps](#)]

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Configure the Automatic Protection Switching (APS) authentication key (password).

**Options** *key*—Authentication password. It can be 1 through 8 characters long. Configure the same key for both the working and protect routers.

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- Configuring Basic Automatic Protect Switching
- For information about the **authentication-key** statement at the [edit interfaces *interface-name* unit *unit-number* family inet address *address* (vrrp-group | vrrp-inet6-group) *group-number*] or [edit logical-systems *logical-system-name* interfaces *interface-name* unit *unit-number* family (inet | inet6) address *address* (vrrp-group | vrrp-inet6-group) *group-number*] hierarchy level, see the Junos OS High Availability Configuration Guide.

## 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], [edit interfaces <i>interface-name</i> <b>gigether-options</b> ], [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. Statement introduced in Junos OS Release 8.4 for J Series Services Routers. Statement introduced in Junos OS Release 9.0 for EX Series switches. 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 and J Series Services Routers, 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 J Series Services Routers with universal Physical Interface Modules (uPIMs) and 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. <b>Default:</b> local-interface-online
<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>• Gigabit Ethernet Autonegotiation Overview</li> <li>• Configuring J Series Services Router Switching Interfaces</li> <li>• Configuring Gigabit Ethernet Interfaces (CLI Procedure)</li> <li>• Configuring Gigabit Ethernet Interfaces (CLI Procedure)</li> </ul>

## auto-reconnect

<b>Syntax</b>	<code>auto-reconnect <i>seconds</i>;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> pppoe-options], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> pppoe-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<b>Description</b>	For J Series Services Routers with PPP over Ethernet interfaces, configure the amount of time to wait before reconnecting after a session has terminated.
<b>Options</b>	<b><i>seconds</i></b> —Time to wait before reconnecting after a session has terminated. <b>Range:</b> 0 through 4,294,967,295 seconds <b>Default:</b> 0 (immediately)
<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>• Configuring the PPPoE Automatic Reconnect Wait Timer</li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>

## backup-interface

---

<b>Syntax</b>	<code>backup-interface es-fpc/pic/port;</code>
<b>Hierarchy Level</b>	[edit interfaces es-fpc/pic/port <a href="#">es-options</a> ]
<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>	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>Junos Services Interfaces Configuration Release 12.3</li></ul>

## bandwidth-limit (Policer for Gigabit Ethernet Interfaces)

---

<b>Syntax</b>	<code>bandwidth-limit bps;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <code>gigether-options</code> <a href="#">ethernet-switch-profile ethernet-policer-profile</a> <code>policer cos-policer-name aggregate</code> ], [edit interfaces <i>interface-name</i> <code>gigether-options</code> <a href="#">ethernet-switch-profile ethernet-policer-profile</a> <code>policer cos-policer-name premium</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>	<code>bps</code> —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). <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>	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>Configuring Gigabit Ethernet Policers</li><li><a href="#">burst-size-limit (Policer for Gigabit Ethernet Interfaces) on page 141</a></li></ul>



---

## bchannel-allocation

---

<b>Syntax</b>	bchannel-allocation (ascending   descending);
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> isdn-options]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.3.
<b>Description</b>	(J Series Services Routers equipped with a Dual-Port Channelized T1/E1 PIM) For Integrated Services Digital Network Primary Rate Interfaces (ISDN PRI), allocate PRI dialout B-channels in ascending or descending order.
<b>Options</b>	(ascending   descending)—Allocate the B-channels in ascending (from low to high) or descending (from high to low) order. <b>Default:</b> Descending order
<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>Allocating B-Channels for Dialout</li><li><i>Junos OS Interfaces and Routing Configuration Guide</i></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> <code>[edit interfaces ct1-fpc/pic/port],</code> <code>[edit interfaces interface-name ds0-options],</code> <code>[edit interfaces interface-name e1-options],</code> <code>[edit interfaces interface-name e3-options],</code> <code>[edit interfaces interface-name t1-options],</code> <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

**Required Privilege** interface—To view this statement in the configuration.  
**Level** interface-control—To add this statement to the configuration.

**Related Documentation**

- Interface Diagnostics
- Configuring E1 BERT Properties
- Configuring E3 BERT Properties
- Configuring T1 BERT Properties
- Configuring T3 BERT Properties
- Examples: Configuring T3 Interfaces
- [bert-error-rate on page 136](#)
- [bert-period on page 138](#)

## bert-error-rate

<b>Syntax</b>	<code>bert-error-rate rate;</code>
<b>Hierarchy Level</b>	<code>[edit interfaces ce1-fpc/pic/port],</code> <code>[edit interfaces ct1-fpc/pic/port],</code> <code>[edit interfaces interface-name ds0-options],</code> <code>[edit interfaces interface-name e1-options],</code> <code>[edit interfaces interface-name e3-options],</code> <code>[edit interfaces interface-name t1-options],</code> <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.


When configuring `t3-options bert-error-rate` on J Series routers, only 0 and 3 through 7 are valid values. If you enter 1 or 2, Junos OS will return the error message `configuration check-out failed`.

<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 134</a></li> <li>• <a href="#">bert-period on page 138</a></li> <li>• <a href="#">ds0-options on page 167</a></li> <li>• <a href="#">e1-options on page 173</a></li> <li>• <a href="#">e3-options on page 174</a></li> <li>• <a href="#">t1-options on page 309</a></li> <li>• <a href="#">t3-options on page 312</a></li> </ul>

- Interface Diagnostics
- Configuring E1 BERT Properties
- Configuring E3 BERT Properties
- 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>	<code>[edit interfaces <i>ce1-fpc/pic/port</i>],</code> <code>[edit interfaces <i>ct1-fpc/pic/port</i>],</code> <code>[edit interfaces <i>interface-name</i> <i>ds0-options</i>],</code> <code>[edit interfaces <i>interface-name</i> <i>e1-options</i>],</code> <code>[edit interfaces <i>interface-name</i> <i>e3-options</i>],</code> <code>[edit interfaces <i>interface-name</i> <i>t1-options</i>],</code> <code>[edit interfaces <i>interface-name</i> <i>t3-options</i>]</code>
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.
<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> <div><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 <code>[edit interfaces <i>ce1-fpc/pic/port</i>]</code> or <code>[edit interfaces <i>ct1-fpc/pic/port</i>]</code> hierarchy level as appropriate.</p></div>
<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>• Interface Diagnostics</li><li>• Configuring E1 BERT Properties</li></ul>


- Configuring E3 BERT Properties
- Configuring T1 BERT Properties
- Configuring T3 BERT Properties
- [bert-algorithm on page 134](#)
- [bert-error-rate on page 136](#)

## 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], [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>	<p><b><i>feet</i></b>—The buildout value in feet.</p> <p><b>Range:</b> 0 through 450 feet (137 meters)</p> <p><b>Default:</b> 10 feet (3 meters)</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 E3 and T3 Parameters on ATM Interfaces</li> </ul>

## buildout (T1 Interfaces)

<b>Syntax</b>	<code>buildout value;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>ct1-fpc/pic/port</i> ] [edit interfaces <i>interface-name</i> <b>t1-options</b> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. 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.
	<div>  <p><b>NOTE:</b> When configuring CT1 interfaces on 10-port Channelized E1/T1 IQE PICs and 16-Port Channelized E1/T1 Circuit Emulation MICs, the <b>buildout</b> statement must be included at the hierarchy level.</p> </div>
<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-0db</b>—For J Series routers only, long buildout with 0 decibel (dB) transmit attenuation</li> <li>• <b>long-7.5db</b>—For MX Series and J Series routers only, long buildout with 7.5 dB transmit attenuation</li> <li>• <b>long-15db</b>—For MX Series and J Series routers only, long buildout with 15 dB transmit attenuation</li> <li>• <b>long-22.5db</b>—For MX Series and J Series routers only, long buildout with 22.5 dB transmit attenuation</li> </ul>
<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>• Configuring the T1 Buildout</li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></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> <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. <b>Range:</b> 1500 through 100,000,000 bytes
<b>Required Privilege Level</b>	<b>interface</b> —To view this statement in the configuration. <b>interface-control</b> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Gigabit Ethernet Policers</li><li><a href="#">bandwidth-limit (Policer for Gigabit Ethernet Interfaces)</a> on page 132</li></ul>

## byte-encoding

---

<b>Syntax</b>	byte-encoding (nx56   nx64);
<b>Hierarchy Level</b>	[edit interfaces t1- <i>fpc/pic/port</i> ], [edit interfaces <i>interface-name</i> ds0-options], [edit interfaces <i>interface-name</i> t1-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. 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.  nx64—Use 8 bits per byte.
<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>Configuring T1 Byte Encoding</li></ul>

## bytes

<b>Syntax</b>	<pre>bytes {     c2 <i>value</i>;     e1-quiet <i>value</i>;     f1 <i>value</i>;     f2 <i>value</i>;     s1 <i>value</i>;     z3 <i>value</i>;     z4 <i>value</i>; }</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>	Set values in some SONET/SDH header bytes.
<b>Options</b>	<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>
<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 SONET/SDH Header Byte Values</li> <li>no-concatenate</li> </ul>

## calling-number

---

<b>Syntax</b>	<code>calling-number <i>number</i>;</code>
<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>	On J Series Services Routers with ISDN interfaces, configure the calling number to include in outgoing calls.
<b>Options</b>	<i>number</i> —Calling number.
<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>Configuring ISDN Physical Interface Properties</li><li><i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>

## cbit-parity

---

<b>Syntax</b>	<code>(cbit-parity   no-cbit-parity);</code>
<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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring E3 and T3 Parameters on ATM Interfaces</li><li>Disabling T3 C-Bit Parity Mode</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>Defining the ATM Traffic-Shaping Profile</li> <li><a href="#">rtvbr on page 286</a></li> <li><a href="#">shaping on page 291</a></li> <li><a href="#">vbr on page 331</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], [edit interfaces at- <i>fpc/pic/port</i> unit <i>logical-unit-number</i> ], [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. <b>Default:</b> 1 cell <b>Range:</b> 1 through 176 cells
<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>Configuring the Layer 2 Circuit Cell-Relay Cell Maximum</li></ul>

## chap

<b>Syntax</b>	<pre> chap {   access-profile name;   challenge-length minimum <i>minimum-length</i> maximum <i>maximum-length</i>;   default-chap-secret name;   local-name name;   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> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 20px;">  <p><b>BEST PRACTICE:</b> On inline service (si) interfaces for L2TP, only the <b>chap</b> statement itself is typically used for subscriber management. We recommend that you leave the subordinate statements at their default values.</p> </div> <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 the PPP Challenge Handshake Authentication Protocol on page 66</a></li> <li>• Junos OS System Basics Configuration Guide</li> <li>• Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface</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>	<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>Specifying an Output Priority Map</li><li><a href="#">input-priority-map on page 205</a></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</a></li></ul>

## clocking

---

<b>Syntax</b>	clocking (external [interface <i>interface-name</i> ]   internal);
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. <b>interface</b> option added in Junos OS Release 8.2. 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.
<b>Options</b>	<b>external</b> —The clock source is provided by the data communication equipment (DCE).  <b>interface <i>interface-name</i></b> —For interfaces operating on T1/E1 PIMs for J Series Services Routers only, 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.  <b>internal</b> —Use the internal stratum 3 clock as the reference clock. <b>Default:</b> internal
<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="#">Configuring the Clock Source on page 83</a></li><li>• Configuring the Clock Source on SONET/SDH Interfaces</li><li>• Clock Sources on Channelized Interfaces</li><li>• Configuring a Channelized T1/E1 Interface to Drop and Insert Time Slots</li><li>• <a href="#">loop-timing on page 225</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). <b>internal</b> —Internal baud timing. <b>loop</b> —Loop timing. <b>Default:</b> loop
<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>Configuring the Serial Clocking Mode</li></ul>

## compatibility-mode

<b>Syntax</b>	compatibility-mode (adtran   digital-link   kentrox   larscom   verilink) <subrate <i>value</i> >;
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <b>e3-options</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>	Configure the E3 or T3 interface to be compatible with the channel service unit (CSU) at the remote end of the line.
	<div>  <p><b>NOTE:</b> The <b>compatibility-mode</b> statement at the [edit interfaces <i>interface-name</i> <b>e3-options</b>] hierarchy level is not valid for IQE PICs.</p> </div>
<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> <div>  <p><b>NOTE:</b> Verilink configuration is not functional if an IQ interface is paired with an IQE interface.</p> </div> <p><b>subrate <i>value</i></b>—Subrate of the E3 or T3 line.</p> <p><b>Range:</b> 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.</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 E3 CSU Compatibility Mode</li> <li>Configuring the T3 CSU Compatibility Mode</li> <li><a href="#">payload-scrambler on page 261</a></li> </ul>

## compression (PPP Properties)

<b>Syntax</b>	compression { acfc; pfc; }
<b>Hierarchy Level</b>	[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> <b>unit</b> <i>logical-unit-number</i> <b>ppp-options</b> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<b>Description</b>	For interfaces with PPP encapsulation, set Link Control Protocol (LCP) compression options.  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>	<ul style="list-style-type: none"> <li>• <a href="#">Configuring PPP Address and Control Field Compression on page 74</a></li> <li>• <a href="#">Configuring the PPP Protocol Field Compression on page 76</a></li> </ul>

## control-polarity

<b>Syntax</b>	control-polarity (negative   positive);
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <b>serial-options</b> ]
<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>	<b>positive</b> —Positive signal polarity.  <b>negative</b> —Negative signal polarity.  <b>Default:</b> positive
<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="#">Configuring Serial Signal Polarities</a></li> </ul>

## control-signal

---

Syntax	control-signal (assert   de-assert   normal);
Hierarchy Level	[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> <a href="#">dce-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> <a href="#">dte-options</a> ]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	For X.21 interfaces only, configure the to-DCE signal.
Options	<b>assert</b> —The to-DCE signal must be asserted.  <b>de-assert</b> —The to-DCE signal must be deasserted.  <b>normal</b> —Normal request-to-send (RTS) signal handling, as defined by ITU-T Recommendation X.21. <b>Default:</b> normal
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"><li>Configuring the Serial Signal Handling</li></ul>

## core-dump

---

Syntax	(core-dump   no-core-dump);
Hierarchy Level	[edit interfaces <i>mo-fpc/pic/port</i> <a href="#">multiservice-options</a> ]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	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): <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>
Required Privilege Level	interface—To view this statement in the configuration. 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 87</a></li><li>Junos Services Interfaces Configuration Release 12.3</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. 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>	<b>rate</b> —Error rate expressed as the number of errors per number of bits. The value 1e-3 is one error in 10 <sup>-3</sup> bits and 5e-4 is five errors in 10 <sup>-4</sup> bits. <b>Default:</b> 5e-5
<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>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. 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 1e-3, 5e-4, 1e-4, and 5e-5. The 1e-5 value uses a 50-second monitoring period. The 5e-6 value uses a 100-second monitoring period. The 1e-6 value uses a 500-second monitoring period.
<b>Options</b>	<b>rate</b> —Error rate expressed as the number of errors per number of bits. The value 1e-3 is one error in $10^{-3}$ bits and 5e-4 is five errors in $10^{-4}$ bits. <b>Default:</b> 5e-6
<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>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> serial-options dce-options], [edit interfaces <i>interface-name</i> serial-options 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>Configuring the Serial Signal Handling</li> </ul>

## cts-polarity

<b>Syntax</b>	cts-polarity (negative   positive);
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> serial-options]
<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>Configuring Serial Signal Polarities</li> </ul>

## current

---

<b>Syntax</b>	<code>current margin;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <b>shdsl-options</b> snr-margin], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>shdsl-options</b> snr-margin]
<b>Release Information</b>	Statement introduced in Junos OS Release 7.4.
<b>Description</b>	For J Series Services Routers only, configure the current target signal-to-noise ratio (SNR) margin to be used when training the SHDSL line. The current margin is the difference between desired SNR and the actual SNR. When configured, the line trains at higher than the current margin plus SNR threshold.
<b>Options</b>	<b>margin</b> —Desired current SNR margin. Specify either <b>disabled</b> or a value from 0 dB through 10 dB. <b>Default:</b> 0 dB
<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>• ATM-over-SHDSL Overview</li></ul>

## data-input

<b>Syntax</b>	<code>data-input (system   interface <i>interface-name</i>);</code>
<b>Hierarchy Level</b>	<code>[edit interfaces <i>ds-pim</i>/0/<i>port:channel</i>]</code>
<b>Release Information</b>	Statement introduced in Junos OS Release 8.2.
<b>Description</b>	<p>For interfaces operating on T1/E1 PIMs for J Series Services Routers only, configure whether an interface should send and receive data from the Routing Engine or from a given interface name. On channelized T1/E1 interfaces partitioned into channels, you can insert time slots from one port directly into the other port on the same PIM, to replace time slots coming through the Routing Engine.</p> <p>To avoid slips, 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 by including the <b>clocking external interface <i>interface-name</i></b> statement at the <code>[edit interfaces <i>interface-name</i>]</code> hierarchy level.</p>
<b>Options</b>	<p><b>system</b>—Interface sends and receives data from the Routing Engine.</p> <p><b>interface <i>interface-name</i></b>—Interface sends and receives data from a specific interface.</p> <p><b>Default:</b> Data is sent and received from the Routing Engine (system).</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 a Channelized T1/E1 Interface to Drop and Insert Time Slots</li> <li><i>Junos OS Interfaces and Routing Configuration Guide</i></li> <li><a href="#">clocking on page 150</a></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> <a href="#">dce-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> <a href="#">dte-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 the from-DCE signal, data-carrier-detect (DCD).
<b>Options</b>	<b>ignore</b> —The from-DCE signal is ignored.  <b>normal</b> —Normal DCD signal handling as defined by the TIA/EIA Standard 530.  <b>require</b> —The from-DCE signal must be asserted. <b>Default:</b> normal
<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>Configuring the Serial Signal Handling</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>	<b>positive</b> —Positive signal polarity.  <b>negative</b> —Negative signal polarity. <b>Default:</b> positive
<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>Configuring Serial Signal Polarities</li></ul>

## dce

<b>Syntax</b>	dce;
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ], [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.  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. 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 84</a></li> </ul>

## dce-options

<b>Syntax</b>	<pre>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); }</pre>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <b>serial-options</b> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.3. Statement previously known as <b>control-leads</b> .
<b>Description</b>	For J Series Services Routers, configure the serial interface signal characteristics.  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>	<ul style="list-style-type: none"> <li>• <a href="#">Configuring the Serial Signal Handling</a></li> </ul>

## default-chap-secret

---

<b>Syntax</b>	<code>default-chap-secret name;</code>
<b>Hierarchy Level</b>	<code>[edit interfaces <i>interface-name</i> ppp-options <a href="#">chap</a>],</code> <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ppp-options <a href="#">chap</a>],</code> <code>[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>]</code>
<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>	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="#">Configuring a Default CHAP Secret on page 67</a></li><li>• <a href="#">access-profile on page 116</a></li></ul>

## description (Interfaces)

<b>Syntax</b>	<code>description text;</code>
<b>Hierarchy Level</b>	<code>[edit interfaces <i>interface-name</i>],</code> <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</code> <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>	<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>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.</p>
<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>	<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="#">Adding an Interface Description to the Configuration on page 46</a></li> <li>• Adding a Logical Unit Description to the Configuration</li> <li>• Configuring Gigabit Ethernet Interfaces (CLI Procedure)</li> <li>• Configuring Gigabit and 10-Gigabit Ethernet Interfaces</li> <li>• Enabling and Disabling Insertion of Option 82 Information</li> <li>• Junos® OS Network Interfaces</li> </ul>

## dialin

---

<b>Syntax</b>	dialin (console   routable);
<b>Hierarchy Level</b>	[edit interfaces umd0 modem-options]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.5.
<b>Description</b>	For J Series Services Routers, configure a USB modem port to act as a dial-in console or WAN backup port.
<b>Options</b>	<b>console</b> —Configure the USB modem port to operate as a dial-in console for management. <b>routable</b> —Configure the USB modem port to operate as a dial-in WAN backup interface. <b>Default:</b> console
<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>• Specifying a USB Modem Interface on J Series Routers</li></ul>



## disable (Interface)

<b>Syntax</b>	disable;
<b>Hierarchy Level</b>	[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> <b>unit</b> <i>logical-unit-number</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. 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 do support it and the laser will be turned off when the interface is disabled.
- 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.

<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="#">Disabling a Physical Interface on page 90</a></li><li>• Disabling a Logical Interface</li></ul>

---

## drop-timeout

---

<b>Syntax</b>	<code>drop-timeout <i>milliseconds</i>;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ], [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> ]
<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>	<i>milliseconds</i> —Drop timeout period. <b>Range:</b> 0 through 2000 milliseconds <b>Default:</b> 0 ms (disabled)
<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>• Junos Services Interfaces Configuration Release 12.3</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>Configuring Channelized DS3-to-DS0 Interfaces</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> <a href="#">dce-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> <a href="#">dte-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 the from-DCE signal, data-set-ready (DSR).
<b>Options</b>	<b>ignore</b> —The from-DCE signal is ignored.  <b>normal</b> —Normal DSR signal handling as defined by the TIA/EIA Standard 530.  <b>require</b> —The from-DCE signal must be asserted. <b>Default:</b> <b>normal</b>
<b>Required Privilege Level</b>	<b>interface</b> —To view this statement in the configuration. <b>interface-control</b> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the Serial Signal Handling</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.  <b>negative</b> —Negative signal polarity. <b>Default:</b> <b>positive</b>
<b>Required Privilege Level</b>	<b>interface</b> —To view this statement in the configuration. <b>interface-control</b> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Serial Signal Polarities</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. Statement previously known as <b>control-leads</b> .
<b>Description</b>	For M Series and T Series routers, configure the serial interface signal characteristics.  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>	<ul style="list-style-type: none"> <li>Configuring the Serial Signal Handling</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.  <b>unbalanced</b> —Unbalanced DTR signal. <b>Default:</b> <b>balanced</b>
<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>Configuring the Serial DTR Circuit</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> <a href="#">dce-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> <a href="#">dte-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 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. <b>Range:</b> 1 through 1000 milliseconds <b>Default:</b> 1000 milliseconds</p> <p><b>interval <i>seconds</i></b>—Offset interval for resynchronization. <b>Range:</b> 1 through 31 seconds <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. <b>Default:</b> <b>normal</b></p>
<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>Configuring the Serial Signal Handling</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>	<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>Configuring Serial Signal Polarities</li> </ul>

## dump-on-flow-control

---

<b>Syntax</b>	dump-on-flow-control;
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <a href="#">multiservice-options</a> ]
<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>	<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 87</a></li> <li>Junos Services Interfaces Configuration Release 12.3</li> <li><a href="#">passive-monitor-mode on page 259</a></li> </ul>

## dynamic-profile (PPP)

---

<b>Syntax</b>	<code>dynamic-profile <i>profile-name</i>;</code>
<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. 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 currently supported on PPPoE interfaces only. On the M120 and M320 routers, this statement is supported for MLPPP bundles only on LSQ interfaces on Adaptive Services PICs and Multiservices PICs.
<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>• Dynamic Profiles Overview</li><li>• Configuring a Basic Dynamic Profile</li><li>• Attaching Dynamic Profiles to Static PPP Subscriber Interfaces</li><li>• Attaching Dynamic Profiles to MLPPP Bundles</li><li>• For hardware requirements, see Hardware Requirements for PPP Subscriber Services on Non-Ethernet Interfaces</li></ul>



## e1-options

<b>Syntax</b>	<pre>e1-options {   bert-algorithm <i>algorithm</i>;   bert-error-rate <i>rate</i>;   bert-period <i>seconds</i>;   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 <i>time-slot-range</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>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.</p>
<b>Description</b>	<p>Configure E1-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>• Channelized E1 IQ and IQE Interfaces Overview</li> <li>• Channelized STM1 Interfaces Overview</li> <li>• E1 Interfaces Overview</li> <li>• T1 Interfaces Overview</li> </ul>

## 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 128](#)

## encapsulation (Physical Interface)

<b>Syntax</b>	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);
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ], [edit interfaces rlsq <i>number:number</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 11.1 for EX Series switches. Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Switches ( <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>	<b>ppp</b> —Use serial PPP encapsulation.
<b>Options</b>	<p><b>atm-ccc-cell-relay</b>—Use ATM cell-relay encapsulation.</p> <p><b>atm-pvc</b>—Use ATM PVC encapsulation.</p> <p><b>cisco-hdlc</b>—Use Cisco-compatible High-Level Data Link Control (HDLC) framing.</p> <p><b>cisco-hdlc-ccc</b>—Use Cisco-compatible HDLC framing on CCC circuits.</p> <p><b>cisco-hdlc-tcc</b>—Use Cisco-compatible HDLC framing on TCC circuits for connecting different media.</p> <p><b>ethernet-bridge</b>—Use Ethernet bridge encapsulation on Ethernet interfaces that have bridging enabled and that must accept all packets.</p> <p><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.</p> <p><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, <i>Multiprotocol Encapsulation over ATM Adaptation Layer 5</i>, 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 BPDUs 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</p>

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.  
.....

<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 Interface Encapsulation on Physical Interfaces on page 60</a></li> </ul>
	<ul style="list-style-type: none"> <li>• Configuring CCC Encapsulation for Layer 2 VPNs</li> <li>• Configuring Layer 2 Switching Cross-Connects Using CCC</li> <li>• Configuring TCC Encapsulation for Layer 2 VPNs and Layer 2 Circuits</li> <li>• Configuring ATM Interface Encapsulation</li> <li>• Configuring ATM-to-Ethernet Interworking</li> <li>• Configuring VLAN Encapsulation</li> <li>• Configuring Extended VLAN Encapsulation</li> <li>• Configuring Encapsulation for Layer 2 Wholesale VLAN Interfaces</li> <li>• Configuring Interfaces for Layer 2 Circuits</li> <li>• Configuring Interface Encapsulation on PTX Series Packet Transport Switches</li> <li>• Configuring an MPLS-Based Layer 2 VPN (CLI Procedure)</li> <li>• Configuring MPLS LSP Tunnel Cross-Connects Using CCC</li> <li>• Configuring TCC</li> <li>• Configuring VPLS Interface Encapsulation</li> <li>• Configuring Interfaces for VPLS Routing</li> <li>• Defining the Encapsulation for Switching Cross-Connects</li> <li>• Understanding Encapsulation on an Interface</li> </ul>

## 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>	nrz—Use NRZ line encoding.  nrzi—Use non-return to zero inverted (NRZI) line encoding.
<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>• Configuring Serial Line Encoding</li> </ul>

## epd-threshold (Physical Interface)

---

<b>Syntax</b>	<code>epd-threshold cells <a href="#">plp1</a> cells;</code>
<b>Hierarchy Level</b>	[edit interfaces at- <i>fpc/pic/port</i> atm-options scheduler-maps <i>map-name</i> <a href="#">forwarding-class</a> <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. <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.  The <b>plp1</b> statement is 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>Configuring an ATM Scheduler Map</li><li><a href="#">linear-red-profile on page 213</a></li></ul>

## es-options

---

<b>Syntax</b>	<pre>es-options {     <a href="#">backup-interface</a> <i>interface-name</i>; }</pre>
<b>Hierarchy Level</b>	[edit interfaces <i>es-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.  The <b>backup-interface</b> statement is 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>Junos Services Interfaces Configuration Release 12.3</li></ul>



## ethernet-policer-profile

<b>Syntax</b>	<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>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile</a> ], [edit interfaces <i>interface-name</i> aggregated-ether-options <a href="#">ethernet-switch-profile</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<b>Description</b>	<p>For Gigabit Ethernet IQ, 10-Gigabit Ethernet, and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), 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>
<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>Configuring Gigabit Ethernet Policers</li> </ul>

## 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 | no-mac-learn-enable);
}
```

**Hierarchy Level** [edit interfaces *interface-name* *gigether-options*],  
[edit interfaces *interface-name* *aggregated-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.

**Description** 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, and the built-in Gigabit Ethernet port on the M7i router), configure VLAN tag and MAC address accounting and filtering properties.

The 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* *gigether-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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Gigabit Ethernet Policers</li> <li>Configuring MAC Address Filtering</li> <li>Stacking and Rewriting Gigabit Ethernet VLAN Tags Overview</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>	<b><i>facility-name</i></b> —Name of facility that overrides the default assignment.
<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>Junos Services Interfaces Configuration Release 12.3</li> </ul>

## 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

## 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) Reduce the Automatic Protection Switching (APS) switchover time in Layer 2 circuits.
	<div>  <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>The fast-aps-switch statement cannot be configured when the APS annex-b option is configured.</li> <li>The interfaces that have the fast-aps-switch statement configured cannot be used in virtual private LAN service (VPLS) environments.</li> </ul> </div>
<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>Reducing APS Switchover Time in Layer 2 Circuits</li> </ul>

## fcs

<b>Syntax</b>	fcs (16   32);
<b>Hierarchy Level</b>	<pre>[edit interfaces e1-<i>fpc/pic/port</i>], [edit interfaces t1-<i>fpc/pic/port</i>], [edit interfaces <i>interface-name</i> ds0-options], [edit interfaces <i>interface-name</i> e1-options], [edit interfaces <i>interface-name</i> e3-options], [edit interfaces <i>interface-name</i> sonet-options], [edit interfaces <i>interface-name</i> t1-options], [edit interfaces <i>interface-name</i> t3-options]</pre>
<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>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 style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <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 <code>[edit interfaces e1-<i>fpc/pic/port</i>]</code> or <code>[edit interfaces t1-<i>fpc/pic/port</i>]</code> 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>	<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 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> <a href="#">t3-options</a> ]
<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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the T3 FEAC Response</li><li><a href="#">loopback (ADSL, DS0, E1/E3, SONET/SDH, SHDSL, and T1/T3) on page 226</a></li><li><a href="#">remote-loopback-respond on page 280</a></li></ul>


## flexible-vlan-tagging

---

<b>Syntax</b>	flexible-vlan-tagging;
<b>Hierarchy Level</b>	[edit interfaces <i>ge-fpc/pic/port</i> ], [edit interfaces <i>et-fpc/pic/port</i> ], [edit interfaces <i>ps0</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.1. Support for aggregated Ethernet added in Junos OS Release 9.0. Statement introduced in Junos OS Release 12.1 for PTX Series Packet Transport Switches.
<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 Switches.</p>
<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>Configuring Mixed Tagging</li><li>Configuring Flexible VLAN Tagging on PTX Series Packet Transport Switches</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> ], [edit interfaces <i>interface-name</i> ether-options], [edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">multiservice-options</a> ], [edit interfaces interface-range <i>name</i> <a href="#">aggregated-ether-options</a> ], [edit interfaces interface-range <i>name</i> ether-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 in EX Series switches. 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>  <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>
<b>Default</b>	Flow control is enabled.
<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>Configuring Flow Control</li> <li>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</li> </ul>

## 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. <b>working</b> —Request the circuit to become the working circuit.
<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>Configuring Switching Between the Working and Protect Circuits</li><li><a href="#">request on page 281</a></li></ul>

## forwarding-class (ATM2 IQ Scheduler Maps)

---

<b>Syntax</b>	<pre>forwarding-class <i>class-name</i> {   <a href="#">epd-threshold</a> <i>cells plp1 cells</i>;   <a href="#">linear-red-profile</a> <i>profile-name</i>;   <a href="#">priority</a> (high   low);   <a href="#">transmit-weight</a> (<i>cells number</i>   percent <i>number</i>); }</pre>
<b>Hierarchy Level</b>	[edit interfaces <i>at-fpc/pic/port</i> atm-options <a href="#">scheduler-maps</a> <i>map-name</i> ]
<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>	<b><i>class-name</i></b> —Name of forwarding class.  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>	<ul style="list-style-type: none"><li>Configuring ATM2 IQ VC Tunnel CoS Components</li><li>Configuring Scheduler Maps on ATM Interfaces</li></ul>


## forwarding-class (Gigabit Ethernet IQ Classifier)

<b>Syntax</b>	<code>forwarding-class <i>class-name</i> {     <code>loss-priority</code> (high   low); }</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <code>gigether-options</code> <code>ethernet-switch-profile</code> <code>ethernet-policer-profile</code> <code>output-priority-map</code> <code>classifier</code> <code>premium</code> ]
<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><i>class-name</i>—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>Specifying an Output Priority Map</li> <li><a href="#">input-priority-map on page 205</a></li> <li><code>forwarding-class</code> statement in the Junos OS Class of Service Configuration Guide</li> </ul>

## fragment-threshold

<b>Syntax</b>	<code>fragment-threshold <i>bytes</i>;</code>
<b>Hierarchy Level</b>	<p>[edit interfaces <i>interface-name</i> <code>mlfr-uni-nni-bundle-options</code>],</p> <p>[edit 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>]</p>
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<b>Description</b>	For multilink, link services, and voice services interfaces, and for J Series Services Routers ISDN interfaces, set the fragmentation threshold.
<b>Options</b>	<p><i>bytes</i>—Maximum size, in bytes, for multilink packet fragments. Any nonzero value must be a multiple of 64 bytes.</p> <p><b>Range:</b> 128 through 16,320 bytes</p> <p><b>Default:</b> 0 bytes (no fragmentation)</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 ISDN Logical Interface Properties</li> <li>Junos Services Interfaces Configuration Release 12.3</li> </ul>

## framing (E1, E3, and T1 Interfaces)

<b>Syntax</b>	framing (g704   g704-no-crc4   g.751   g.832   unframed   sf   esf);
<b>Hierarchy Level</b>	[edit interfaces ce1- <i>fpc/pic/port</i> ], [edit interfaces ct1- <i>fpc/pic/port</i> ], [edit interfaces at- <i>fpc/pic/port</i> e3-options], [edit interfaces e1- <i>fpc/pic/port</i> e1-options], [edit interfaces t1- <i>fpc/pic/port</i> t1-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.
<b>Description</b>	Configure the framing format.
	<div>  <p><b>NOTE:</b> 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-<i>fpc/pic/port</i>] or [edit interfaces ct1-<i>fpc/pic/port</i>] hierarchy level as appropriate.</p> </div>
<b>Default</b>	esf for T1 interfaces; g704 for E1 interfaces. There is no default value for E3 over ATM interfaces.
<b>Options</b>	<p>esf—Extended superframe (ESF) mode for T1 interfaces.</p> <p>g704—G.704 framing format for E1 interfaces.</p> <p>g704-no-crc4—G.704 framing with no cyclic redundancy check 4 (CRC4) for E1 interfaces.</p> <p>g.751—G.751 framing format for E3 over ATM interfaces.</p> <p>g.832—G.832 framing format for E3 over ATM interfaces.</p> <p>sf—Superframe (SF) mode for T1 interfaces.</p> <p>unframed—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>Configuring E1 Framing</li> <li>Configuring E3 and T3 Parameters on ATM Interfaces</li> <li>Configuring T1 Framing</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.  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>	<ul style="list-style-type: none"><li>• Ethernet Interfaces Overview</li><li>• <a href="#">gether-options (ACX Series)</a></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> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 in EX Series switches. Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.
<b>Description</b>	For Ethernet interfaces, enable updating of the ARP cache for replies received in response to gratuitous ARP requests.
<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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring Gratuitous ARP</li><li>• <a href="#">no-gratuitous-arp-request on page 246</a></li></ul>

## hello-timer

<b>Syntax</b>	<code>hello-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 rate at which hello messages are sent. A hello message is transmitted after a period defined in milliseconds has elapsed.
<b>Options</b>	<p><b>milliseconds</b>—The rate at which hello messages are sent.</p> <p><b>Range:</b> 1 through 180 milliseconds</p> <p><b>Default:</b> 10 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>Junos Services Interfaces Configuration Release 12.3</li> <li><a href="#">acknowledge-timer on page 119</a></li> <li>address</li> </ul>

## high-plp-max-threshold

<b>Syntax</b>	<code>high-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 high PLP CoS VC. When the fill level exceeds the defined percentage, all packets are dropped.
<b>Options</b>	<b>percent</b> —Fill-level percentage when linear random early discard (RED) is applied to cells with PLP.
<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 ATM2 IQ VC Tunnel CoS Components</li> <li><a href="#">low-plp-max-threshold on page 230</a></li> <li><a href="#">low-plp-threshold on page 231</a></li> <li><a href="#">queue-depth on page 275</a></li> </ul>

## high-plp-threshold

---

<b>Syntax</b>	<code>high-plp-threshold percent;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>at-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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring ATM2 IQ VC Tunnel CoS Components</li><li>• <a href="#">high-plp-max-threshold on page 195</a></li><li>• <a href="#">low-plp-max-threshold on page 230</a></li><li>• <a href="#">low-plp-threshold on page 231</a></li><li>• <a href="#">queue-depth on page 275</a></li></ul>


## hold-time (APS)

---

<b>Syntax</b>	<code>hold-time milliseconds;</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>	Hold-time value to use to determine whether a neighbor APS router is operational.
<b>Options</b>	<b>milliseconds</b> —Hold-time value. <b>Range:</b> 1 through 65,534 milliseconds <b>Default:</b> 3000 milliseconds (3 times the advertisement interval)
<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>• Configuring APS Timers</li><li>• <a href="#">advertise-interval on page 120</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> <code>[edit interfaces interface-range <i>interface-range-name</i>]</code>
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 10.4R5 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.
<b>Description</b>	Specify the hold-time value to use to damp interface transitions. When an interface goes from up to down, it is not advertised to the rest of the system as being down until it has remained down for the hold-time period. Similarly, an interface is not advertised as being up until it has remained up for the hold-time period.
	<div>  <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>We recommend that you configure the <b>hold-time</b> value after determining an appropriate value by performing repeated tests in the actual hardware environment. This is because the appropriate value for <b>hold-time</b> depends on the hardware (XFP, SFP, SR, ER, or LR) used in the networking environment.</li> <li>The <b>hold-time</b> option is not available for controller interfaces.</li> </ul> </div>
<b>Default</b>	Interface transitions are not damped.
<b>Options</b>	<p><b>down <i>milliseconds</i></b>—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.</p> <p><b>Range:</b> 0 through 4,294,967,295 milliseconds</p> <p><b>Default:</b> 0 milliseconds (interface transitions are not damped)</p> <p><b>up <i>milliseconds</i></b>—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.</p> <p><b>Range:</b> 0 through 4,294,967,295 milliseconds</p> <p><b>Default:</b> 0 milliseconds (interface transitions are not damped)</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="#">advertise-interval on page 120</a></li> <li>interfaces (for EX Series switches)</li> </ul>

## hold-time (SONET/SDH Defect Triggers)

<b>Syntax</b>	hold-time up <i>milliseconds</i> down <i>milliseconds</i> ;
<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.</p> <p><b>Range:</b> 1 through 65,534 milliseconds</p> <p><b>Default:</b> No hold time</p> <p><b>up <i>milliseconds</i></b>—Hold time to wait before the interface is marked up.</p> <p><b>Range:</b> 1 through 65,534 milliseconds</p> <p><b>Default:</b> No hold time</p>


<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>Configuring SONET/SDH Defect Triggers</li> <li><a href="#">hold-time (Physical Interface) on page 197</a></li> </ul>

## host (Interfaces)

<b>Syntax</b>	<pre>host <i>hostname</i> {     services <i>severity-level</i>;     facility-override <i>facility-name</i>;     log-prefix <i>prefix-value</i>;     port <i>port-number</i>; }</pre>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> services-options syslog]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<b>Description</b>	Specify the hostname for the system logging utility.
<b>Options</b>	<p><b>hostname</b>—Name of the system logging utility host machine. This can be the local Routing Engine or an external server address.</p> <p>The remaining statements are explained separately.</p>
<b>Usage Guidelines</b>	See Applying Filters and Services to Interfaces.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## idle-cycle-flag

---

<b>Syntax</b>	<code>idle-cycle-flag value;</code>
<b>Hierarchy Level</b>	<code>[edit interfaces e1-fpc/pic/port],</code> <code>[edit interfaces t1-fpc/pic/port],</code> <code>[edit interfaces interface-name ds0-options],</code> <code>[edit interfaces interface-name e1-options],</code> <code>[edit interfaces interface-name e3-options],</code> <code>[edit interfaces interface-name serial-options],</code> <code>[edit interfaces interface-name t1-options],</code> <code>[edit interfaces interface-name t3-options]</code>
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.
<b>Description</b>	Configure the value that the DS0, E1, E3, T1, or T3 interface transmits during idle cycles.
	<div><p><b>NOTE:</b> When configuring E1 or T1 interfaces on 10-port Channelized E1/T1 IQE PICs, the <code>idle-cycle-flag</code> statement must be included at the <code>[edit interfaces e1-fpc/pic/port]</code> or <code>[edit interfaces t1-fpc/pic/port]</code> hierarchy level as appropriate.</p></div>
<b>Options</b>	<p><b>value</b>—Value to transmit in the idle cycles:</p> <ul style="list-style-type: none"><li><b>flags</b>—Transmit the value 0x7E.</li><li><b>ones</b>—Transmit the value 0xFF (all ones).</li></ul> <p><b>Default:</b> <b>Flags</b></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>Configuring the E1 Idle Cycle Flag</li><li>Configuring the E3 Idle Cycle Flag</li><li>Configuring the T1 Idle Cycle Flag</li><li>Configuring the T3 Idle Cycle Flag</li></ul>

## 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</a> <a href="#">ethernet-policer-profile</a> input-priority-map]
<b>Release Information</b>	Statement introduced before Junos Release 7.4.
<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. <b>Range:</b> 0 through 7
<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>Specifying an Input Priority Map</li> </ul>

## ignore-all

---

<b>Syntax</b>	ignore-all;
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> <a href="#">dce-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> <a href="#">dte-options</a> ]
<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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Serial Signal Handling</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> ], [edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.0. 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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Ignoring Layer 3 Incomplete Errors</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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring Communication with Directly Attached ATM Switches and Routers</li><li>• show ilmi</li><li>• show ilmi statistics</li></ul>

## inactivity-timeout

---

<b>Syntax</b>	<code>inactivity-timeout <i>seconds</i>;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <a href="#">services-options</a> ]
<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>	<p><b><i>seconds</i></b>—Timeout period, in seconds.</p> <p><b>Range:</b> 4 through 86,400 seconds</p> <p><b>Default:</b> 30 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>Junos Services Interfaces Configuration Release 12.3</li> </ul>

## indication

---

<b>Syntax</b>	<code>indication (ignore   normal   require);</code>
<b>Hierarchy Level</b>	<p>[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> <a href="#">dce-options</a>],</p> <p>[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> <a href="#">dte-options</a>]</p>
<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>Configuring the Serial Signal Handling</li> </ul>

## indication-polarity

---

<b>Syntax</b>	indication-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 indication signal polarity.
<b>Options</b>	<b>positive</b> —Positive signal polarity. <b>negative</b> —Negative signal polarity. <b>Default:</b> positive
<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>Configuring Serial Signal Polarities</li></ul>

## ingress-rate-limit

---

<b>Syntax</b>	ingress-rate-limit <i>rate</i> ;
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<b>Description</b>	Perform port-based rate limiting on ingress traffic arriving on Fast Ethernet 8-port, 12-port, and 48-port PICs.
<b>Options</b>	<b>rate</b> —Traffic rate, in megabits per second (Mbps). <b>Range:</b> 1 through 100 Mbps
<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>Configuring the Ingress Rate Limit</li></ul>



## input-priority-map

---

<b>Syntax</b>	input-priority-map { <a href="#">ieee802.1p</a> premium [ <i>values</i> ]; }
<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 and 10-Gigabit Ethernet interfaces only, define the input policer priority map to be applied to incoming frames on this interface.  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>	<ul style="list-style-type: none"> <li>Specifying an Input Priority Map</li> <li><a href="#">output-priority-map on page 254</a></li> </ul>

## interface (Hierarchical CoS Schedulers)

---

<b>Syntax</b>	interface <i>interface-name</i> ;
<b>Hierarchy Level</b>	[edit interfaces interface-set <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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Junos OS Class of Service Configuration Guide</li> </ul>

## interfaces

---

<b>Syntax</b>	interfaces { ... }
<b>Hierarchy Level</b>	[edit]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<b>Description</b>	Configure interfaces on the router.
<b>Default</b>	The management and internal Ethernet interfaces are automatically configured. You must configure all other interfaces.
<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="#">Physical Interface Configuration Statements Overview on page 3</a></li><li>• Configuring Aggregated Ethernet Link Protection</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>	<code>[edit interfaces <i>interface-range</i> name <b>no-partition</b>],</code> <code>[edit interfaces <i>interface-range</i> name <b>partition</b> <i>partition-number</i>],</code> <code>[edit interfaces <i>interface-range</i> name <b>partition</b> <i>partition-number</i> oc-slice <i>oc-slice-range</i>],</code> <code>[edit interfaces <i>interface-range</i> name <b>partition</b> <i>partition-number</i> timeslot <i>timeslot-range</i>]</code>
<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 <code>[edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> timeslot <i>timeslot-range</i>]</code> hierarchy level to create a bearer (B) channel <code>bc-pim/0/port:channel</code> 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 <code>[edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> oc-slice <i>oc-slice-range</i> interface-type coc1-fpc/pic/port]</code> hierarchy level.</p> <p><b>ct1</b>—Channelized T1 interface type. You can specify this interface type at the <code>[edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> interface-type ct3-fpc/pic/port&lt;:channel&gt;]</code> hierarchy level.</p> <p><b>ct3</b>—Channelized T3 interface type. You can specify this interface type at the <code>[edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> oc-slice <i>oc-slice-range</i> interface-type coc1-fpc/pic/port:channel no-partition]</code> 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 <code>[edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> timeslot <i>timeslot-range</i>]</code> hierarchy level to create a (D) channel <code>dc-pim/0/port</code> to control the B-channels.</p> <p><b>ds</b>—DS0 interface type. You can specify this interface type at the <code>[edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> interface-type (ce1-fpc/pic/port   ct1-fpc/pic/port&lt;:channel&gt;)]</code> hierarchy level.</p> <p><b>so</b>—SONET/SDH interface type. You can specify this interface type at the <code>[edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> oc-slice <i>oc-slice-range</i> interface-type coc12-fpc/pic/port]</code> hierarchy level.</p> <p><b>t1</b>—T1 interface type. You can specify this interface type at the <code>[edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> oc-slice <i>oc-slice-range</i> interface-type (coc12-fpc/pic/port   coc1-fpc/pic/port)]</code> hierarchy level.</p> <p><b>t3</b>—T3 interface type. You can specify this interface type at the <code>[edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> oc-slice <i>oc-slice-range</i> interface-type (coc12-fpc/pic/port   coc1-fpc/pic/port:channel no-partition)]</code> 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

---

## invert-data

---

**Syntax** invert-data;

**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* t1-options],  
[edit interfaces *interface-name* e3-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** 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.

.....

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- Configuring E1 Data Inversion
- Configuring E3 Data Inversion
- Configuring T1 Data Inversion

## keepalives

<b>Syntax</b>	<code>keepalives &lt;interval <i>seconds</i>&gt; &lt;down-count <i>number</i>&gt; &lt;up-count <i>number</i>&gt;;</code>
<b>Hierarchy Level</b>	<code>[edit interfaces <i>interface-name</i>],</code> <code>[edit interfaces <i>interface-name</i> <i>unit</i> <i>logical-unit-number</i>],</code> <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>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 81</a></li> <li>• Configuring Frame Relay Keepalives</li> <li>• Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface</li> </ul>

## lACP (Aggregated Ethernet)

<b>Syntax</b>	<pre>lACP {   (active   passive);   admin-key key;   fast-failover;   link-protection {     disable;     (revertive   non-revertive);   }   periodic interval;   system-id mac-address;   system-priority priority; }</pre>
<b>Hierarchy Level</b>	[edit interfaces aex <a href="#">aggregated-ether-options</a> ]
<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>
<b>Description</b>	For aggregated Ethernet interfaces only, configure Link Aggregation Control Protocol (LACP).
<b>Default</b>	If you do not specify LACP as either <b>active</b> or <i>passive</i> , LACP remains passive.
<b>Options</b>	<p><b>active</b>—Initiate transmission of LACP packets.</p> <p><b>admin-key <i>number</i></b>—Specify an administrative key for the router or switch.</p> <div> </div> <p><b>NOTE:</b> You must also configure Multichassis Link Aggregation (MC-LAG) when you configure the <b>admin-key</b>.</p> <p><b>passive</b>—Respond to LACP packets.</p> <p><b>fast-failover</b>—Specify to override the IEEE 802.3ad standard and allow the standby link to receive traffic. Overriding the default behavior facilitates subsecond failover.</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>Configuring Aggregated Ethernet LACP</li> <li>Configuring Aggregated Ethernet LACP (CLI Procedure)</li> </ul>

- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch

## line-encoding

<b>Syntax</b>	line-encoding (ami   b8zs);
<b>Hierarchy Level</b>	[edit interfaces <i>ct1-fpc/pic/port</i> ], [edit interfaces <i>interface-name</i> <b>t1-options</b> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. 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. <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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring T1 Line Encoding</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. 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</a></li></ul>

## line-rate

---

<b>Syntax</b>	<code>line-rate <i>line-rate</i>;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <a href="#">shdsl-options</a> ], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">shdsl-options</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 7.4.
<b>Description</b>	For J Series Services Routers only, configure the SHDSL line rate.
<b>Options</b>	<b><i>line-rate</i></b> —SHDSL line rate, in Kbps. Possible values are:  2-wire (Kbps): 192, 256, 320, 384, 448, 512, 576, 640, 704, 768, 832, 896, 960, 1024, 1088, 1152, 1216, 1280, 1344, 1408, 1472, 1536, 1600, 1664, 1728, 1792, 1856, 1920, 1984, 2048, 2112, 2176, 2240, 2304, <b>auto</b>  4-wire (Kbps): 384, 512, 640, 768, 896, 1024, 1152, 1280, 1408, 1536, 1664, 1792, 1920, 2048, 2176, 2304, 2432, 2560, 2688, 2816, 2944, 3072, 3200, 3328, 3456, 3584, 3712, 3840, 3968, 4096, 4224, 4352, 4480, 4608  <b>Default:</b> For 2-wire mode, <b>auto</b> ; for 4-wire mode, <b>4608</b> Kbps
<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="#">ATM-over-SHDSL Overview</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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring an ATM Scheduler Map</li><li>• <a href="#">linear-red-profiles on page 214</a></li><li>• Configuring Scheduler Maps on ATM Interfaces</li><li>• epd-threshold</li></ul>

## linear-red-profiles

---

<b>Syntax</b>	<code>linear-red-profiles <i>profile-name</i> {     <i>high-plp-threshold percent</i>;     <i>low-plp-threshold percent</i>;     <i>queue-depth cells</i>; }</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>	<b><i>profile-name</i></b> —Name of the drop profile.  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>	<ul style="list-style-type: none"><li>Configuring ATM2 IQ VC Tunnel CoS Components</li><li>Configuring Linear RED Profiles on ATM Interfaces</li></ul>

## link-layer-overhead

---

<b>Syntax</b>	<code>link-layer-overhead <i>percent</i>;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ], [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> ]
<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><i>percent</i></b> —Percentage of total bundle bandwidth to be set aside for link-layer overhead. <b>Range:</b> 0 through 50 percent <b>Default:</b> 4 percent
<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>Junos Services Interfaces Configuration Release 12.3</li></ul>

## link-mode

<b>Syntax</b>	link-mode <i>mode</i> (automatic   full-duplex   half-duplex);
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ], [edit interfaces <i>interface-name</i> ether-options], [edit interfaces ge-pim/0/0 <i>switch-options</i> <i>switch-port</i> <i>port-number</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.
<b>Description</b>	Set the device's link connection characteristic.
<b>Options</b>	<p><i>mode</i>—Link characteristics:</p> <ul style="list-style-type: none"> <li>• <b>automatic</b>—Link mode is negotiated. This is the default for EX Series switches.</li> <li>• <b>full-duplex</b>—Connection is full duplex.</li> <li>• <b>half-duplex</b>—Connection is half duplex.</li> </ul> <p><b>Default:</b> Fast Ethernet interfaces, except the J Series ePIM Fast Ethernet interfaces, can operate in either full-duplex or half-duplex mode. The router's management Ethernet interface, <b>fxp0</b> or <b>em0</b>, the built-in Fast Ethernet interfaces on the FIC (M7i router), and the Gigabit Ethernet ports on J Series Services Routers with uPIMs installed and configured for access switching mode autonegotiate whether to operate in full-duplex or half-duplex mode. Unless otherwise noted here, all other interfaces operate only in full-duplex mode.</p>



**NOTE:** On J Series ePIM Fast Ethernet interfaces, if you specify half-duplex (or if full-duplex mode is not autonegotiated), the following message is written to the system log: "Half-duplex mode not supported on this PIC, forcing full-duplex mode."



**NOTE:** 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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring the Link Characteristics on Ethernet Interfaces</li><li>• Understanding Management Ethernet Interfaces</li><li>• Configuring Gigabit Ethernet Interfaces (CLI Procedure)</li></ul>

## link-protection

<b>Syntax</b>	<pre>link-protection {   disable;   (revertive  non-revertive); }</pre>
<b>Hierarchy Level</b>	[edit interfaces aex <a href="#">aggregated-ether-options</a> ] [edit interfaces aex aggregated-ether-options <i>lACP</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.3. Statement introduced in Junos OS Release 9.0 for EX Series switches. Support for <b>disable</b> , <b>revertive</b> , and <b>non-revertive</b> statements added in Junos OS Release 9.3.
<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 <b>[edit interfaces ge-fpc/pic/port gigether-options 802.3ad aex]</b> hierarchy level or the <b>[edit interfaces fe-fpc/pic/port 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>• <b>[edit interfaces ge-fpc/pic/port ether-options 802.3ad aex]</b></li> <li>• <b>[edit interfaces xe-fpc/pic/port ether-options 802.3ad aex]</b></li> </ul> <p>For LACP standards link protection, specify <b>link-protection</b> at the following hierarchy levels:</p> <ul style="list-style-type: none"> <li>• For global LACP link protection, specify at <b>[edit chassis aggregated-devices ethernet lACP]</b></li> <li>• For a specific aggregated Ethernet interface, specify at <b>[edit interfaces aeX aggregated-ether-options lACP]</b></li> </ul>
<b>Options</b>	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>	<ul style="list-style-type: none"> <li>• Configuring Aggregated Ethernet Link Protection</li> <li>• Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</li> </ul>

## link-speed (Aggregated Ethernet)

---

<b>Syntax</b>	link-speed <i>speed</i> ;
<b>Hierarchy Level</b>	[edit interfaces aex <a href="#">aggregated-ether-options</a> ], [edit interfaces interface-range <i>name</i> aggregated-ether-options], [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. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	For aggregated Ethernet interfaces only, set the required link speed.
<b>Options</b>	<p><b>speed</b>—For aggregated Ethernet links, you can specify <b>speed</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 speed values:</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 speed values:</p> <ul style="list-style-type: none"><li>• <b>10m</b></li><li>• <b>100m</b></li><li>• <b>1g</b></li><li>• <b>10g</b></li></ul>
<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="#">Configuring Aggregated Ethernet Link Speed</a></li><li>• <a href="#">Configuring Aggregated Ethernet Links (CLI Procedure)</a></li><li>• <a href="#">Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch</a></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. 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>	<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 Aggregated Ethernet Link Speed</li> <li>• Configuring Aggregated SONET/SDH Link Speed</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 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>Configuring Tunable Keepalives for Frame Relay LMI</li> <li><a href="#">lmi-type on page 221</a></li> <li><a href="#">mlfr-uni-nni-bundle-options on page 235</a></li> </ul>

## lmi-type

<b>Syntax</b>	lmi-type (ansi   itu   c-lmi);
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <a href="#">lmi</a> ], [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>	Set Frame Relay Local Management Interface (LMI) type.
<div>  <p><b>NOTE:</b> Consortium LMI is supported on all MPCs and I-chip based FPCs.</p> </div>	
<b>Options</b>	<p><b>ansi</b>—Use ANSI T1.167 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>	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>Configuring Frame Relay Keepalives</li> <li><a href="#">mlfr-uni-nni-bundle-options on page 235</a></li> <li><a href="#">lmi (Frame Relay) on page 220</a></li> <li>Junos Services Interfaces Configuration Release 12.3</li> </ul>

## local-name

---

<b>Syntax</b>	local-name <i>name</i> ;
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ppp-options chap], [edit interfaces <i>interface-name</i> ppp-options pap], [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ppp-options chap], [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ppp-options pap], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ppp-options chap], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ppp-options pap]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Support for PAP added in Junos OS Release 8.3.
<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.
<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="#">Configuring the PPP Challenge Handshake Authentication Protocol on page 66</a></li><li>• <a href="#">Configuring the PPP Password Authentication Protocol on page 68</a></li><li>• Junos OS System Basics Configuration Guide</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> ], [edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number ppp-options pap</a> ], [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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring the Local Password</li> <li><a href="#">Configuring the PPP Password Authentication Protocol on page 68</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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Switching Between the Working and Protect Circuits</li> </ul>

## log-prefix (Interfaces)

---


<b>Syntax</b>	<code>log-prefix <i>prefix-value</i>;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> services-options syslog <a href="#">host hostname</a> ]
<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>Usage Guidelines</b>	See Configuring System Logging for Services Interfaces.
<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>Junos Services Interfaces Configuration Release 12.3</li></ul>

## long-buildout

---

<b>Syntax</b>	<code>(long-buildout   no-long-buildout);</code>
<b>Hierarchy Level</b>	[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>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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the T3 Line Buildout</li></ul>

## loop-timing

<b>Syntax</b>	(loop-timing   no-loop-timing);
<b>Hierarchy Level</b>	[edit interfaces ct3- <i>fpc/pic/port</i> <a href="#">t3-options</a> ], [edit interfaces e1- <i>fpc/pic/port:0</i> <a href="#">sonet-options</a> ], [edit interfaces stm1- <i>fpc/pic/port</i> <a href="#">sonet-options</a> ]
<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.
	<div>  <p><b>NOTE:</b> 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.</p> </div>
<b>Options</b>	<p><b>loop-timing</b>—Configure loop timing (external) clocking.</p> <p><b>no-loop-timing</b>—Configure line timing (internal) clocking.</p> <p><b>Default:</b> no-loop-timing</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 Channelized IQ and IQE SONET/SDH Loop Timing</li> <li>Configuring the Channelized T3 Loop Timing</li> <li><a href="#">clocking on page 150</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> <code>[edit interfaces ct1-fpc/pic/port],</code> <code>[edit interfaces t1-fpc/pic/port],</code> <code>[edit interfaces interface-name ds0-options],</code> <code>[edit interfaces interface-name dsl-options],</code> <code>[edit interfaces interface-name e1-options],</code> <code>[edit interfaces interface-name e3-options],</code> <code>[edit interfaces interface-name shdsl-options],</code> <code>[edit interfaces interface-name sonet-options],</code> <code>[edit interfaces interface-name t1-options],</code> <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**.

<b>Options</b>	<b>local</b> —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.

<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>• Configuring E3 and T3 Parameters on ATM Interfaces</li><li>• Configuring E1 Loopback Capability</li><li>• Configuring E3 Loopback Capability</li><li>• Configuring SONET/SDH Loopback Capability</li><li>• Configuring SHDSL Operating Mode on an ATM Physical Interface</li><li>• Configuring T1 Loopback Capability</li><li>• Configuring T3 Loopback Capability</li><li>• <a href="#">feac-loop-respond on page 187</a></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> <a href="#">aggregated-ether-options</a> ], [edit interfaces <i>interface-name</i> ether-options], [edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ], [edit interfaces interface-range <i>name</i> ether-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. 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.
<div> <b>NOTE:</b> By default, local aggregated Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces connect to a remote system.</div>	
<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>Configuring Ethernet Loopback Capability</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>	<p><b>mode</b>—You can specify the one of the following loopback modes:</p> <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>	<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 Loopback Capability</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>	<p><b>high</b>—Packet has high loss priority.</p> <p><b>low</b>—Packet has low loss priority.</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> </ul>

## low-plp-max-threshold

---

<b>Syntax</b>	<code>low-plp-max-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 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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring ATM2 IQ VC Tunnel CoS Components</li><li><a href="#">high-plp-max-threshold on page 195</a></li><li><a href="#">low-plp-threshold on page 231</a></li><li>Configuring Linear RED Profiles on ATM Interfaces</li><li>high-plp-max-threshold</li><li><a href="#">queue-depth on page 275</a></li></ul>

## low-plp-threshold

---


<b>Syntax</b>	<code>low-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 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>	<i>percent</i> —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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring ATM2 IQ VC Tunnel CoS Components</li> <li><a href="#">high-plp-max-threshold on page 195</a></li> <li><a href="#">high-plp-threshold on page 196</a></li> <li>Configuring Linear RED Profiles on ATM Interfaces</li> <li>high-plp-max-threshold</li> <li>high-plp-threshold</li> <li><a href="#">low-plp-max-threshold on page 230</a></li> <li><a href="#">queue-depth on page 275</a></li> </ul>

## mac

---

<b>Syntax</b>	<code>mac mac-address;</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, <b>0011.2233.4455</b> or <b>00:11:22:33:44:55</b> .
<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>Configuring the MAC Address on the Management Ethernet Interface</li></ul>

## mac-learn-enable

<b>Syntax</b>	(mac-learn-enable   no-mac-learn-enable);
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<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), and for Gigabit Ethernet DPCs on MX Series routers, configure whether source and destination MAC addresses are dynamically learned:</p> <ul style="list-style-type: none"> <li>• <b>mac-learn-enable</b>—Allow the interface to dynamically learn source and destination MAC addresses.</li> <li>• <b>no-mac-learn-enable</b>—Prohibit the interface from dynamically learning source and destination MAC addresses.</li> </ul> <p>MAC address learning is based on source addresses. You can start accounting for traffic after there has been traffic sent from the MAC address. Once the MAC address is learned, the frames and bytes transmitted to or received from the MAC address can be tracked.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p> <b>NOTE:</b> When you gather interfaces into a bridge domain, the <b>no-mac-learn-enable</b> statement at the [edit interfaces <i>interface-name</i> gigether-options ethernet-switch-profile] hierarchy level is not supported. You must use the <b>no-mac-learning</b> statement at the [edit bridge-domains <i>bridge-domain-name</i> bridge-options interface <i>interface-name</i>] hierarchy level to disable MAC learning on an interface in a bridge domain. For information on disabling MAC learning for a bridge domain, see <i>MX Series Layer 2 Configuration Guide</i>.</p> </div>
<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="#">Configuring MAC Address Filtering</a></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> ], [edit interfaces aex <a href="#">aggregated-sonet-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> ], [edit interfaces interface-range <i>range</i> <a href="#">aggregated-ether-options</a> ], [edit interfaces interface-range <i>range</i> <a href="#">aggregated-sonet-options</a> ], [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. 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><b><i>number</i></b>—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 16. 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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Aggregated Ethernet Minimum Links</li> <li>Configuring Aggregated SONET/SDH Minimum Links</li> <li>Configuring Aggregated Ethernet Links (CLI Procedure)</li> <li>Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch</li> <li>Junos Services Interfaces Configuration Release 12.3</li> </ul>

## mlfr-uni-nni-bundle-options

<b>Syntax</b>	<pre>mlfr-uni-nni-bundle-options {     acknowledge-retries <i>number</i>;     acknowledge-timer <i>milliseconds</i>;     action-red-differential-delay (disable-tx   remove-link);     drop-timeout <i>milliseconds</i>;     fragment-threshold <i>bytes</i>;     hello-timer <i>milliseconds</i>;     link-layer-overhead <i>percent</i>;     lmi-type (ansi   itu   c-lmi);     minimum-links <i>number</i>;     mrru <i>bytes</i>;     n391 <i>number</i>;     n392 <i>number</i>;     n393 <i>number</i>;     red-differential-delay <i>milliseconds</i>;     t391 <i>seconds</i>;     t392 <i>number</i>;     yellow-differential-delay <i>milliseconds</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>Configure link services and voice services interface management 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>Configuring Frame Relay Keepalives</li> <li><a href="#">lmi (Frame Relay) on page 220</a></li> <li><a href="#">lmi-type on page 221</a></li> <li>Junos Services Interfaces Configuration Release 12.3</li> </ul>

## modem-options

---

<b>Syntax</b>	<pre>modem-options {     dialin (console   routable);     init-command-string <i>initialization-command-string</i>; }</pre>
<b>Hierarchy Level</b>	[edit interfaces umd0]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.2.
<b>Description</b>	<p>For J Series Services Routers, configure a USB port to act as a USB modem.</p> <p>The remaining statement is explained separately.</p>
<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>• Specifying a USB Modem Interface on J Series Routers</li></ul>

## mpls (Interfaces)

---

<b>Syntax</b>	<pre>mpls {     pop-all-labels {         required-depth <i>number</i>;     } }</pre>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> atm-options], [edit interfaces <i>interface-name</i> sonet-options], [edit interfaces <i>interface-name</i> fastether-options], [edit interfaces <i>interface-name</i> gigether-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<b>Description</b>	<p>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.</p> <p>The remaining statements are explained separately.</p>
<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>• Removing MPLS Labels from Incoming Packets</li><li>• Removing MPLS Labels from Incoming Packet</li><li>• Junos Services Interfaces Configuration Release 12.3</li></ul>



## mrru

---

<b>Syntax</b>	<code>mrru bytes;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> ], [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.
<b>Description</b>	For multilink, link services, voice services, and J Series Services Routers ISDN interfaces only, set the maximum received reconstructed unit (MRRU). The MRRU is similar to the MTU, but is specific to multilink interfaces.
<b>Options</b>	<b>bytes</b> —MRRU size. <b>Range:</b> 1500 through 4500 bytes <b>Default:</b> 1500 bytes
<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>Configuring ISDN Logical Interface Properties</li> <li><a href="#">mtu on page 238</a></li> <li>Junos Services Interfaces Configuration Release 12.3</li> </ul>

## mtu

<b>Syntax</b>	<code>mtu bytes;</code>
<b>Hierarchy Level</b>	<pre>[edit interfaces <i>interface-name</i>], [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> family <i>family</i>], [edit interfaces <i>interface-range name</i>], [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>], [edit logical-systems <i>logical-system-name</i> protocols l2circuit local-switching interface <i>interface-name</i> backup-neighbor <i>address</i>], [edit logical-systems <i>logical-system-name</i> protocols l2circuit neighbor <i>address</i> interface <i>interface-name</i>], [edit logical-systems <i>logical-system-name</i> protocols l2circuit neighbor <i>address</i> interface <i>interface-name</i> backup-neighbor <i>address</i>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols vpls neighbor <i>address</i> backup-neighbor <i>address</i>], [edit protocols l2circuit local-switching interface <i>interface-name</i> backup-neighbor <i>address</i>], [edit protocols l2circuit neighbor <i>address</i> interface <i>interface-name</i>], [edit protocols l2circuit neighbor <i>address</i> interface <i>interface-name</i> backup-neighbor <i>address</i>], [edit routing-instances <i>routing-instance-name</i> protocols vpls neighbor <i>address</i> backup-neighbor <i>address</i>]</pre>
<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>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Switches.</p> <p>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access 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 the routed VLAN interface (RVI) on EX Series switches, you must configure the jumbo MTU size on the member physical interfaces and also on the RVI itself (the <b>vlan</b> interface).</p>



**CAUTION:** For EX Series switches, setting or deleting the jumbo MTU size on the RVI (the **vlan** interface) while the switch is transmitting packets might cause packets to be dropped.



**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.



**NOTE:** 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.

For more information about configuring MTU for specific interfaces and router or switch combinations, see [“Configuring the Media MTU” on page 48](#).

**Options** *bytes*—MTU size.

**Range:** 256 through 9192 bytes, 256 through 9500 bytes (Junos OS 12.1X48R2 for PTX Series systems)

**Default:** 1500 bytes (INET, INET6, and ISO families), 1448 bytes (MPLS), 1514 bytes (EX Series switch interfaces)

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\)](#)
- [Configuring Interfaces for Layer 2 Circuits](#)
- [Configuring the Media MTU on page 48](#)
- [Configuring Routed VLAN Interfaces \(CLI Procedure\)](#)
- [Setting the Protocol MTU](#)

## 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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring Multicast Statistics Collection on Aggregated Ethernet Interfaces</a></li><li>• <a href="#">Configuring Multicast Statistics Collection on Aggregated SONET Interfaces</a></li><li>• <a href="#">Configuring Multicast Statistics Collection on Ethernet Interfaces</a></li><li>• <a href="#">Configuring Multicast Statistics Collection on SONET Interfaces</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 87</a></li><li>• Junos Services Interfaces Configuration Release 12.3</li><li>• <a href="#">passive-monitor-mode on page 259</a></li></ul>

## n391

---

<b>Syntax</b>	<code>n391 number;</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 voice services interfaces only, set the Frame Relay full status polling interval.
<b>Options</b>	<i>number</i> —Polling interval. <b>Range:</b> 1 through 255 <b>Default:</b> 6
<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>• Junos Services Interfaces Configuration Release 12.3</li><li>• <a href="#">n392 on page 243</a></li><li>• <a href="#">n393 on page 244</a></li><li>• <a href="#">timeslots on page 315</a></li><li>• <a href="#">t392 on page 311</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. <b>Range:</b> 1 through 10 <b>Default:</b> 3
<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>• Junos Services Interfaces Configuration Release 12.3</li><li>• <a href="#">n391 on page 242</a></li><li>• <a href="#">n393 on page 244</a></li><li>• <a href="#">timeslots on page 315</a></li><li>• <a href="#">t392 on page 311</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. <b>Range:</b> 1 through 10 <b>Default:</b> 4
<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>• Junos Services Interfaces Configuration Release 12.3</li><li>• <a href="#">n391 on page 242</a></li><li>• <a href="#">n392 on page 243</a></li><li>• <a href="#">timeslots on page 315</a></li><li>• <a href="#">t392 on page 311</a></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> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.3. Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.
<b>Description</b>	<p>For 1-, 4-, and 8-port Gigabit Ethernet IQ2 and IQ2-E PICs, for 1-port 10-Gigabit Ethernet IQ2 and IQ2-E PICs configured for 802.1Q flexible VLAN tagging, for all Ethernet interfaces on MX Series routers, and for aggregated Ethernet interfaces on IQ2 and IQ2-E PICs or MX Series DPCs, configure mixed tagging support for untagged packets on a port. When the <b>native-vlan-id</b> statement is included with the <a href="#">flexible-vlan-tagging</a> statement, untagged packets are accepted on the same mixed VLAN-tagged port.</p> <p>The logical interface on which untagged packets are received must be configured with the same native VLAN ID as that configured on the physical interface. 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 interface-mode the statement, untagged packets are accepted and forwarded within the bridge domain that is configured with the matching VLAN ID.</p>
<b>Options</b>	<p><i>number</i>—VLAN ID number.</p> <p><b>Range:</b> (ACX Series routers) 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 Mixed Tagging Support for Untagged Packets</li> <li>Configuring a Logical Interface for Access Mode</li> <li><a href="#">flexible-vlan-tagging on page 188</a></li> </ul>

## neighbor (Automatic Protection Switching for SONET/SDH)

---

<b>Syntax</b>	<code>neighbor <i>address</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>	<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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Basic Automatic Protect Switching</li></ul>

## no-gratuitous-arp-request

---

<b>Syntax</b>	<code>no-gratuitous-arp-request;</code>
<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. 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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Gratuitous ARP</li><li><a href="#">gratuitous-arp-reply on page 194</a></li></ul>

## no-keepalives

<b>Syntax</b>	no-keepalives;
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ], [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ], [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 81</a></li> <li>• Disabling the Sending of PPPoE Keepalive Messages</li> <li>• Configuring Frame Relay Keepalives</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>	<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>	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>	<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="#">link-protection on page 217</a></li> <li>• Configuring Aggregated Ethernet Link Protection</li> <li>• Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</li> </ul>

## no-partition

---

<b>Syntax</b>	no-partition <b>interface-type</b> (e1   (cau4   so)   (ct3   t3)   so   t3);
<b>Hierarchy Level</b>	[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]
<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>• Channelized E1 IQ and IQE Interfaces Overview</li><li>• Channelized OC12/STM4 IQ and IQE Interfaces Overview</li><li>• Configuring an OC12/STM4 Interface</li></ul>

- Configuring Channelized STM1 IQ and IQE Interfaces
- Configuring T3 IQ Interfaces
- [partition on page 257](#)
- no-partition

## no-termination-request

<b>Syntax</b>	no-termination-request;
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ppp-options], [edit interfaces lsq- <i>fpc/pic/port</i> lsq-failure-options]
<b>Release Information</b>	Statement introduced in Junos OS Release 7.4. Support at the [edit interfaces <i>interface-name</i> ppp-options] hierarchy level added in Junos OS Release 8.3.
<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>	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>• Configuring Link PIC Failover on Channelized OC3 IQ and IQE Interfaces</li> <li>• Configuring Link PIC Failover on Channelized OC12/STM4 IQ and IQE Interfaces</li> <li>• Configuring Link PIC Failover on Channelized STM1 Interfaces</li> <li>• Junos Services Interfaces Configuration Release 12.3</li> </ul>

## oam-liveness

---

<b>Syntax</b>	<pre>oam-liveness {     down-count <i>cells</i>;     up-count <i>cells</i>; }</pre>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i> ], [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ], [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> ], [edit logical-systems <i>logical-system-name</i> 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> family <i>family</i> address <i>address</i> multipoint-destination <i>address</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 11.1 for the QFX Series.
<b>Description</b>	For ATM encapsulation only, configure Operation, Administration, and Maintenance (OAM) F5 loopback cell count thresholds. Not supported on ATM-over-SHDSL interfaces.  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.
<b>Options</b>	<b>down-count <i>cells</i></b> —Minimum number of consecutive OAM F4 or F5 loopback cells lost before a VC is declared down. <b>Range:</b> 1 through 255 <b>Default:</b> 5 cells  <b>up-count <i>cells</i></b> —Minimum number of consecutive OAM F4 or F5 loopback cells received before a VC is declared up. <b>Range:</b> 1 through 255 <b>Default:</b> 5 cells
<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>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>],  [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],  [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>],  [edit logical-systems <i>logical-system-name</i> 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> 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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Channelized OC12/STM4 IQ and IQE Interfaces Overview</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> 30 seconds</p>
<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>Junos Services Interfaces Configuration Release 12.3</li></ul>



## optics-options

<b>Syntax</b>	<pre> optics-options {   alarm low-light-alarm {     (link-down   syslog);   }   warning low-light-warning {     (link-down   syslog);   }   wavelength nm; } </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>
<b>Description</b>	For 10-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>10-Gigabit Ethernet DWDM Interface Wavelength Overview</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>	[edit interfaces <i>interface-name</i> together-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>	<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>	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="#">Specifying an Output Priority Map</a></li><li>• <a href="#">input-priority-map on page 205</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>	<p><b>tag</b>—Tag, count, and process received packets that exceed the threshold.</p> <p><b>discard</b>—Discard received packets that exceed the threshold. No counting is done.</p>
<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="#">Configuring Receive and Transmit Leaky Bucket Properties on page 85</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. 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 on page 85</a></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 <b>aps</b> ]
<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>	<b>group-name</b> —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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Configuring APS Load Sharing</li> <li>• <a href="#">working-circuit on page 340</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 66</a></li> <li>• <a href="#">Configuring PPP PAP Authentication</a></li> <li>• <a href="#">Tracing Operations of the pppd Process on page 73</a></li> <li>• <a href="#">traceoptions (PPP Process)</a></li> <li>• <a href="#">Junos OS System Basics Configuration Guide</a></li> <li>• <a href="#">Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface</a></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>	For IQ interfaces and J Series interfaces on the Dual-Port Channelized E1 and T1PIM, configure the channelized interface partition. 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>• Channelized E1 IQ and IQE Interfaces Overview</li> <li>• Channelized OC12/STM4 IQ and IQE Interfaces Overview</li> <li>• Configuring Channelized T3 IQ Interfaces</li> <li>• <a href="#">no-partition on page 248</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> ], [edit interfaces <i>interface-name</i> <code>unit logical-unit-number ppp-options chap</code> ], [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. 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 68</a></li><li>• Junos OS System Basics Configuration Guide</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> ], [edit interfaces <i>interface-name</i> <code>unit logical-unit-number ppp-options pap</code> ], [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. 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 71</a></li><li>• Junos OS System Basics Configuration Guide</li></ul>

## passive-monitor-mode

<b>Syntax</b>	<code>passive-monitor-mode;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ], [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ], [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>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 the <i>Junos OS ATM Interfaces Configuration Guide</i> and <i>Junos OS ATM Interfaces Configuration Guide</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>• Enabling Passive Monitoring on ATM Interfaces</li> <li>• Passive Monitoring on Ethernet Interfaces Overview</li> <li>• Enabling Passive Monitoring on SONET/SDH Interfaces</li> <li>• <a href="#">multiservice-options on page 241</a></li> <li>• Junos Services Interfaces Configuration Release 12.3</li> </ul>


## path-trace

---

Syntax	<code>path-trace <i>trace-string</i>;</code>
Hierarchy Level	[edit interfaces <i>interface-name</i> <a href="#">sonet-options</a> ]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	<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 <i>pic-number</i>] 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>
Options	<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>
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"><li>Configuring the SONET/SDH Path Trace Identifier</li><li><a href="#">sonet-options on page 295</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> ], [edit interfaces <i>interface-name</i> <a href="#">sonet-options</a> ], [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>	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>Configuring E3 and T3 Parameters on ATM Interfaces</li> <li>Configuring E3 HDLC Payload Scrambling</li> <li>Configuring SONET/SDH HDLC Payload Scrambling</li> <li>Configuring T3 HDLC Payload Scrambling</li> <li>Examples: Configuring T3 Interfaces</li> <li><a href="#">compatibility-mode on page 152</a></li> </ul>

## periodic

---

<b>Syntax</b>	<code>periodic interval;</code>
<b>Hierarchy Level</b>	[edit interfaces aex <a href="#">aggregated-ether-options lacp</a> ], [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. 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>	<b><i>interval</i></b> —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. 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 LACP</a></li><li>• <a href="#">Configuring Aggregated Ethernet LACP (CLI Procedure)</a></li><li>• <a href="#">Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch</a></li></ul>

## per-unit-scheduler

<b>Syntax</b>	per-unit-scheduler;
<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>	For channelized OC3 IQ, channelized OC12 IQ, channelized STM1 IQ, channelized T3 IQ, channelized E1 IQ, E3 IQ, link services IQ interfaces (lsq-), link services (ls-) on J Series routers, Gigabit Ethernet IQ, Gigabit Ethernet IQ2 and IQ2-E, and 10-Gigabit Ethernet interfaces only, enable association of scheduler map names with logical interfaces.
	<div>  <p><b>NOTE:</b> Per-unit scheduling is not supported on T1 interfaces configured on the Channelized OC12 IQ PIC.</p> </div>
	<div>  <p><b>NOTE:</b> On Gigabit Ethernet IQ2 and IQ2-E PICs without the <code>per-unit-scheduler</code> statement, the entire PIC supports 4071 VLANs and the user can configure all the VLANs on the same port.</p> <p>On Gigabit Ethernet IQ2 and IQ2-E PICs with the <code>per-unit-scheduler</code> statement, the entire PIC supports <math>1024 - 2 * \text{number of ports}</math> (1024 minus two times the number of ports), because each port is allocated two default schedulers.</p> </div>
	<p>When including the <code>per-unit-scheduler</code> statement for interfaces on the IQ2 and IQ2-E PIC, you must also include the <code>vlan-tagging</code> statement at the [edit interfaces <i>interface-name</i>] hierarchy level.</p>
<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="#">vlan-tagging on page 333</a></li> </ul>

## pfc

---

<b>Syntax</b>	pfc;
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <a href="#">ppp-options compression</a> ], [edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> <a href="#">ppp-options compression</a> ], [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>	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. 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 76</a></li></ul>

## pic-type

---

<b>Syntax</b>	pic-type (atm1   atm2);
<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 ATM interfaces, configure the type of ATM PIC installed in your router.
<b>Options</b>	<b>atm1</b> —ATM1 PIC. <b>atm2</b> —ATM2 IQ PIC.
<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="#">Configuring the ATM PIC Type</a></li></ul>

## plp1

<b>Syntax</b>	<code>plp1 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> family <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 QFX Series switches.</p>
<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>	<p><b>cells</b>—Maximum number of cells.</p> <p><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</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 Two EPD Thresholds per Queue</li> <li>Configuring an ATM Scheduler Map</li> <li><a href="#">linear-red-profile on page 213</a></li> </ul>

## plp-to-clp

---

<b>Syntax</b>	plp-to-clp;
<b>Hierarchy Level</b>	[edit interfaces at- <i>fpc/pic/port atm-options</i> ], [edit interfaces at- <i>fpc/pic/port unit logical-unit-number</i> ], [edit logical-systems <i>logical-system-name</i> interfaces at- <i>fpc/pic/port unit logical-unit-number</i> ]
<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>	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>• Enabling the PLP Setting to Be Copied to the CLP Bit</li><li>• Copying the PLP Setting to the CLP Bit on ATM Interfaces</li></ul>

## policer (CoS)

<b>Syntax</b>	<pre> policer <i>cos-policer-name</i> {     aggregate {         bandwidth-limit <i>bps</i>;         burst-size-limit <i>bytes</i>;     }     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> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<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), 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).</p>
<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>Configuring Gigabit Ethernet Policers</li> </ul>

## pool

---

<b>Syntax</b>	<code>pool <i>pool-name</i> &lt;priority <i>priority</i>&gt;;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>br-pim/0/port</i> dialer-options], [edit interfaces <i>umd0</i> dialer-options], [edit interfaces <i>dlm</i> unit <i>logical-unit-number</i> dialer-options], [edit logical-systems <i>logical-system-name</i> interfaces <i>dlm</i> unit <i>logical-unit-number</i> dialer-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<b>Description</b>	On J Series Services Routers, for logical and physical ISDN interfaces, specify the dial pool. The dial pool allows logical (dialer) and physical ( <b><i>br-pim/0/port</i></b> ) interfaces to be bound together dynamically on a per-call basis. On a dialer interface, <b>pool</b> directs the dialer interface which dial pool to use. On <b><i>br-pim/0/port</i></b> interface, <b>pool</b> defines the pool to which the interface belongs.
<b>Options</b>	<b><i>pool-name</i></b> —Pool identifier.  <b><i>priority priority</i></b> —(Physical <b><i>br-pim/0/port</i></b> interfaces only) Specify a priority value of 0 (lowest) to 255 (highest) for the interface within the pool.
<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>Configuring ISDN Physical Interface Properties</li><li><i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>



## pop-all-labels

<b>Syntax</b>	pop-all-labels { required-depth <i>number</i> ; }
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> atm-options mpls], [edit interfaces <i>interface-name</i> sonet-options mpls], [edit interfaces <i>interface-name</i> fastether-options mpls], [edit interfaces <i>interface-name</i> gigether-options mpls]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. 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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Removing MPLS Labels from Incoming Packets</li> <li>Removing MPLS Labels from Incoming Packet</li> <li>Junos Services Interfaces Configuration Release 12.3</li> </ul>

## ppp-options

<b>Syntax</b>	<pre> ppp-options {   authentication [ <i>authentication-protocols</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>;   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>
<b>Hierarchy Level</b>	<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. 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 66</a></li> <li>• Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface</li> </ul>

## premium (Output Priority Map)

<b>Syntax</b>	<pre>premium {   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</a> <a href="#">ethernet-policer-profile</a> output-priority-map classifier]
<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>	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>• Specifying an Output Priority Map</li> <li>• <a href="#">input-priority-map on page 205</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> <i>cos-policer-name</i> ]
<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 123</a></li><li>• <a href="#">ieee802.1p on page 201</a></li></ul>

## preserve-interface

<b>Syntax</b>	<code>preserve-interface;</code>
<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>	<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 Link PIC Redundancy</li> <li>• Junos Services Interfaces Configuration Release 12.3</li> </ul>

## primary (AS PIC or Multiservices PIC Interfaces)

<b>Syntax</b>	<code>primary 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 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>	<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>• Junos Services Interfaces Configuration Release 12.3</li> </ul>

## priority (Schedulers)

---

Syntax	priority (high   low);
Hierarchy Level	[edit interfaces at- <i>fpc/pic/port</i> atm-options scheduler-maps <i>map-name</i> forwarding-class <i>class-name</i> ]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	For ATM2 IQ interfaces only, assign queuing priority to a forwarding class.
Options	<b>low</b> —Forwarding class has low priority. <b>high</b> —Forwarding class has high priority.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"><li>Configuring ATM2 IQ VC Tunnel CoS Components</li></ul>

## promiscuous-mode

---

Syntax	promiscuous-mode { vpi <i>vpi-identifier</i> ; }
Hierarchy Level	[edit interfaces <i>interface-name</i> atm-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	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.
Options	<b>vpi-identifier</b> —Open this VPI in promiscuous mode. <b>Range:</b> 0 through 255
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	<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 334</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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring Basic Automatic Protect Switching</li> <li><a href="#">working-circuit on page 340</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>	<i>cells</i> —Maximum number of cells the queue can contain. <b>Range:</b> 1 through 64,000 cells
<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>Configuring ATM2 IQ VC Tunnel CoS Components</li> <li>Configuring Linear RED Profiles on ATM Interfaces</li> <li><a href="#">high-plp-threshold on page 196</a></li> <li><a href="#">low-plp-threshold on page 231</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 ], [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> shaping ], [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 ], [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. 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. <b>Range:</b> 1 through 16,383 packets <b>Default:</b> 16,383 packets
<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>Configuring the ATM1 Queue Length</li></ul>



## rate

<b>Syntax</b>	<code>rate percentage;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <a href="#">receive-bucket</a> ], [edit interfaces <i>interface-name</i> <a href="#">transmit-bucket</a> ]
<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. <b>Range:</b> 0 through 100
<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="#">Configuring Receive and Transmit Leaky Bucket Properties on page 85</a></li> </ul>

## receive-bucket

<b>Syntax</b>	<pre>receive-bucket {   <a href="#">overflow</a> (discard   tag);   <a href="#">rate percentage</a>;   <a href="#">threshold bytes</a>; }</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>	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="#">Configuring Receive and Transmit Leaky Bucket Properties on page 85</a></li> <li>• <a href="#">transmit-bucket on page 318</a></li> </ul>

## red-differential-delay

---

<b>Syntax</b>	<code>red-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 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><i>milliseconds</i></b> —Red differential delay threshold. <b>Range:</b> 1 through 2000 milliseconds <b>Default:</b> 10 milliseconds
<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="#">action-red-differential-delay on page 119</a></li><li>• <a href="#">yellow-differential-delay on page 341</a></li><li>• Junos Services Interfaces Configuration Release 12.3</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>	[edit <a href="#">interfaces</a> (rsp0   rsp1)], [edit interfaces rlsqnumber]
<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 or MultiServices PIC interface.</p> <p><b>secondary <i>interface-name</i></b>—The identifier for the secondary (backup) LSQ AS or MultiServices PIC interface.</p> <p><b>hot-standby</b>—For one-to-one AS or MultiServices PIC redundancy configurations, specify that the failure detection and recovery must take place in less than 5 seconds.</p>
<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>Junos Services Interfaces Configuration Release 12.3</li> </ul>

## remote-loopback-respond

---

<b>Syntax</b>	remote-loopback-respond;
<b>Hierarchy Level</b>	[edit interfaces <i>ct1-fpc/pic/port</i> ], [edit interfaces <i>interface-name</i> <b>t1-options</b> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. 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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring the T1 Remote Loopback Response</li><li><a href="#">feac-loop-respond on page 187</a></li><li><a href="#">loopback (ADSL, DS0, E1/E3, SONET/SDH, SHDSL, and T1/T3) on page 226</a></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. <b>working</b> —Request that the circuit become the working circuit.
<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>Configuring Switching Between the Working and Protect Circuits</li><li><a href="#">force on page 190</a></li></ul>

## required-depth


---

<b>Syntax</b>	<code>required-depth <i>number</i>;</code>
<b>Hierarchy Level</b>	<code>[edit interfaces <i>interface-name</i> atm-options mpls pop-all-labels],</code> <code>[edit interfaces <i>interface-name</i> sonet-options mpls pop-all-labels],</code> <code>[edit interfaces <i>interface-name</i> fastether-options mpls pop-all-labels],</code> <code>[edit interfaces <i>interface-name</i> gigether-options mpls pop-all-labels]</code>
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.
<b>Description</b>	<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>
<b>Options</b>	<p><b><i>number</i></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>
<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>• Removing MPLS Labels from Incoming Packets</li><li>• Removing MPLS Labels from Incoming Packets</li><li>• Junos Services Interfaces Configuration Release 12.3</li></ul>

## revert-time (Interfaces)

<b>Syntax</b>	<code>revert-time seconds;</code>
<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>	Configure APS revertive mode.
<b>Default</b>	APS operates in nonrevertive mode.
<b>Options</b>	<p><b>seconds</b>—Amount of time to wait after the working circuit has again become functional before making the working circuit active again.</p> <p><b>Range:</b> 1 through 65,535 seconds</p> <p><b>Default:</b> None (APS operates in nonrevertive 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>Configuring Revertive Mode</li> </ul>

## revertive

<b>Syntax</b>	<code>revertive;</code>
<b>Hierarchy Level</b>	[edit interfaces aeX aggregated-ether-options lacp link-protection]
<b>Release Information</b>	<p>Statement introduced in Junos OS Release 9.3.</p> <p>Statement introduced in Junos OS Release 12.3 for EX Series switches.</p>
<b>Description</b>	Enable the ability to switch to a better priority link (if one is available).
	<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 10px;">  </div> <div> <p><b>NOTE:</b> 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.</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>non-revertive (Chassis)</li> <li>Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring SONET/SDH RFC 2615 Support</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 dce-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">serial-options dte-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 the to-DCE signal, request to send (RTS).
<b>Options</b>	<b>assert</b> —The to-DCE signal must be asserted.  <b>de-assert</b> —The to-DCE signal must be deasserted.  <b>normal</b> —Normal RTS signal handling, as defined by the TIA/EIA Standard 530. <b>Default:</b> normal
<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>Configuring the Serial Signal Handling</li></ul>



---

## rts-polarity

---

<b>Syntax</b>	<code>rts-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 RTS signal polarity.
<b>Options</b>	<b>negative</b> —Negative signal polarity. <b>positive</b> —Positive signal polarity. <b>Default:</b> <b>positive</b>
<b>Required Privilege Level</b>	<b>interface</b> —To view this statement in the configuration. <b>interface-control</b> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Serial Signal Polarities</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.  <b>Range:</b> 1 through 4000 cells</p> <p><b>peak rate</b>—Peak rate, in bits per second or cells per second.  <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.  <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>Configuring ATM CBR</li> <li>Configuring ATM2 IQ Real-Time VBR</li> <li>Applying Scheduler Maps to Logical ATM Interfaces</li> </ul>

- [cbr on page 145](#)
- [vbr on page 331](#)

## scheduler-maps

---

<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 interfaces <i>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><b><i>map-name</i></b>—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>• Configuring ATM2 IQ VC Tunnel CoS Components</li> <li>• atm-scheduler-map</li> <li>• Junos OS Class of Service Configuration Guide</li> </ul>

## secondary

---

<b>Syntax</b>	<code>secondary <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 secondary (backup) AS PIC interface or MultiServices PIC interface.
<b>Options</b>	<b><i>interface-name</i></b> —The identifier for the AS PIC interface or MultiServices PIC interface, which must be of the form <b><i>sp-fpc/pic/port</i></b> .
<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>• Junos Services Interfaces Configuration Release 12.3</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
  - no-concatenate

---

## services (Priority Level)

---

- Syntax** `services priority-level;`
- Hierarchy Level** [edit [interfaces](#) *interface-name* [services-options](#) [sysloghost](#) *hostname*]
- Release Information** Statement introduced before Junos OS Release 7.4.
- Description** Specify system logging priority level.
- Options** *priority-level*—Assigns a priority level to the facility. Valid entries are as follows:
- **alert**—Conditions that should be corrected immediately.
  - **any**—Matches any level.
  - **emergency**—Panic conditions.
  - **critical**—Critical conditions.
  - **error**—Error conditions.
  - **info**—Informational messages.
  - **notice**—Conditions that require special handling.
  - **warning**—Warning messages.
- Required Privilege Level**
- interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.
- Related Documentation**
- Junos Services Interfaces Configuration Release 12.3

## 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 Services Interfaces Configuration Release 12.3

## shaping

<b>Syntax</b>	<pre>shaping {   (cbr rate   rtvbr peak rate sustained rate burst length   vbr peak rate sustained rate burst   length);   queue-length number; }</pre>
<b>Hierarchy Level</b>	<pre>[edit interfaces interface-name atm-options vpi vpi-identifier], [edit interfaces interface-name unit logical-unit-number], [edit interfaces interface-name unit logical-unit-number address address family family multipoint-destination address], [edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number], [edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number 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>Defining Virtual Path Tunnels</li> <li>Defining the ATM Traffic-Shaping Profile</li> <li>Configuring ATM QoS or Shaping</li> <li>Applying Scheduler Maps to Logical ATM Interfaces</li> </ul>

## shdsl-options

---

<b>Syntax</b>	<pre>shdsl-options {   annex (annex-a   annex-b);   line-rate <i>line-rate</i>;   loopback (local   remote   payload);   snr-margin {     current <i>margin</i>;     snext <i>margin</i>;   } }</pre>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 7.4.
<b>Description</b>	<p>For J Series Services Routers only, configure symmetric DSL (SHDSL) options.</p> <p>The statements are explained separately.</p>
<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>• ATM-over-SHDSL Overview</li></ul>



## snext

---

<b>Syntax</b>	<code>snext margin;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <b>shdsl-options</b> <b>snr-margin</b> ], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>shdsl-options</b> <b>snr-margin</b> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 7.4.
<b>Description</b>	For J Series Services Routers only, configure self-near-end crosstalk (SNEXT) signal-to-noise ratio (SNR) margin for a SHDSL line. When configured, the line trains at higher than SNEXT threshold. The SNR margin is the difference between the desired SNR and the actual SNR.
<b>Options</b>	<b>margin</b> —Desired SNEXT margin. Possible values are disabled or a margin between –10dB and 10 dB. <b>Default:</b> disabled
<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>• ATM-over-SHDSL Overview</li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>

## snr-margin

---

<b>Syntax</b>	<pre>snr-margin {     <b>current</b> margin;     <b>snext</b> margin; }</pre>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <b>shdsl-options</b> ], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>shdsl-options</b> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 7.4.
<b>Description</b>	<p>For J Series Services Routers only, configure the SHDSL signal-to-noise ratio (SNR) margin. The SNR margin is the difference between the desired SNR and the actual SNR. Configuring the SNR creates a more stable SHDSL connection by making the line train at a SNR margin higher than the threshold. If any external noise below the threshold is applied to the line, the line remains stable.</p> <p>The statements are explained separately.</p>
<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>• ATM-over-SHDSL Overview</li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</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>	• Configuring SONET/SDH Parameters on ATM Interfaces
	• Channelized OC12/STM4 IQ and IQE Interfaces Overview
	• Channelized STM1 Interfaces Overview
	• SONET/SDH Physical Interface Properties Overview
	• no-concatenate

## source-address-filter

<b>Syntax</b>	source-address-filter { <i>mac-address</i> ; }
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <a href="#">aggregated-ether-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 12.1X48 for PTX Packet Transport Switches.
<b>Description</b>	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. This statement is not supported on the J Series Services Routers.
<b>Options</b>	<p><b><i>mac-address</i></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><i>mac-address</i></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 VRRP and VRRP for IPv6 Overview, 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>
<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>Enabling Ethernet MAC Address Filtering</li> <li>Configuring MAC Filtering on PTX Series Packet Transport Switches</li> <li><a href="#">source-filtering on page 298</a></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> ], [edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 12.1X48 for PTX Packet Transport Switches.
<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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Enabling Ethernet MAC Address Filtering</li><li>• Configuring MAC Filtering on PTX Series Packet Transport Switches</li><li>• accept-source-mac</li><li>• <a href="#">source-address-filter on page 297</a></li></ul>

## speed (Ethernet)

<b>Syntax</b>	speed (10m   100m   1g   auto);
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ], [edit interfaces ge-pim/0/0 <b>switch-options</b> switch-port <i>port-number</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.
<b>Description</b>	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), the built-in Ethernet interfaces on J Series Services Routers, Combo Line Rate DPCs and Tri-Rate Ethernet Copper interfaces on MX Series routers, and on the Gigabit Ethernet ports on J Series Services Routers with uPIMs installed and configured for access switching mode. 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.
<b>Options</b>	You can specify the speed as either <b>10m</b> (10 Mbps), <b>100m</b> (100 Mbps), or on J Series routers with uPIMs installed and on MX Series routers, <b>1g</b> (1 Gbps). You can specify the <b>auto</b> option only on MX Series routers.
<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="#">Configuring the Interface Speed on page 77</a></li> <li>• Configuring the Interface Speed on Ethernet Interfaces</li> <li>• Configuring Gigabit Ethernet Autonegotiation</li> <li>• Configuring J Series Services Router Switching Interfaces</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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring Gigabit Ethernet Autonegotiation</li><li>no-auto-mdix</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> <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>Configuring SONET/SDH Interface Speed</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>Configuring ISDN Physical Interface Properties</li> <li><i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>

## spid2

---


<b>Syntax</b>	<code>spid2 spid2-string;</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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring ISDN Physical Interface Properties</li><li><i>J Series Services Router Configuration Guide</i></li></ul>

## stacked-vlan-tagging

---

<b>Syntax</b>	<code>stacked-vlan-tagging;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.
<b>Description</b>	For Gigabit Ethernet IQ interfaces, enable stacked VLAN tagging for all logical interfaces on the physical interface.  For pseudowire subscriber interfaces, enable stacked VLAN tagging for logical interfaces on the pseudowire service.
<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>Stacking and Rewriting Gigabit Ethernet VLAN Tags Overview</li><li>vlan-tags (Stacked VLAN Tags)</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> ], [edit interfaces t1- <i>fpc/pic/port</i> ], [edit interfaces <i>interface-name</i> <b>ds0-options</b> ], [edit interfaces <i>interface-name</i> <b>e1-options</b> ], [edit interfaces <i>interface-name</i> <b>e3-options</b> ], [edit interfaces <i>interface-name</i> <b>t1-options</b> ], [edit interfaces <i>interface-name</i> <b>t3-options</b> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. 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.
	<div>  <p><b>NOTE:</b> 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-<i>fpc/pic/port</i>] or [edit interfaces t1-<i>fpc/pic/port</i>] hierarchy level as appropriate.</p> </div>
<b>Options</b>	<b>filler</b> —Wait two idle cycles between the start and end flags.  <b>shared</b> —Share the transmission of the start and end flags. This is the default.
<b>Required Privilege Level</b>	<b>interface</b> —To view this statement in the configuration. <b>interface-control</b> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Configuring E1 Start and End Flags</li> <li>Configuring the E3 Start and End Flags</li> <li>Configuring T1 Start and End Flags</li> <li>Configuring T3 Start and End Flags</li> </ul>

## static-tei-val

---

<b>Syntax</b>	<code>static-tei-val value;</code>
<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 J Series Services Routers only. Statically configure the Terminal Endpoint Identifier (TEI) value. The TEI value represents any ISDN-capable device attached to an ISDN network that is the terminal endpoint. TEIs are used to distinguish between several different devices using the same ISDN links.
<b>Options</b>	<b>value</b> —Value between 0 through 63.
<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>Configuring ISDN Physical Interface Properties</li><li><i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>

## switching-mode

---

<b>Syntax</b>	<code>switching-mode (bidirectional   unidirectional);</code>
<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>	<b>bidirectional</b> —Support bidirectional mode only.  <b>unidirectional</b> —Interoperate with a SONET/SDH LTE provisioned for unidirectional mode.
<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>Configuring Switching Mode</li></ul>

---

## switch-options

---

<b>Syntax</b>	<pre>switch-options {   switch-port <i>port-number</i> {     (<i>auto-negotiation</i>   no-auto-negotiation);     speed (10m   100m   1g);     link-mode (full-duplex   half-duplex);   } }</pre>
<b>Hierarchy Level</b>	[edit interfaces <i>ge-pim/0/0</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.4.
<b>Description</b>	On a J Series Services Router with multiport Gigabit Ethernet uPIMs installed and operating in access switching mode, only one physical interface is configured for the entire multiport Gigabit Ethernet uPIM. 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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring J Series Services Router Switching Interfaces</li></ul>

## switch-port

---

<b>Syntax</b>	<pre>switch-port <i>port-number</i> {     (auto-negotiation   no-auto-negotiation);     speed (10m   100m   1g);     link-mode (full-duplex   half-duplex); }</pre>
<b>Hierarchy Level</b>	[edit interfaces <i>ge-pim/0/0</i> <a href="#">switch-options</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.4.
<b>Description</b>	On a J Series Services Router with Ethernet uPIMs installed and operating in access switching mode, 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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring J Series Services Router Switching Interfaces</li></ul>

## switch-type

<b>Syntax</b>	switch-type (att5e   etsi   ni1   ntdms-100)
<b>Hierarchy Level</b>	[edit interfaces br-pim/O/port isdn-options]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<b>Description</b>	For J Series Services Routers only. Configure the ISDN variant supported.
<b>Options</b>	<p><b>att5e</b>—AT&amp;T switch variant.</p> <p><b>etsi</b>—European Telecommunications Standards Institute switch variant.</p> <p><b>ni1</b>—National ISDN 1 switch variant.</p> <p><b>ntdms-100</b>—Northern Telecom DMS-100.</p> <p><b>ntt</b>—NTT Group switch for Japan.</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>• ISDN Interfaces Overview</li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>

## syslog (Monitoring)

<b>Syntax</b>	(syslog   no-syslog);
<b>Hierarchy Level</b>	[edit <a href="#">interfaces</a> mo-fpc/pic/port <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 <b>/var/log</b> 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 87</a></li> <li>• Junos Services Interfaces Configuration Release 12.3</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. 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>priority</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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</li></ul>



## t1-options

<b>Syntax</b>	<pre> t1-options {   bert-algorithm <i>algorithm</i>;   bert-error-rate <i>rate</i>;   bert-period <i>seconds</i>;   buildout <i>value</i>;   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 <i>time-slot-range</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>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.</p>
<b>Description</b>	<p>Configure T1-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>T1 Interfaces Overview</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>	<b>seconds</b> —Timer value, in seconds. <b>Range:</b> 1 through 65536 seconds <b>Default:</b> 10 seconds
<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>Configuring ISDN Physical Interface Properties</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>	<b>seconds</b> —Link integrity polling interval. <b>Range:</b> 5 through 30 seconds <b>Default:</b> 10 seconds
<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="#">n391 on page 242</a></li><li><a href="#">n392 on page 243</a></li><li><a href="#">n393 on page 244</a></li><li><a href="#">t392 on page 311</a></li><li>Junos Services Interfaces Configuration Release 12.3</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. <b>Range:</b> 5 through 30 seconds <b>Default:</b> 15 seconds
<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="#">n391 on page 242</a></li><li>• <a href="#">n392 on page 243</a></li><li>• <a href="#">n393 on page 244</a></li><li>• <a href="#">t391 on page 310</a></li><li>• <a href="#">timeslots on page 315</a></li><li>• Junos Services Interfaces Configuration Release 12.3</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 [ <i>tpids</i> ];</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> <b>gigether-options</b> <b>ethernet-switch-profile</b> ], [edit interfaces <i>interface-name</i> <b>aggregated-ether-options</b> <b>ethernet-switch-profile</b> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.
<b>Description</b>	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.  For 10-Gigabit Ethernet LAN/WAN PIC interfaces on T Series routers, only the default TPID value ( <b>0x8100</b> ) is supported.
<b>Options</b>	<i>tpids</i> —TPIDs to be accepted on the VLAN. Specify TPIDs in hexadecimal.
<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>Configuring Frames with Particular TPIDs to Be Processed as Tagged Frames</li> </ul>

## tei-option



<b>Syntax</b>	<code>tei-option (first-call   power-up);</code>
<b>Hierarchy Level</b>	[edit interfaces <i>br-pim</i> / <i>0/port</i> <b>isdn-options</b> ]
<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.  <b>power-up</b> —Activation occurs when the Services Router is powered on. <b>Default:</b> <b>power-up</b>
<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>Configuring ISDN Physical Interface Properties</li> <li><i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>

## threshold

---

<b>Syntax</b>	<code>threshold <i>bytes</i>;</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.
<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 on page 85</a></li></ul>

## timeslots

<b>Syntax</b>	<code>timeslots <i>time-slot-range</i>;</code>
<b>Hierarchy Level</b>	<code>[edit interfaces e1-<i>fpc/pic/port</i>],</code> <code>[edit interfaces t1-<i>fpc/pic/port</i>],</code> <code>[edit interfaces <i>interface-name</i> e1-<b>options</b>],</code> <code>[edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i>],</code> <code>[edit interfaces <i>interface-name</i> t1-<b>options</b>]</code>
<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.
	<div>  <p><b>NOTE:</b> When configuring E1 or T1 interfaces on the 10-port Channelized E1/T1 IQE PIC, the <code>timeslots</code> statement must be included at the <code>[edit interfaces e1-<i>fpc/pic/port</i>]</code> or <code>[edit interfaces t1-<i>fpc/pic/port</i>]</code> hierarchy level as appropriate.</p> </div>
<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-<i>options</i></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>
	<div>  <p><b>NOTE:</b> 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.</p> </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>• Configuring Fractional E1 IQ and IQE Interfaces</li> <li>• Configuring Fractional T1 IQ and IQE Interfaces</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> <a href="#">dce-options</a> ], [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> <a href="#">dte-options</a> ]
<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>	<b>ignore</b> —The from-DCE signal is ignored.  <b>normal</b> —Normal TM signal handling as defined by the TIA/EIA Standard 530.  <b>require</b> —The from-DCE signal must be asserted. <b>Default:</b> normal
<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>• Configuring the Serial Signal Handling</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>	<b>negative</b> —Negative signal polarity.  <b>positive</b> —Positive signal polarity. <b>Default:</b> positive
<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>• Configuring Serial Signal Polarities</li></ul>



## traceoptions (Individual Interfaces)

<b>Syntax</b>	<pre> traceoptions {     file <i>filename</i> &lt;files <i>name</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable   no-world-readable&gt;;     flag <i>flag</i>;     match; } </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>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.</p>
<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</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</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.<b>dcd</b>.</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> </ul>

- **ipc**—Interface interprocess communication (IPC) messages
- **media**—Interface media changes
- **q921**—Trace ISDN Q.921 frames
- **q931**—Trace ISDN Q.931 frames

**Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.

**Related Documentation**

- [Tracing Operations of an Individual Router or Switch Interface](#)

---

## transmit-bucket

---

**Syntax**

```
transmit-bucket {  
    overflow discard;  
    rate percentage;  
    threshold bytes;  
}
```

**Hierarchy Level** [edit interfaces *interface-name*]

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Set parameters for the transmit leaky bucket, which specifies what percentage of the interface's total capacity can be used to transmit packets.

For each DS3 channel in a channelized OC12 interface, you can configure a unique transmit bucket.

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 Receive and Transmit Leaky Bucket Properties on page 85](#)
- [receive-bucket on page 277](#)

## transmit-clock

<b>Syntax</b>	transmit-clock invert;
<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 the transmit clock signal.
<b>Options</b>	<b>invert</b> —Shift the clock phase 180 degrees.
<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>Configuring the Serial Clocking Mode</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> <a href="#">forwarding-class</a> <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.  <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.  <b>Range:</b> 0 through 32,000</p>
<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>Configuring ATM2 IQ VC Tunnel CoS Components</li> </ul>

## traps

---

<b>Syntax</b>	(traps   no-traps);
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ], [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ], [edit interfaces interface-range <i>name</i> ], [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. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.
<b>Description</b>	Enable or disable the sending of Simple Network Management Protocol (SNMP) notifications when the state of the connection changes.
<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="#">Enabling or Disabling SNMP Notifications on Physical Interfaces on page 89</a></li><li>• <a href="#">Enabling or Disabling SNMP Notifications on Logical Interfaces</a></li></ul>

## trigger

<b>Syntax</b>	<pre>trigger {     defect ignore;     defect <b>hold-time</b> up <i>milliseconds</i> down <i>milliseconds</i>; }</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>rfi-l</b>—Line remote failure indication</li> <li>• <b>rfi-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>	<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 SONET/SDH Defect Triggers</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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Junos Services Interfaces Configuration Release 12.3</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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>Configuring E3 IQ and IQE Unframed Mode</li></ul>

---

## unidirectional

---

<b>Syntax</b>	unidirectional;
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ], [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.
<b>Description</b>	<p>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:</p> <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. 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 15</a></li><li>• <a href="#">Enabling Unidirectional Traffic Flow on Physical Interfaces on page 89</a></li></ul>

## 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 {
    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;
    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 ...
}
bridge-domain-type (bvlan | svlan);
bundle interface-name;
core-facing;
demux-destination {
    destination-prefix;
}
demux-source {
    source-prefix;
}
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;
isid-list all-service-groups;
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 only. 0 through 16,385 for all other static interface types.

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 Logical Interface Properties](#)
- [Example: Configuring E-LINE and E-LAN Services for a PBB Network on MX Series Routers](#)
- [Junos Services Interfaces Configuration Release 12.3](#)

## 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.  <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.  <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.  <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>Configuring ATM CBR</li> <li>Applying Scheduler Maps to Logical ATM Interfaces</li> </ul>

- [cbr on page 145](#)
- [rtvbr on page 286](#)
- [shaping on page 291](#)

---

## 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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Configuring ATM2 IQ VC Tunnel CoS Components</a></li><li>• <a href="#">Configuring Scheduler Maps on ATM Interfaces</a></li></ul>



## vlan-tagging

<b>Syntax</b>	vlan-tagging;
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.
<b>Description</b>	For Fast Ethernet and Gigabit Ethernet interfaces, aggregated Ethernet interfaces configured for VPLS, and pseudowire subscriber interfaces, 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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch</li> <li>• Example: Configuring BGP Autodiscovery for LDP VPLS</li> <li>• Configuring a Layer 3 Subinterface (CLI Procedure)</li> <li>• Configuring Tagged Aggregated Ethernet Interfaces</li> <li>• Configuring Interfaces for VPLS Routing</li> <li>• Enabling VLAN Tagging</li> <li>• 802.1Q VLANs Overview</li> <li>• vlan-id</li> </ul>

## vlan-tags-outer

<b>Syntax</b>	vlan-tags-outer <i>vlan-tag</i> ;
<b>Hierarchy Level</b>	[edit interfaces interface-set <i>interface-set-name</i> interface <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.5.
<b>Description</b>	The S-VLAN outer tag that belongs to a set of interfaces used to configure hierarchical CoS schedulers.
<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>• Junos OS Class of Service Configuration Guide</li> </ul>

## vlan-vci-tagging

---

<b>Syntax</b>	<code>vlan-vci-tagging;</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.0.
<b>Description</b>	Enable the ATM-to-Ethernet interworking cross-connect function on a Gigabit Ethernet, 10-Gigabit Ethernet, or aggregated Ethernet interface.
<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>Configuring ATM-to-Ethernet Interworking</li></ul>

## 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> <b>atm-options promiscuous-mode</b> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. 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.  When you include <b>vpi</b> statements at the [edit interfaces <i>interface-name</i> <b>atm-options promiscuous-mode</b> ] 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 vci statement. (For a list of hierarchy levels at which you can include the vci statement, see vci.)  <b>Range:</b> 0 through 255
<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>Configuring ATM Cell-Relay Promiscuous Mode</li></ul>

---

## vtmapping

---

<b>Syntax</b>	<code>vtmapping (itu-t   klm);</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> sonet-options]; [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>	<p>For the Channelized STM1 IQ PIC or Channelized STM1 PIC, configure virtual tributary mapping.</p> <p>For the Channelized STM1 PIC, you configure virtual tributary mapping at the <b>[edit chassis <i>fpc number</i> <i>pic number</i>]</b> hierarchy level.</p>
<b>Options</b>	<p><b>itu-t</b>—International Telephony Union standard.</p> <p><b>klm</b>—KLM standard.</p> <p><b>Default:</b> klm</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 Virtual Tributary Mapping of Channelized STM1 Interfaces</li><li>Configuring the Junos OS to Support Channelized STM1 Interface Virtual Tributary Mapping</li></ul>

## warning

---

<b>Syntax</b>	<pre>warning low-light-warning {   (link-down   syslog); }</pre>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> optics-options]
<b>Release Information</b>	Statement introduced in Junos OS Release 10.0. Statement introduced in Junos OS Release 12.1 for EX Series switches.
<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> —Drops the 10-Gigabit Ethernet link and marks link as down.  <b>syslog</b> —Writes the optics information to the system log.
<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>Configuring 10-Gigabit Ethernet Link Down Notification for Optics Options Alarm or Warning</li></ul>

## wavelength

<b>Syntax</b>	<code>wavelength <i>nm</i></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. Statement introduced in Junos OS Release 12.1 for EX Series switches.
<b>Description</b>	For 10-Gigabit Ethernet DWDM interfaces only, configure full C-band ITU-Grid tunable optics.
<b>Options</b>	<p><i>nm</i>—Wavelength value. It can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b>1528.77</b>—1528.77 nanometers (nm), corresponds to 50 GHz through 100 GHz</li> <li>• <b>1529.16</b>—1529.16 nm, corresponds to 50 GHz</li> <li>• <b>1529.55</b>—1529.55 nm, corresponds to 50 GHz through 100 GHz</li> <li>• <b>1529.94</b>—1529.94 nm, corresponds to 50 GHz</li> <li>• <b>1530.33</b>—1530.33 nm, corresponds to 50 GHz through 100 GHz</li> <li>• <b>1530.72</b>—1530.72 nm, corresponds to 50 GHz</li> <li>• <b>1531.12</b>—1531.12 nm, corresponds to 50 GHz through 100 GHz</li> <li>• <b>1531.51</b>—1531.51 nm, corresponds to 50 GHz</li> <li>• <b>1531.90</b>—1531.90 nm, corresponds to 50 GHz through 100 GHz</li> <li>• <b>1532.29</b>—1532.29 nm, corresponds to 50 GHz</li> <li>• <b>1532.68</b>—1532.68 nm, corresponds to 50 GHz through 100 GHz</li> <li>• <b>1533.07</b>—1533.07 nm, corresponds to 50 GHz</li> <li>• <b>1533.47</b>—1533.47 nm, corresponds to 50 GHz through 100 GHz</li> <li>• <b>1533.86</b>—1533.86 nm, corresponds to 50 GHz</li> <li>• <b>1534.25</b>—1534.25 nm, corresponds to 50 GHz through 100 GHz</li> <li>• <b>1534.64</b>—1534.64 nm, corresponds to 50 GHz</li> <li>• <b>1535.04</b>—1535.04 nm, corresponds to 50 GHz through 100 GHz</li> <li>• <b>1535.43</b>—1535.43 nm, corresponds to 50 GHz</li> <li>• <b>1535.82</b>—1535.82 nm, corresponds to 50 GHz through 100 GHz</li> <li>• <b>1536.22</b>—1536.22 nm, corresponds to 50 GHz</li> <li>• <b>1536.61</b>—1536.61 nm, corresponds to 50 GHz through 100 GHz</li> <li>• <b>1537.00</b>—1537.00 nm, corresponds to 50 GHz</li> <li>• <b>1537.40</b>—1537.40 nm, corresponds to 50 GHz through 100 GHz</li> </ul>

- **1537.79**—1537.79 nm, corresponds to 50 GHz
- **1538.19**—1538.19 nm, corresponds to 50 GHz through 100 GHz
- **1538.58**—1538.58 nm, corresponds to 50 GHz
- **1538.98**—1538.98 nm, corresponds to 50 GHz through 100 GHz
- **1539.37**—1539.37 nm, corresponds to 50 GHz
- **1539.77**—1539.77 nm, corresponds to 50 GHz through 100 GHz
- **1540.16**—1540.16 nm, corresponds to 50 GHz
- **1540.56**—1540.56 nm, corresponds to 50 GHz through 100 GHz
- **1540.95**—1540.95 nm, corresponds to 50 GHz
- **1541.35**—1541.35 nm, corresponds to 50 GHz through 100 GHz
- **1541.75**—1541.75 nm, corresponds to 50 GHz
- **1542.14**—1542.14 nm, corresponds to 50 GHz through 100 GHz
- **1542.54**—1542.54 nm, corresponds to 50 GHz
- **1542.94**—1542.94 nm, corresponds to 50 GHz through 100 GHz
- **1543.33**—1543.33 nm, corresponds to 50 GHz
- **1543.73**—1543.73 nm, corresponds to 50 to 100 GHz
- **1544.13**—1544.13 nm, corresponds to 50 GHz
- **1544.53**—1544.53 nm, corresponds to 50 GHz through 100 GHz
- **1544.92**—1544.92 nm, corresponds to 50 GHz
- **1545.32**—1545.32 nm, corresponds to 50 GHz through 100 GHz
- **1545.72**—1545.72 nm, corresponds to 50 GHz
- **1546.12**—1546.12 nm, corresponds to 50 GHz through 100 GHz
- **1546.52**—1546.52 nm, corresponds to 50 GHz
- **1546.92**—1546.92 nm, corresponds to 50 GHz through 100 GHz
- **1547.32**—1547.32 nm, corresponds to 50 GHz
- **1547.72**—1547.72 nm, corresponds to 50 GHz through 100 GHz
- **1548.11**—1548.11 nm, corresponds to 50 GHz
- **1548.51**—1548.51 nm, corresponds to 50 GHz through 100 GHz
- **1548.91**—1548.91 nm, corresponds to 50 GHz
- **1549.32**—1549.32 nm, corresponds to 50 GHz through 100 GHz
- **1549.72**—1549.72 nm, corresponds to 50 GHz
- **1550.12**—1550.12 nm, corresponds to 50 GHz through 100 GHz
- **1550.52**—1550.52 nm, corresponds to 50 GHz

- **1550.92**—1550.92 nm, corresponds to 50 GHz through 100 GHz
- **1551.32**—1551.32 nm, corresponds to 50 GHz
- **1551.72**—1551.72 nm, corresponds to 50 GHz through 100 GHz
- **1552.12**—1552.12 nm, corresponds to 50 GHz
- **1552.52**—1552.52 nm, corresponds to 50 GHz through 100 GHz
- **1552.93**—1552.93 nm, corresponds to 50 GHz
- **1553.33**—1554.33 nm, corresponds to 50 GHz through 100 GHz
- **1553.73**—1554.73 nm, corresponds to 50 GHz
- **1554.13**—1554.13 nm, corresponds to 50 GHz through 100 GHz
- **1554.54**—1554.54 nm, corresponds to 50 GHz
- **1554.94**—1554.94 nm, corresponds to 50 GHz through 100 GHz
- **1555.34**—1555.34 nm, corresponds to 50 GHz
- **1555.75**—1555.75 nm, corresponds to 50 GHz through 100 GHz
- **1556.15**—1556.15 nm, corresponds to 50 GHz
- **1556.55**—1556.55 nm, corresponds to 50 GHz through 100 GHz
- **1556.96**—1556.96 nm, corresponds to 50 GHz
- **1557.36**—1557.36 nm, corresponds to 50 GHz through 100 GHz
- **1557.77**—1557.77 nm, corresponds to 50 GHz
- **1558.17**—1558.17 nm, corresponds to 50 GHz through 100 GHz
- **1558.58**—1558.58 nm, corresponds to 50 GHz
- **1558.98**—1558.98 nm, corresponds to 50 GHz through 100 GHz
- **1559.39**—1559.39 nm, corresponds to 50 GHz
- **1559.79**—1559.79 nm, corresponds to 50 GHz through 100 GHz
- **1560.20**—1560.20 nm, corresponds to 50 GHz
- **1560.61**—1560.61 nm, corresponds to 50 to 100 GHz
- **1561.01**—1561.01 nm, corresponds to 50 GHz
- **1561.42**—1561.42 nm, corresponds to 50 GHz through 100 GHz
- **1561.83**—1561.83 nm, corresponds to 50 GHz
- **1562.23**—1562.23 nm, corresponds to 50 GHz through 100 GHz
- **1562.64**—1562.64 nm, corresponds to 50 GHz
- **1563.05**—1563.05 nm, corresponds to 50 GHz through 100 GHz
- **1563.45**—1563.45 nm, corresponds to 50 GHz

- **1563.86**—1563.86 nm, corresponds to 50 GHz through 100 GHz
- **Default: 1550.12**—1550.12 nm, corresponds to 50 GHz through 100 GHz

<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>• 10-Gigabit Ethernet DWDM Interface Wavelength Overview</li></ul>

---

## 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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• Configuring Basic Automatic Protect Switching</li><li>• <a href="#">protect-circuit on page 275</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>	<p><i>milliseconds</i>—Yellow differential delay threshold.</p> <p><b>Range:</b> 1 through 2000 milliseconds</p> <p><b>Default:</b> 6 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>Junos Services Interfaces Configuration Release 12.3</li> <li><a href="#">action-red-differential-delay on page 119</a></li> <li>remote</li> </ul>

## z0-increment

---

<b>Syntax</b>	<code>(z0-increment   no-z0-increment);</code>
<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>	<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 an Incrementing STM ID</li> <li><a href="#">sonet-options on page 295</a></li> </ul>



## PART 3

# Administration

- [Monitoring Commands on page 345](#)
- [Command Summaries on page 695](#)



## CHAPTER 5

# Monitoring Commands

## show interfaces (10-Gigabit Ethernet)

---

<b>Syntax</b>	<code>show interfaces <i>xe-fpc/pic/port</i></code> <code>&lt;brief   detail   extensive   terse&gt;</code> <code>&lt;descriptions&gt;</code> <code>&lt;media&gt;</code> <code>&lt;snmp-index <i>snmp-index</i>&gt;</code> <code>&lt;statistics&gt;</code>
<b>Release Information</b>	Command introduced in Junos OS Release 8.0.
<b>Description</b>	(M320, M120, MX Series, and T Series routers only) Display status information about the specified 10-Gigabit Ethernet interface.
<b>Options</b>	<p><code><i>xe-fpc/pic/port</i></code>—Display standard information about the specified 10-Gigabit Ethernet 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>	<p><a href="#">show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, IQ2) on page 361</a></p> <p><a href="#">show interfaces extensive (10-Gigabit Ethernet, WAN PHY Mode) on page 364</a></p> <p><a href="#">show interfaces extensive (10-Gigabit Ethernet, DWDM OTN PIC) on page 366</a></p> <p><a href="#">show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode) on page 369</a></p> <p><a href="#">show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode, Transmit-Only) on page 369</a></p> <p><a href="#">show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode, Receive-Only) on page 370</a></p>
<b>Output Fields</b>	See <a href="#">Table 19 on page 347</a> for the output fields for the <code>show interfaces</code> (10-Gigabit Ethernet) command.

Table 19: 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 Common Output Fields Description.	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 Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	All levels

Table 19: 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 Common Output Fields Description.	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).	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.	detail extensive
<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>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 19 on page 347</a>.</p>	detail extensive



Table 19: show interfaces Gigabit 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 19: 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>	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. Displayed on IQ2 interfaces.	<b>extensive</b>
<b>Queue counters (Ingress)</b>	<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>	<b>extensive</b>

Table 19: show interfaces Gigabit Ethernet 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> </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>	<p>The FECmode configured on the interface.</p> <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>	<p>OTN mode.</p> <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>	<p>The forward error correction (FEC) counters for the DWDM OTN PIC.</p> <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>
<b>OTN FEC alarms</b>	<p>OTN FEC excessive or degraded error alarms triggered on the interface.</p> <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>	<p>OTN OC defects triggered on the interface.</p> <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>

Table 19: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
<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>—High bit error rate. Indicates the number of bit errors when the PCS receiver is operating in normal mode.</li> <li>• <b>Errored blocks</b>—Loss of block lock. The number of errored blocks when PCS receiver is operating in normal mode.</li> </ul>	<b>detail extensive</b>

Table 19: 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</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 <a href="#">Table 20 on page 361</a></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>—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 19: 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 19: 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 19: 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 19: 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 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 19: show interfaces Gigabit Ethernet 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>	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 Common Output Fields Description.	All levels

Table 19: 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> 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 Common Output Fields Description.	<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>	<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 19: 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.  <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, <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 Common Output Fields Description.	<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 Common Output Fields Description.	<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 Common Output Fields Description.	<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 19: 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 20 on page 361](#) 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 20 on page 361](#), 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 20: 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:  Input bytes: 496 bytes per packet, representing the Layer 2 packet  MAC statistics:  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:  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:  Input bytes: 490 bytes per packet, representing the Layer 3 packet + 12 bytes  MAC statistics:  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:  Input bytes: 478 bytes per packet, representing the Layer 3 packet	

## Sample Output

**show interfaces extensive**

```
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
```

**(10-Gigabit Ethernet,  
LAN PHY Mode, IQ2)**

```

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          Seconds
                    0

```

```

    Errored blocks                                0
MAC statistics:
    Receive
    Transmit
    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
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
    0 bps
    0 bps
    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**

```
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
```



**(10-Gigabit Ethernet,  
WAN PHY Mode)**

```

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

```

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

```

(10-Gigabit Ethernet,  
DWDM OTN PIC)

```

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:      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 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 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
    0 best-effort         95      95000000000    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)**

```

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,

```

### Mode, Unidirectional Mode, Transmit-Only

```

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
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

```

user@host> show interfaces xe-7/0/0-rx extensive
Physical interface: xe-7/0/0-rx, Enabled, Physical link is Up

```

extensive (10-Gigabit  
Ethernet, LAN PHY

Interface index: 174, SNMP ifIndex: 118, Generation: 175  
Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps,  
Unidirectional: Rx-Only

### Mode, Unidirectional Mode, Receive-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 389</a></p> <p><a href="#">show interfaces extensive (ATM IMA Group) on page 389</a></p> <p><a href="#">show interfaces (ATM1, SONET Mode) on page 390</a></p> <p><a href="#">show interfaces brief (ATM1, SONET Mode) on page 391</a></p> <p><a href="#">show interfaces detail (ATM1, SONET Mode) on page 391</a></p> <p><a href="#">show interfaces extensive (ATM1, SONET Mode) on page 392</a></p> <p><a href="#">show interfaces (ATM2, SDH Mode) on page 394</a></p> <p><a href="#">show interfaces brief (ATM2, SDH Mode) on page 395</a></p> <p><a href="#">show interfaces detail (ATM2, SDH Mode) on page 396</a></p> <p><a href="#">show interfaces extensive (ATM2, SDH Mode) on page 397</a></p> <p><a href="#">show interfaces (ATM2, SONET Mode) on page 400</a></p> <p><a href="#">show interfaces brief (ATM2, SONET Mode) on page 401</a></p> <p><a href="#">show interfaces detail (ATM2, SONET Mode) on page 402</a></p> <p><a href="#">show interfaces extensive (ATM2, SONET Mode) on page 404</a></p>
<b>Output Fields</b>	<p><a href="#">Table 21 on page 373</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 21: ATM show interfaces Output Fields

Field Name	Field Description	Level of Output
Physical Interface		

Table 21: 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 Common Output Fields Description.	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 Common Output Fields Description.	All levels

Table 21: 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 Common Output Fields Description.	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 21: 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> <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 21: 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 21: 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>  <b>Transmitted SONET 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>SDH alarms</b>  <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: <b>SDH PHY</b>, <b>SDH regenerator section</b>, <b>SDH multiplex section</b>, and <b>SDH path</b>.</p>	All levels

Table 21: 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 21: 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>  <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>  <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 21: 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 21: 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 21: 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 21: 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 21: 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 Common Output Fields Description.	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 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 Common Output Fields Description.	<b>detail extensive none</b>
<b>Addresses, Flags</b>	Information about the address flags. Possible values are described in the “Addresses Flags” section under Common Output Fields Description.	<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 21: ATM 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>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 21: 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 21: 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 (ATM1, SONET Mode)

user@host&gt; 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**

```

user@host> show interfaces at-0/2/1
Physical interface: at-0/2/1, Enabled, Physical link is Up

```

**(ATM2, SDH Mode)**

```

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       OK
  PHY Light    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 (ATM-over-ADSL)

<b>Syntax</b>	<pre>show interfaces at-pim/0/port &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>	(J Series routers) Display status information about the specified ATM-over-asynchronous DSL (ADSL) interface.
<b>Options</b>	<p><b>at-pim/0/port</b>—Display standard information about the specified ADSL 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-over-ADSL) on page 410</a></p> <p><a href="#">show interfaces brief (ATM-over-ADSL) on page 410</a></p> <p><a href="#">show interfaces detail (ATM-over-ADSL) on page 411</a></p> <p><a href="#">show interfaces extensive (ATM-over-ADSL) on page 412</a></p>
<b>Output Fields</b>	Table 22 on page 408 lists only output fields that are specific to the <b>show interfaces</b> (ATM-over-ADSL) command. For information about all other output fields, see Table 92 under the <a href="#">show interfaces (ATM)</a> command.

Table 22: ATM-over-ADSL show interfaces Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
ADSL alarms	Number and type of ADSL alarms. See “ADSL media” for details.	detail extensive none
ADSL defects	Number and type of ADSL defects. See “ADSL media” for details.	detail extensive none

Table 22: ATM-over-ADSL show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
ADSL status	<p>Operational information for ATM-over-ADSL interfaces.</p> <ul style="list-style-type: none"> <li>• <b>Modem status</b>—Status of the modem: <b>Down</b>, <b>Training</b>, or <b>Showtime</b>.</li> <li>• <b>DSL mode</b>—Configured line type of the digital subscriber line: <b>adsl2plus</b>, <b>ansi-dmt</b>, <b>auto</b>, <b>itu-dmt</b>, or <b>itu-dmt-bis</b>.</li> <li>• <b>Last fail code</b>—Reason for failure: <b>ATU-C not detected</b>, <b>incompatible line condition</b>, <b>protocol error</b>, <b>message error</b>, <b>spurious ATU detected</b>, <b>forced silence</b>, <b>unselectable operation mode</b>, or <b>none</b>.</li> <li>• <b>Subfunction</b>—Specified analog front-end chip and discrete front.</li> <li>• <b>Seconds in showtime</b>—Number of seconds the ADSL connection is in showtime.</li> </ul>	detail extensive none
ADSL media	<p>Information about ADSL media-specific defects that can prevent the interface from passing packets. The following information is displayed for each defect:</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. A state other than <b>OK</b> indicates a problem.</li> </ul> <p>The possible defects are as follows:</p> <ul style="list-style-type: none"> <li>• <b>LOF</b>—Loss of frame.</li> <li>• <b>LOS</b>—Loss of signal.</li> <li>• <b>LOM</b>—Loss of multiframe.</li> <li>• <b>LOP</b>—Loss of pointer.</li> <li>• <b>LOCDI</b>—Loss of cell delineation for an interleaved channel.</li> <li>• <b>LOCDNI</b>—Loss of cell delineation for a noninterleaved channel.</li> </ul>	extensive
ADSL Statistics	<p>Information about the ADSL terminal unit-remote (ATU-R) at the far end of the connection and the ADSL terminal unit-central office (ATU-C) at the near end:</p> <ul style="list-style-type: none"> <li>• <b>Attenuation (dB)</b>—Attenuation in decibels.</li> <li>• <b>Capacity used (%)</b>—Percentage of capacity used.</li> <li>• <b>Noise margin (dB)</b>—Maximum extraneous signal allowed without causing the output to deviate from an allowable level, in decibels.</li> <li>• <b>Output power (dBm)</b>—Amount of power used by the ATM-over-ADSL interface.</li> <li>• <b>Bit rate (kbps)</b>—Speed of data transfer on the ATM-over-ADSL interface, in kilobits per second.</li> <li>• <b>CRC</b>—Number of cyclic redundancy check errors.</li> <li>• <b>FEC</b>—Number of forward error corrections.</li> <li>• <b>HEC</b>—Number of header error checksums.</li> <li>• <b>Received cells</b>—Number of cells received through the interface.</li> <li>• <b>Transmitted cells</b>—Number of cells sent through the interface.</li> </ul>	detail extensive

## Sample Output

### show interfaces (ATM-over-ADSL)

```
user@host> show interfaces at-5/0/0
Physical interface: at-5/0/0, Enabled, Physical link is Down
  Interface index: 149, SNMP ifIndex: 68
  Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, ADSL mode,
  Speed: ADSL2+, Loopback: None
  Device flags   : Present Running Down
  Link flags     : None
  CoS queues     : 8 supported, 8 in use
  Current address: 00:05:85:c3:85:84
  Last flapped   : 2005-12-19 15:36:02 PST (12w0d 18:33 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  ADSL alarms    : None
  ADSL defects   : None
  ADSL status:
    Modem status : Training
    DSL mode      : Adsl2plus Annex A
    Last fail code: ATU-C not detected
    Subfunction   : 0x00
    Seconds in showtime : 0

Logical interface at-5/0/0.0 (Index 70) (SNMP ifIndex 71)
  Flags: Device-Down Point-To-Multipoint SNMP-Traps 0x4000
  Encapsulation: Ether-over-ATM-LLC
  Input packets : 0
  Output packets: 0
  Protocol inet, MTU: 1500
  Flags: None
  VCI 0.128
  Flags: Active, Multicast
  Total down time: 0 sec, Last down: Never
  Input packets : 0
  Output packets: 0

Logical interface at-5/0/0.32767 (Index 71) (SNMP ifIndex 70)
  Flags: Device-Down 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
  Input packets : 0
  Output packets: 0
```

### show interfaces brief (ATM-over-ADSL)

```
user@host> show interfaces at-5/0/0 brief
Physical interface: at-5/0/0, Enabled, Physical link is Down
  Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, ADSL mode,
  Speed: ADSL2+, Loopback: None
  Device flags   : Present Running Down
  Link flags     : None
Logical interface at-5/0/0.0
  Flags: Device-Down Point-To-Multipoint SNMP-Traps 0x4000
  Encapsulation: Ether-over-ATM-LLC
  inet
  VCI 0.128
  Flags: Active, Multicast
```

Total down time: 0 sec, Last down: Never

Logical interface at-5/0/0.32767

Flags: Device-Down Point-To-Multipoint No-Multicast SNMP-Traps 0x4000

Encapsulation: ATM-VCMUX

VCI 0.4

Flags: Active

Total down time: 0 sec, Last down: Never

#### show interfaces detail (ATM-over-ADSL)

user@host> show interfaces at-5/0/0 detail

Physical interface: at-5/0/0, Enabled, Physical link is Down

Interface index: 149, SNMP ifIndex: 68, Generation: 30

Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, ADSL mode,

Speed: ADSL2+, Loopback: None

Device flags : Present Running Down

Link flags : None

CoS queues : 8 supported, 8 in use

Hold-times : Up 0 ms, Down 0 ms

Current address: 00:05:85:c3:85:84

Last flapped : 2005-12-19 15:36:02 PST (12w0d 18:33 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

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
4 be-class	0	0	0
5 ef-class	0	0	0
6 af-class	0	0	0

ADSL alarms : None

ADSL defects : None

ADSL status:

Modem status : Training

DSL mode : Adsl2plus Annex A

Last fail code: ATU-C not detected

Subfunction : 0x00

Seconds in showtime : 0

ADSL Statistics:		ATU-R		ATU-C
Attenuation (dB)	:	0.0		0.0
Capacity used (%)	:	0		0
Noise margin (dB)	:	0.0		0.0
Output power (dBm)	:	0.0		0.0

		Interleave	Fast	Interleave	Fast
Bit rate (kbps)	:	0	0	0	0
CRC	:	0	0	0	0
FEC	:	0	0	0	0
HEC	:	0	0	0	0

```

Received cells      :                0          0
Transmitted cells   :                0          0

```

Logical interface at-5/0/0.0 (Index 70) (SNMP ifIndex 71) (Generation 8)

Flags: Device-Down Point-To-Multipoint SNMP-Traps 0x4000

Encapsulation: Ether-over-ATM-LLC

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: 12, Route table: 0

Flags: None

VCI 0.128

Flags: Active, Multicast

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

```

Logical interface at-5/0/0.32767 (Index 71) (SNMP ifIndex 70) (Generation 9)

Flags: Device-Down 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

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**

user@host> **show interfaces at-5/0/0 extensive**

Physical interface: at-5/0/0, Enabled, Physical link is Down

Interface index: 149, SNMP ifIndex: 68, Generation: 30



## (ATM-over-ADSL)

```

Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, ADSL mode,
Speed: ADSL2+, Loopback: None
Device flags   : Present Running Down
Link flags     : None
CoS queues     : 8 supported, 8 in use
Hold-times     : Up 0 ms, Down 0 ms
Current address: 00:05:85:c3:85:84
Last flapped   : 2005-12-19 15:36:02 PST (12w0d 18:34 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: 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             0              0              0
  4 be-class                 0              0              0
  5 ef-class                 0              0              0
  6 af-class                 0              0              0

ADSL alarms   : None
ADSL defects  : None
ADSL media:
  Seconds      Count  State
  LOF          0      0 OK
  LOS          0      0 OK
  LOM          0      0 OK
  LOP          0      0 OK
  LOCDI        0      0 OK
  LOCDNI       0      0 OK
ADSL status:
  Modem status : Training
  DSL mode      : Adsl2plus  Annex A
  Last fail code: ATU-C not detected
  Subfunction   : 0x00
  Seconds in showtime : 0
ADSL Statistics:
  ATU-R      ATU-C
  Attenuation (dB) :      0.0      0.0
  Capacity used (%) :      0      0
  Noise margin (dB) :      0.0      0.0
  Output power (dBm) :      0.0      0.0

  Interleave  Fast  Interleave  Fast
  Bit rate (kbps) :      0      0      0      0
  CRC              :      0      0      0      0

```

```

FEC          :          0          0          0          0
HEC          :          0          0          0          0
Received cells :          0          0
Transmitted cells :          0          0
ATM status:
HCS state:    Hunt
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: 5
CoS information:
CoS transmit queue      Bandwidth      Buffer      Priority      Limit
                        %      bps      %      usec
0 best-effort           95      7600000  95          0          low      none
3 network-control       5       400000   5           0          low      none

Logical interface at-5/0/0.0 (Index 70) (SNMP ifIndex 71) (Generation 8)
Flags: Device-Down Point-To-Multipoint SNMP-Traps 0x4000
Encapsulation: Ether-over-ATM-LLC
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: 12, Route table: 0
Flags: None
VCI 0.128
Flags: Active, Multicast
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
Logical interface at-5/0/0.32767 (Index 71) (SNMP ifIndex 70) (Generation 9)
Flags: Device-Down 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
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 (ATM-over-SHDSL)

---

<b>Syntax</b>	<code>show interfaces at-pim/0/port</code> <code>&lt;brief   detail   extensive   terse&gt;</code> <code>&lt;descriptions&gt;</code> <code>&lt;media&gt;</code> <code>&lt;snmp-index <i>snmp-index</i>&gt;</code> <code>&lt;statistics&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4.
<b>Description</b>	(J Series routers) Display status information about the specified ATM-over-symmetric high-speed DSL (SHDSL) interface.
<b>Options</b>	<code>at-pim/0/port</code> —Display standard information about the specified SHDSL interface  <code>brief   detail   extensive   terse</code> —(Optional) Display the specified level of output.  <code>descriptions</code> —(Optional) Display interface description strings.  <code>media</code> —(Optional) Display media-specific information about network interfaces.  <code>snmp-index <i>snmp-index</i></code> —(Optional) Display the SNMP index of the interface.  <code>statistics</code> —(Optional) Display static interface statistics.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show interfaces (ATM-over-SHDSL) on page 419</a> <a href="#">show interfaces brief (ATM-over-SHDSL) on page 419</a> <a href="#">show interfaces detail (ATM-over-SHDSL) on page 420</a> <a href="#">show interfaces extensive (ATM-over-SHDSL) on page 422</a>
<b>Output Fields</b>	Table 23 on page 417 lists only output fields that are specific to the <b>show interfaces</b> (ATM-over-SHDSL) command. For information about all other output fields, see Table 92 under the <a href="#">show interfaces (ATM)</a> command.

Table 23: ATM-over-SHDSL show interfaces Output Fields

Field Name	Field Description	Level of Output
SHDSL alarms	Number and type of SHDSL alarms. See "SHDSL media" for details.	detail extensive none
SHDSL defects	Number and type of SHDSL defects. See "SHDSL media" for details.	detail extensive none
SHDSL media	<p>Information about the SHDSL media-specific defects that can prevent the interface from passing packets. The following information is displayed for each defect:</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. A state other than <b>OK</b> indicates a problem.</li> </ul> <p>The possible defects are as follows:</p> <ul style="list-style-type: none"> <li>• <b>LOSD</b>—Loss of signal was detected at the remote application interface.</li> <li>• <b>LOSW</b>—Loss of sync word. A message ID was sent.</li> <li>• <b>ES</b>—Errored seconds. One or more cyclic redundancy check (CRC) anomalies were detected.</li> <li>• <b>SES</b>—Severely errored seconds. At least 50 CRC anomalies were detected.</li> <li>• <b>UAS</b>—Unavailable seconds. An interval occurred during which one or more LOSW defects were detected.</li> </ul>	extensive
SHDSL status	<p>Operational information for ATM-over-SHDSL interfaces.</p> <ul style="list-style-type: none"> <li>• <b>Line termination</b>—SHDSL transceiver unit- remote (STU-R) (Only customer premises equipment is supported.)</li> <li>• <b>Annex</b>—Either Annex A or Annex B. Annex A is supported in North America, and Annex B is supported in Europe.</li> <li>• <b>Line mode</b>—SHDSL mode configured on the G.SHDSL Physical Interface Module (PIM), either 2-wire or 4-wire.</li> <li>• <b>Modem status</b>—Data.</li> <li>• <b>Bit rate (kbps)</b>—Speed of data transfer on the ATM-over-G.SHDSL interface, in kilobits per second.</li> <li>• <b>Last fail mode</b>—Code for the last interface failure.</li> <li>• <b>Framer mode</b>—Framer mode of the underlying interface: ATM.</li> <li>• <b>Dying gasp</b>—Ability of a J Series router that has lost power to send a message informing the attached DSL access multiplexer (DSLAM) that it is about to go offline: <b>Enabled</b> or <b>Disabled</b>.</li> <li>• <b>Framer sync status</b>—Framer synchronization status: <b>In sync</b> or <b>Out of sync (OOS)</b>.</li> <li>• <b>Chipset version</b>—Version number of the chipset on the interface.</li> <li>• <b>Firmware version</b>—Version number of the firmware on the interface.</li> </ul>	detail extensive none

Table 23: ATM-over-SHDSL show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
SHDSL statistics	<ul style="list-style-type: none"> <li>• <b>Loop Attenuation (dB)</b>—Attenuation in decibels.</li> <li>• <b>Transmit power (dBm)</b>—Power of the transmitting interface.</li> <li>• <b>Receiver gain (db)</b>—Power increase of the receiving interface, in decibels.</li> <li>• <b>SNR sampling (dB)</b>—Signal-to-noise ratio at a receiver point, in decibels.</li> <li>• <b>CRC errors</b>—Number of cyclic redundancy check errors.</li> <li>• <b>SEGA errors</b>—Number of segment anomaly errors. A regenerator operating on a segment received corrupted data.</li> <li>• <b>LOSW errors</b>—Number of loss of signal defect errors. Three or more consecutively received frames contained one or more errors in the framing bits.</li> <li>• <b>Received cells</b>—Number of cells received through the interface.</li> <li>• <b>Transmitted cells</b>—Number of cells sent through the interface.</li> <li>• <b>HEC errors</b>—Number of header error checksum errors.</li> <li>• <b>Cell Drop</b>—Number of dropped cells on the interface.</li> </ul>	detail extensive

## Sample Output

### show interfaces (ATM-over-SHDSL)

```

user@host> show interfaces at-4/0/0
Physical interface: at-4/0/0, Enabled, Physical link is Down
  Interface index: 141, SNMP ifIndex: 41
  Link-level type: Ethernet-over-ATM, MTU: 4482, Clocking: Internal,
  Speed: SHDSL(2-wire), Loopback: None
  Device flags   : Present Running Down
  Link flags     : None
  CoS queues     : 8 supported, 8 in use
  Current address: 00:05:85:c2:44:60
  Last flapped   : 2006-03-21 15:07:11 PST (2w0d 00:59 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  SHDSL alarms   : LOSD
  SHDSL defects  : LOSD
  SHDSL status:
    Line termination : STU-R
    Annex            : Unknown
    Line mode        : 2-wire
    Modem status     : Training
    Bit rate (kbps)  : 0
    Last fail mode   : No failure (0x00)
    Frammer mode     : ATM
    Dying gasp       : Enabled
    Frammer sync status : Out of sync
    Chipset version  : 00
    Firmware version : R3.0.1

Logical interface at-4/0/0.0 (Index 68) (SNMP ifIndex 44)
  Flags: Device-Down Point-To-Point SNMP-Traps 0x4000
  Encapsulation: Ether-over-ATM-LLC
  Input packets : 0
  Output packets: 0
  Protocol inet, MTU: 1500
  Flags: None
  VCI 0.128
  Flags: Active
  Total down time: 0 sec, Last down: Never
  Input packets : 0
  Output packets: 0
Logical interface at-4/0/0.32767 (Index 69) (SNMP ifIndex 43)
  Flags: Device-Down 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
  Input packets : 0
  Output packets: 0

```

### show interfaces brief (ATM-over-SHDSL)

```

user@host> show interfaces at-4/0/0 brief
Physical interface: at-4/0/0, Enabled, Physical link is Down
  Link-level type: Ethernet-over-ATM, MTU: 4482, Clocking: Internal,
  Speed: SHDSL(2-wire), Loopback: None
  Device flags   : Present Running Down
  Link flags     : None

```

```

Logical interface at-4/0/0.0
  Flags: Device-Down Point-To-Point SNMP-Traps 0x4000
  Encapsulation: Ether-over-ATM-LLC
  inet
  VCI 0.128
    Flags: Active
    Total down time: 0 sec, Last down: Never

Logical interface at-4/0/0.32767
  Flags: Device-Down Point-To-Multipoint No-Multicast SNMP-Traps 0x4000
  Encapsulation: ATM-VCMUX
  VCI 0.4
    Flags: Active
    Total down time: 0 sec, Last down: Never

```

#### show interfaces detail (ATM-over-SHDSL)

```

user@host> show interfaces at-4/0/0 detail
Physical interface: at-4/0/0, Enabled, Physical link is Down
  Interface index: 141, SNMP ifIndex: 41, Generation: 22
  Link-level type: Ethernet-over-ATM, MTU: 4482, Clocking: Internal,
  Speed: SHDSL(2-wire), Loopback: None
  Device flags   : Present Running Down
  Link flags     : None
  CoS queues     : 8 supported, 8 in use
  Hold-times    : Up 0 ms, Down 0 ms
  Current address: 00:05:85:c2:44:60
  Last flapped   : 2006-03-21 15:07:11 PST (2w0d 01:00 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
  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

```

  SHDSL alarms   : LOSD
  SHDSL defects  : LOSD
  SHDSL status:
    Line termination : STU-R
    Annex            : Unknown
    Line mode        : 2-wire
    Modem status     : Training
    Bit rate (kbps)  : 0
    Last fail mode   : No failure (0x00)
    Framers mode     : ATM
    Dying gasp       : Enabled
    Framers sync status : Out of sync
    Chipset version  : 00
    Firmware version : R3.0.1
  SHDSL statistics:
    Loop attenuation (dB) : 2.3
    Transmit power (dBm)  : 0.0
    Receiver gain (dB)    : 20.412
    CRC errors            : 0

```



```

SEGA errors      : 0
LOSW errors      : 0
Received cells   : 0
Transmitted cells : 0
HEC errors       : 0
Cell drop        : 0

```

Logical interface at-4/0/0.0 (Index 68) (SNMP ifIndex 44) (Generation 8)

Flags: Device-Down Point-To-Point SNMP-Traps 0x4000

Encapsulation: Ether-over-ATM-LLC

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: 11, 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

```

Logical interface at-4/0/0.32767 (Index 69) (SNMP ifIndex 43) (Generation 9)

Flags: Device-Down 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

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-over-SHDSL)**

```

user@host> show interfaces at-4/0/0 extensive
Physical interface: at-4/0/0, Enabled, Physical link is Down
Interface index: 141, SNMP ifIndex: 41, Generation: 22
Link-level type: Ethernet-over-ATM, MTU: 4482, Clocking: Internal,
Speed: SHDSL(2-wire), Loopback: None
Device flags   : Present Running Down
Link flags     : None
CoS queues     : 8 supported, 8 in use
Hold-times     : Up 0 ms, Down 0 ms
Current address: 00:05:85:c2:44:60
Last flapped   : 2006-03-21 15:07:11 PST (2w0d 01:02 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: 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     0                0                0

SHDSL alarms   : LOSD
SHDSL defects  : LOSD
SHDSL media:
  Seconds      Count  State
  LOSD         1228405  1 Defect Active
  LOSW         0        0 OK
  ES           0
  SES          0
  UAS          1228402
SHDSL status:
  Line termination : STU-R
  Annex            : Unknown
  Line mode        : 2-wire
  Modem status     : Training
  Bit rate (kbps)  : 0
  Last fail mode   : No failure (0x00)
  Framing mode     : ATM
  Dying gasp      : Enabled
  Framing sync status : Out of sync
  Chipset version  : 00
  Firmware version : R3.0.1
SHDSL statistics:
  Loop attenuation (dB) : 2.3
  Transmit power (dBm)  : 0.0
  Receiver gain (dB)    : 20.412
  CRC errors           : 0

```

```

SEGA errors          : 0
LOSW errors          : 0
Received cells       : 0
Transmitted cells    : 0
HEC errors           : 0
Cell drop            : 0
Packet Forwarding Engine configuration:
  Destination slot: 4
CoS information:
  CoS transmit queue      Bandwidth      Buffer      Priority  Limit
                           %      bps      %      usec
0 best-effort             95      2196400  95      0      low    none
3 network-control         5      115600   5      0      low    none

Logical interface at-4/0/0.0 (Index 68) (SNMP ifIndex 44) (Generation 8)
Flags: Device-Down Point-To-Point SNMP-Traps 0x4000
Encapsulation: Ether-over-ATM-LLC
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: 11, 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

Logical interface at-4/0/0.32767 (Index 69) (SNMP ifIndex 43) (Generation 9)
Flags: Device-Down 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

```

```
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 (Channelized DS3-to-DS0)

<b>Syntax</b>	<code>show interfaces ds-fpc/pic/port:t1channel:ds0channel</code> <brief   detail   extensive> <descriptions> <media> <snmp-index <i>snmp-index</i> > <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-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 <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 DS3-to-DS0) on page 434</a>
<b>Output Fields</b>	<a href="#">Table 24 on page 425</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 24: 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 Common Output Fields 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>

Table 24: 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 Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the "Interface Flags" section under Common Output Fields Description.	All levels
<b>Link flags</b>	Information about the link. Possible values are described in the "Link Flags" section under Common Output Fields Description.	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 24: 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 24: 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 24: 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 24: 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 24: 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 24: 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 Common Output Fields Description.	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 24: Channelized DS3 show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
<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.	detail extensive
<b>Flags</b>	Information about the protocol family flags. Possible values are described in the “Family Flags” section under Common Output Fields Description.	<b>detail extensive none</b>
<b>Addresses, Flags</b>	Information about the address flags. Possible values are described in the “Addresses Flags” section under Common Output Fields Description.	<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>Redundant Link</b>	(LSQ redundancy) Backup link for Link Services IQ redundancy.	<b>detail extensive none</b>

## 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> <code>&lt;brief   detail   extensive   terse&gt;</code> <code>&lt;descriptions&gt;</code> <code>&lt;media&gt;</code> <code>&lt;snmp-index <i>snmp-index</i>&gt;</code> <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 DS3-to-DS1 interface.
<b>Options</b>	<p><code>t1-fpc/pic/port:t1channel</code>—Display standard information about the specified channelized DS3-to-DS1 interface.</p> <p><code>brief   detail   extensive   terse</code>—(Optional) Display brief interface information.</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 DS3-to-DS1) on page 437</a>
<b>Output Fields</b>	See the output field table for the <a href="#">show interfaces (Channelized DS3-to-DS0)</a> command.



## 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 440</a></p> <p><a href="#">show interfaces extensive (Channelized E1 IQ Multilink PPP Encapsulation) on page 440</a></p> <p><a href="#">show interfaces extensive (Channelized E1 IQ MLFR Encapsulation) on page 441</a></p> <p><a href="#">show interfaces detail (Clear Channel E1) on page 443</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**

```
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
```

## E1 IQ Multilink PPP Encapsulation)

```

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

```

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

```

## E1 IQ MLFR Encapsulation)

```

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 timedout : 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 453</a>
<b>Output Fields</b>	Table 25 on page 444 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 25: 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 Common Output Fields Description.	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 25: 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 Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the "Interface Flags" section under Common Output Fields Description.	All levels
<b>Link flags</b>	Information about the link. Possible values are described in the "Link Flags" section under Common Output Fields Description.	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 25: 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 25: 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 <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>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 25: 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 25: 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>  <b>DS1 defects</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>

Table 25: 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 DS0 channel on the Channelized E1 to DS0 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 25: 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 Common Output Fields Description.	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

Table 25: Channelized E1 and Channelized E1 IQ show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Traffic statistics</b>	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 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>	(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 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 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		Buffer	Priority	Limit
		%	bps	%	usec		
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 456</a> <a href="#">show interfaces extensive (Channelized OC1 on Channelized OC12 IQ) on page 456</a> <a href="#">show interfaces extensive (Channelized OC12 IQ) (Physical) on page 457</a> <a href="#">show interfaces extensive (Channelized T1 from Channelized OC12 IQ) on page 457</a> <a href="#">show interfaces extensive (Channelized T3 on Channelized OC12 IQ) on page 457</a> <a href="#">show interfaces extensive (CSTM4 on Channelized OC-12 IQ) on page 458</a> <a href="#">show interfaces extensive (DS0 on Channelized OC12 IQ) on page 458</a> <a href="#">show interfaces extensive (SONET Interface on Channelized OC12 IQ) on page 458</a> <a href="#">show interfaces extensive (T1 on Channelized OC12 IQ) on page 458</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](#)

```
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
```

### OC1 on Channelized OC12 IQ)

```
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

```
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
```

**T3 on Channelized  
OC12 IQ)**

```
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 t1-0/2/0:1:1:1 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>	<pre>show interfaces t3-fpc/pic/port:t3channel &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 channelized OC12 interface.
<b>Options</b>	<p><b>t3-fpc/pic/port:t3channel</b>—Display standard information about the specified channelized OC12 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>	<a href="#">show interfaces extensive (Channelized OC12) on page 460</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
HDLC 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 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  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>	<pre>show interfaces (<i>type-fpc/pic/port &lt;:channel&gt;&lt;:channel&gt;&lt;:channel&gt;</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 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>	<p><a href="#">show interfaces extensive (Channelized OC3 IQ) (Physical) on page 478</a></p> <p><a href="#">show interfaces extensive (Channelized OC1 on Channelized OC3 IQ) on page 478</a></p> <p><a href="#">show interfaces extensive (Channelized T1 on Channelized OC3 IQ) on page 479</a></p> <p><a href="#">show interfaces extensive (DSO on Channelized OC3 IQ) on page 480</a></p>
<b>Output Fields</b>	Table 26 on page 464 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 26: 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 Common Output Fields Description.	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 Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	All levels
<b>Link flags</b>	Information about the link. Possible values are described in the “Link Flags” section under Common Output Fields Description.	All levels
<b>Hold-times</b>	Current interface hold-time up and hold-time down, in milliseconds.	<b>detail extensive</b>

Table 26: 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 26: 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> <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 26: 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 26: 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 26: 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 26: 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 26: 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 26: 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 26: Channelized OC show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
SDH multiplex 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>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>	extensive
SDH path	<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>	extensive

Table 26: 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 26: Channelized OC show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
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>—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>	extensive
Interface transmit queues	<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>	extensive
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 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>	extensive
BERT configuration	<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>	detail extensive none

Table 26: 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 Common Output Fields Description.	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 26: 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 inet.0.	<b>detail extensive</b>
<b>Addresses, Flags</b>	Information about the address flags. Possible values are described in the “Addresses Flags” section under Common Output Fields Description.	<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>	<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  
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

```
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
```

## OC1 on Channelized OC3 IQ)

```

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

```

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

```

### T1 on Channelized OC3 IQ)

```

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
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)

```

## show interfaces (Channelized STM1 IQ)

<b>Syntax</b>	<pre>show interfaces (<i>type-fpc/pic/port</i> &lt;:<i>channel</i>&gt;&lt;:<i>channel</i>&gt;) &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 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>	<p><a href="#">show interfaces (Channelized STM1 IQ) (Physical) on page 483</a></p> <p><a href="#">show interfaces (Channelized AU-4) (Physical) on page 483</a></p> <p><a href="#">show interfaces (Channelized E1) (Physical) on page 483</a></p> <p><a href="#">show interfaces (DS) on page 484</a></p>
<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 timeout   : 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> <brief   detail   extensive   terse> <descriptions> <media> <snmp-index <i>snmp-index</i> > <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 497</a>
<b>Output Fields</b>	<a href="#">Table 27 on page 485</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 27: 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 Common Output Fields Description.	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 27: 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 Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the "Interface Flags" section under Common Output Fields Description.	All levels
<b>Link flags</b>	Information about the link. Possible values are described in the "Link Flags" section under Common Output Fields Description.	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 27: Channelized STM1 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
ANSI LMI settings or ITU LMI settings	<p>(Frame Relay) Local Management Interface settings. The format is (ANSI or ITU) LMI settings: <i>value, value...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>	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: <i>nn</i> (last seen <i>hh:mm:ss</i> 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: <i>nn</i> (last seen <i>hh:mm:ss</i> 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 27: Channelized STM1 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>	<p>(Frame Relay, displayed only from the DTE) Number of DLCIs configured from the DCE.</p>	<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 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>	<p>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>.</p>	<b>detail extensive none</b>

Table 27: 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 27: 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> <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> <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 27: 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 27: 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 27: Channelized STM1 show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
SDH multiplex 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>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>	extensive
SDH path	<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>	extensive

Table 27: 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 27: 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 Common Output Fields Description.	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 Common Output Fields Description.	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 <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 Common Output Fields Description.	<b>detail extensive none</b>
<b>Addresses, Flags</b>	Information about the address flags. Possible values are described in the “Addresses Flags” section under Common Output Fields Description.	<b>detail extensive none</b>
<b>Destination</b>	IP address of the remote side of the connection.	<b>detail extensive none</b>

Table 27: Channelized STM1 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>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:
      Seconds      Count
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:
      Seconds      Count
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:
      Seconds      Count
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:
      Seconds      Count
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>	<pre>show interfaces (ct1-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 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 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 (CT1) on page 509</a> <a href="#">show interfaces extensive (T1) on page 509</a> <a href="#">show interfaces extensive (DS0) on page 510</a>
<b>Output Fields</b>	Table 28 on page 500 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 28: 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 28: 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 Common Output Fields 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.	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 Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	All levels
<b>Link flags</b>	Information about the link. Possible values are described in the “Link Flags” section under Common Output Fields Description.	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 28: Channelized T1 IQ and T3 IQ show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Keepalive statistics</b>	<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>• (last seen 00:00:00 ago)—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>• (last seen 00:00:00 ago)—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>LMI settings</b>	<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) LMI settings: <i>value, value... xx seconds</i>, 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) 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</i> 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: <i>nn</i> (last sent <i>hh:mm:ss</i> 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 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>	<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 28: 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 28: 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 28: 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 28: 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 28: 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 Common Output Fields Description.	<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 Common Output Fields Description.	<b>detail extensive none</b>
<b>Addresses, Flags</b>	Information about the address flags. Possible values are described in the “Addresses Flags” section under Common Output Fields Description.	<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>

Table 28: Channelized T1 IQ and T3 IQ 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>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 (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 timedout : 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 timedout  : 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 514</a></p> <p><a href="#">show interfaces extensive (Channelized T1 on Channelized T3 IQ) on page 514</a></p> <p><a href="#">show interfaces extensive (DSO on Channelized T3 IQ) on page 514</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 (DS0 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 373</a></li> <li>• show interfaces routing</li> </ul>
<b>List of Sample Output</b>	<a href="#">show interfaces dsc on page 519</a> <a href="#">show interfaces dsc brief on page 519</a> <a href="#">show interfaces dsc detail on page 519</a> <a href="#">show interfaces dsc extensive on page 519</a>
<b>Output Fields</b>	Table 29 on page 515 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 29: 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 29: 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 Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the "Interface Flags" section under Common Output Fields Description.	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 Common Output Fields Description.	<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 29: 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>
<b>Flags</b>	Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under Common Output Fields Description.	All levels

Table 29: Discard show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
<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>All levels</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>

## 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

```
user@host> show interfaces dsc extensive
Physical interface: dsc, Enabled, Physical link is Up
```

**extensive**

```
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>	<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 Fast Ethernet interface.
<b>Options</b>	<p><b><i>interface-type</i></b>—On M Series and T Series routers, the interface type is <b><i>fe-fpc/pic/port</i></b>. On the J Series routers, the interface type is <b><i>fe-pim/O/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 (Fast Ethernet) on page 535</a></p> <p><a href="#">show interfaces brief (Fast Ethernet) on page 535</a></p> <p><a href="#">show interfaces detail (Fast Ethernet) on page 535</a></p> <p><a href="#">show interfaces extensive (Fast Ethernet) on page 536</a></p>
<b>Output Fields</b>	<p><a href="#">Table 30 on page 521</a> lists the output fields for the <b>show interfaces Fast Ethernet</b> command. Output fields are listed in the approximate order in which they appear.</p>

**Table 30: 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 Common Output Fields Description.	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>

Table 30: show interfaces Fast Ethernet 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>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>Link-mode</b>	Type of link connection configured for the physical interface: <b>Full-duplex</b> or <b>Half-duplex</b>	<b>extensive</b>
<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 Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the "Interface Flags" section under Common Output Fields Description.	All levels
<b>Link flags</b>	Information about the link. Possible values are described in the "Links Flags" section under Common Output Fields Description.	All levels
<b>Wavelength</b>	(10-Gigabit Ethernet dense wavelength-division multiplexing [DWDM] interfaces) Displays the configured wavelength, in nanometers (nm).	All levels

Table 30: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
<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>	(GigabitEthernet 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.	<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).	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> <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>

Table 30: 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 30: 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>	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. Displayed on IQ2 interfaces.	<b>extensive</b>
<b>Queue counters (Ingress)</b>	<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>	<b>extensive</b>

Table 30: show interfaces Fast Ethernet 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> </ul>	<b>detail extensive none</b>
<b>OTN FEC statistics</b>	<p>The forward error correction (FEC) counters provide the following statistics:</p> <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>	<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>—High bit error rate. Indicates the number of bit errors when the PCS receiver is operating in normal mode.</li> <li>• <b>Errored blocks</b>—Loss of block lock. The number of errored blocks when PCS receiver is operating in normal mode.</li> </ul>	<b>detail extensive</b>

Table 30: 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</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>—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 30: 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 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 30: 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 30: 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 30: 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 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 30: show interfaces Fast Ethernet 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>	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 Common Output Fields Description.	All levels
<b>VLAN-Tag</b>	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. <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-pop</b>—An outer VLAN tag is pushed in front of the existing VLAN tag, and then removed.</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> none



Table 30: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Demux:</b>	IP demultiplexing (demux) value that appears if this interface is used as the demux underlying interface. The output is one of the following: <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 Common Output Fields Description.	<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>	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> </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>	Number and rate of bytes and packets transiting the switch. <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, 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 Common Output Fields Description.	<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>

Table 30: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
<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 Common Output Fields Description.	<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 Common Output Fields Description.	<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 (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:
Total octets      Receive      Transmit
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>	<code>show interfaces <i>ge-fpc/pic/port</i></code> <code>&lt;brief   detail   extensive   terse&gt;</code> <code>&lt;descriptions&gt;</code> <code>&lt;media&gt;</code> <code>&lt;snmp-index <i>snmp-index</i>&gt;</code> <code>&lt;statistics&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4.
<b>Description</b>	(M Series, T Series, and MX Series routers only) 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>Verifying and Managing Agent Circuit Identifier-Based Dynamic VLAN Configuration</li></ul>
<b>List of Sample Output</b>	<p><a href="#">show interfaces (Gigabit Ethernet) on page 554</a></p> <p><a href="#">show interfaces (Gigabit Ethernet on MX Series Routers) on page 554</a></p> <p><a href="#">show interfaces extensive (Gigabit Ethernet on MX Series Routers showing interface transmit statistics configuration) on page 554</a></p> <p><a href="#">show interfaces brief (Gigabit Ethernet) on page 556</a></p> <p><a href="#">show interfaces detail (Gigabit Ethernet) on page 556</a></p> <p><a href="#">show interfaces extensive (Gigabit Ethernet IQ2) on page 557</a></p> <p><a href="#">show interfaces (Gigabit Ethernet Unnumbered Interface) on page 560</a></p> <p><a href="#">show interfaces (ACI Interface Set Configured) on page 561</a></p>
<b>Output Fields</b>	<a href="#">Table 31 on page 539</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 32 on page 552</a> .

Table 31: 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 Common Output Fields Description.	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 Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	All levels

Table 31: 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 Common Output Fields Description.	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 (ms).	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).	None
<b>Output Rate</b>	Output rate in bps and pps.	None
<b>Statistics last cleared</b>	Time when the statistics for the interface were last set to zero.	detail extensive
<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>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 31: show interfaces Gigabit 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 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 31: 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>	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. Displayed on IQ2 interfaces.	<b>extensive</b>
<b>Queue counters (Ingress)</b>	<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>	<b>extensive</b>

Table 31: show interfaces Gigabit Ethernet 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> </ul>	<b>detail extensive none</b>
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>	<b>detail extensive</b>
<b>OTN FEC statistics</b>	<p>The forward error correction (FEC) counters provide the following statistics:</p> <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>
<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>—High bit error rate. Indicates the number of bit errors when the PCS receiver is operating in normal mode.</li> <li>• <b>Errored blocks</b>—Loss of block lock. The number of errored blocks when the PCS receiver is operating in normal mode.</li> </ul>	<b>detail extensive</b>

Table 31: 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.</li> </ul> <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> <ul style="list-style-type: none"> <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 31: 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 31: 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 31: 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 31: 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	(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.	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 31: show interfaces Gigabit Ethernet 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>	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 Common Output Fields Description.	All levels

Table 31: 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> 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>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</b> none
<b>Protocol</b>	Protocol family. Possible values are described in the “Protocol Field” section under Common Output Fields Description.	<b>detail extensive</b> none
<b>MTU</b>	Maximum transmission unit size on the logical interface.	<b>detail extensive</b> none
<b>Dynamic Profile</b>	(MX Series routers with Trio MPCs only) 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</b> none
<b>Service Name Table</b>	(MX Series routers with Trio MPCs only) Name of the service name table for the interface configured with a PPPoE family.	<b>detail extensive</b> none
<b>Max Sessions</b>	(MX Series routers with Trio MPCs only) Maximum number of PPPoE logical interfaces that can be activated on the underlying interface.	<b>detail extensive</b> none

Table 31: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Duplicate Protection</b>	(MX Series routers with Trio MPCs only) 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>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>	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> </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>	Number and rate of bytes and packets transiting the switch.  <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, <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 Common Output Fields Description.	<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>

Table 31: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
<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 Common Output Fields Description.	<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 Common Output Fields Description.	<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 32: 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:  Input bytes: 496 bytes per packet, representing the Layer 2 packet  MAC statistics:  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:  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:  Input bytes: 490 bytes per packet, representing the Layer 3 packet + 12 bytes  MAC statistics:  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.

Table 32: Gigabit Ethernet IQ PIC Traffic and MAC Statistics by Interface Type (*continued*)

Interface Type	Sample Command	Byte and Octet Counts Include	Comments
Outbound logical interface	<b>show interfaces ge-0/0/0.50 extensive</b>	Traffic statistics:  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
  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: SNMP-Traps 0x20000000 Encapsulation: Ethernet-Bridge
  Input packets : 0
  Output packets: 0
  Protocol aenet, AE bundle: ae0.0   Link Index: 4
```

### show interfaces extensive (Gigabit)

```
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
```

Ethernet on MX Series  
Routers showing  
interface transmit

Interface flags:	SNMP-Traps	Internal:	0x4000	
Output bytes :	240614363944			772721536 bps
Output packets:	35384446506			1420444 pps
Direction :	Output			

## statistics configuration)

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

	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
  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      Receive      Transmit
Total packets     38910844056      7174605
Unicast packets   418398473      78903
                  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           500000000    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           500000000    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 31 on page 539](#).

#### show interfaces (Gigabit Ethernet)

```

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

```

### Unnumbered Interface)

```
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,
    AC Name: nbc
  Input packets : 9
  Output packets: 8
  Protocol multiservice, MTU: Unlimited
```

## show interfaces (ISDN B-Channel)

<b>Syntax</b>	<pre>show interfaces bc-pim/0/port:channel &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>	(J Series routers only) Display information about the specified ISDN B-channel interface.
<b>Options</b>	<p><b>bc-pim/0/port:channel</b>—Display standard information about the specified ISDN B-channel interface.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display the interface description string.</p> <p><b>media</b>—(Optional) Display media-specific information.</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>Additional Information</b>	There are no user-configurable fields on B-channel interfaces.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show interfaces (ISDN B-Channel) on page 566</a> <a href="#">show interfaces brief (ISDN B-Channel) on page 566</a> <a href="#">show interfaces detail (ISDN B-Channel) on page 566</a> <a href="#">show interfaces extensive (ISDN B-Channel) on page 567</a>
<b>Output Fields</b>	<a href="#">Table 33 on page 562</a> lists the output fields for the <b>show interfaces</b> (ISDN B-channel) command. Output fields are listed in the approximate order in which they appear.

**Table 33: ISDN B-Channel show interfaces Output Fields**

Field Name	Field Description	Level of Output
<b>Physical Interface</b>	Name of the physical interface type.	All levels
<b>Enabled</b>	State of the interface. Possible values are described in the “Enabled Fiel” section under Common Output Fields Description.	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>

Table 33: ISDN B-Channel 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>Type</b>	Type of interface.	All levels
<b>Link-level type</b>	Encapsulation used on the physical interface.	All levels
<b>MTU</b>	Maximum transmission unit (MTU)—Size of the largest packet to be transmitted.	All levels
<b>Clocking</b>	Reference clock source of the interface.	All levels
<b>Speed</b>	Network speed on the interface.	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 is the top level.	<b>detail extensive none</b>
<b>Device flags</b>	Information about the physical device. Possible values are described in the “Device Flags” section under Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	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 Common Output Fields Description.	<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 media access control (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>CoS queues</b>	Number of class-of-service (CoS) queues configured.	<b>detail extensive none</b>
<b>Last flapped</b>	Date, time, and length of time since the interface changed its status from down to up.	<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 interface statistics were last set to zero.	<b>detail extensive</b>

Table 33: ISDN B-Channel 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 logical and 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>	<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 the Junos OS 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>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>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>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>



Table 33: ISDN B-Channel 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>	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 Common Output Fields Description.	All levels
<b>Encapsulation</b>	Encapsulation on the logical interface.	All levels

## Sample Output

### show interfaces (ISDN B-Channel)

```
user@host> show interfaces bc-4/0/0:1
Physical interface: bc-4/0/0:1, Enabled, Physical link is Up
  Interface index: 151, SNMP ifIndex: 75
  Type: Serial, Link-level type: 57, MTU: 4092, Clocking: Internal,
  Speed: 64kbps,
  Parent: br-4/0/0 Interface index 129
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Link type      : Full-Duplex
  Link flags     : None
  CoS queues     : 8 supported, 8 maximum usable queues
  Last flapped   : 2006-06-13 19:50:38 PDT (14:39:03 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)

Logical interface bc-4/0/0:1.0 (Index 74) (SNMP ifIndex 79)
  Flags: Point-To-Point SNMP-Traps Encapsulation: 64
```

### show interfaces brief (ISDN B-Channel)

```
user@host> show interfaces bc-4/0/0:1 brief
Physical interface: bc-4/0/0:1, Enabled, Physical link is Up
  Type: Serial, Link-level type: 57, MTU: 4092, Clocking: Internal,
  Speed: 64kbps
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000

Logical interface bc-4/0/0:1.0
  Flags: Point-To-Point SNMP-Traps Encapsulation: 64
```

### show interfaces detail (ISDN B-Channel)

```
user@host> show interfaces bc-4/0/0:1 detail
Physical interface: bc-4/0/0:1, Enabled, Physical link is Up
  Interface index: 151, SNMP ifIndex: 75, Generation: 152
  Type: Serial, Link-level type: 57, MTU: 4092, Clocking: Internal,
  Speed: 64kbps,
  Parent: br-4/0/0 Interface index 129
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  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
  CoS queues     : 8 supported, 8 maximum usable queues
  Last flapped   : 2006-06-13 19:50:38 PDT (14:39:06 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes   : 4096
    Output bytes  : 128423
    Input packets : 0
    Output packets: 9801
  Egress queues: 8 supported, 8 in use
  Queue counters:
    Queued packets  Transmitted packets  Dropped packets

    0 best-effort   13                13                0
    1 expedited-fo  0                 0                 0
```

2 assured-forw	0	0	0
3 network-cont	9788	9788	0

Logical interface bc-4/0/0:1.0 (Index 74) (SNMP ifIndex 79) (Generation 140)  
 Flags: Point-To-Point SNMP-Traps Encapsulation: 64

### show interfaces extensive (ISDN B-Channel)

```
user@host> show interfaces bc-4/0/0:1 extensive
Physical interface: bc-4/0/0:1, Enabled, Physical link is Up
Interface index: 151, SNMP ifIndex: 75, Generation: 152
Type: Serial, Link-level type: 57, MTU: 4092, Clocking: Internal,
Speed: 64kbps,
Parent: br-4/0/0 Interface index 129
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
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
CoS queues : 8 supported, 8 maximum usable queues
Last flapped : 2006-06-13 19:50:38 PDT (14:39:12 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 4096 0 bps
Output bytes : 128423 0 bps
Input packets: 0 0 pps
Output packets: 9801 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: 4, Errors: 0, Drops: 0, MTU errors: 0,
Resource errors: 0
Egress queues: 8 supported, 8 in use
Queue counters: Queued packets Transmitted packets Dropped packets

0 best-effort 13 13 0
1 expedited-fo 0 0 0
2 assured-forw 0 0 0
3 network-cont 9788 9788 0

Packet Forwarding Engine configuration:
Destination slot: 4, PLP byte: 1 (0x00)
CoS information:
CoS transmit queue Bandwidth Buffer Priority Limit
% bps % usec
0 best-effort 95 60800 95 0 low none
3 network-control 5 3200 5 0 low none
Logical interface bc-4/0/0:1.0 (Index 74) (SNMP ifIndex 79) (Generation 140)
Flags: Point-To-Point SNMP-Traps Encapsulation: 64
```

## show interfaces (ISDN BRI)

<b>Syntax</b>	<pre>show interfaces br-pim/0/port &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>	(J Series routers only) Display status information about the specified ISDN Basic Rate Interface (BRI) interface.
<b>Options</b>	<p><b>br-pim/0/port</b>—Display standard information about the specified ISDN BRI interface.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display the interface description string.</p> <p><b>media</b>—(Optional) Display media-specific information.</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 (ISDN BRI) on page 571</a> <a href="#">show interfaces brief (ISDN BRI) on page 571</a> <a href="#">show interfaces detail (ISDN BRI) on page 571</a> <a href="#">show interfaces extensive (ISDN BRI) on page 571</a>
<b>Output Fields</b>	<p><a href="#">Table 34 on page 568</a> lists the output fields for the <b>show interfaces (ISDN BRI)</b> command. Output fields are listed in the approximate order in which they appear.</p>

**Table 34: ISDN BRI show interfaces Output Fields**

Field Name	Field Description	Level of Output
<b>Physical Interface</b>	Name of the physical interface type.	All levels
<b>Enabled</b>	State of the interface. Possible values are described in the “Enabled Field” section under Common Output Fields Description.	All levels
<b>Interface index</b>	Physical interface index number that 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 34: ISDN BRI show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
<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
<b>Clocking</b>	Reference clock source of the interface.	All levels
<b>Speed</b>	Network speed on the interface.	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 is the top level.	<b>detail extensive none</b>
<b>Device flags</b>	Information about the physical device. Possible values are described in the “Device Flags” section under Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	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 Common Output Fields Description.	<b>detail extensive none</b>
<b>Physical info</b>	Information about the physical interface.	<b>detail extensive none</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</b>
<b>Hardware address</b>	Media access control (MAC) address of the interface.	<b>detail extensive</b>
<b>Alternate link address</b>	Backup link address.	<b>detail extensive</b>
<b>Last flapped</b>	Date, time, and length of time since the interface changed its status from down to up.	<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 34: ISDN BRI 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 logical and 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>	<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 the Junos OS 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>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>

## Sample Output

### show interfaces (ISDN BRI)

```
user@host> show interfaces br-4/0/0
Physical interface: br-4/0/0, Enabled, Physical link is Up
  Interface index: 129, SNMP ifIndex: 59
  Type: BRI, Link-level type: Controller, MTU: 4092, Clocking: 1,
  Speed: 128kbps, Parent: None
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link type      : Full-Duplex
  Link flags     : None
  Physical info  : S/T
  Last flapped   : 2006-06-13 19:50:38 PDT (15:18:26 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
```

### show interfaces brief (ISDN BRI)

```
user@host> show interfaces brief br-4/0/0
Physical interface: br-4/0/0, Enabled, Physical link is Up
  Type: BRI, Link-level type: Controller, MTU: 4092, Clocking: 1, Speed: 128kbps

  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
```

### show interfaces detail (ISDN BRI)

```
user@host> show interfaces br-4/0/0 detail
Physical interface: br-4/0/0, Enabled, Physical link is Up
  Interface index: 129, SNMP ifIndex: 59, Generation: 130
  Type: BRI, Link-level type: Controller, MTU: 4092, Clocking: 1,
  Speed: 128kbps, Parent: None
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link type      : Full-Duplex
  Link flags     : None
  Physical info  : S/T
  Hold-times     : Up 0 ms, Down 0 ms
  Last flapped   : 2006-06-13 19:50:38 PDT (15:18:32 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
```

### show interfaces extensive (ISDN BRI)

```
user@host> show interfaces br-4/0/0 extensive
Physical interface: br-4/0/0, Enabled, Physical link is Up
  Interface index: 129, SNMP ifIndex: 59, Generation: 130
  Type: BRI, Link-level type: Controller, MTU: 4092, Clocking: 1,
  Speed: 128kbps, Parent: None
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link type      : Full-Duplex  Link flags   : None
  Physical info  : S/T
  Hold-times     : Up 0 ms, Down 0 ms
  Last flapped   : 2006-06-13 19:50:38 PDT (15:18:38 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
```



## show interfaces (ISDN D-channel)

<b>Syntax</b>	<pre>show interfaces dc-pim/0/port:0 &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>	(J Series routers only) Display information about the specified ISDN D-channel interface.
<b>Options</b>	<p><b>dc-pim/0/port:0</b>—Display standard information about the specified ISDN D-channel interface.</p> <p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display the interface description string.</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>Additional Information</b>	There are no user-configurable features on D-channel interfaces.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show interfaces (ISDN D-Channel) on page 577</a> <a href="#">show interfaces brief (ISDN D-Channel) on page 577</a> <a href="#">show interfaces detail (ISDN D-Channel) on page 577</a> <a href="#">show interfaces extensive (ISDN D-Channel) on page 578</a>
<b>Output Fields</b>	<a href="#">Table 35 on page 573</a> lists the output fields for the <b>show interfaces</b> (ISDN D-channel) command. Output fields are listed in the approximate order in which they appear.

**Table 35: ISDN D-Channel show interfaces Output Fields**

Field Name	Field Description	Level of Output
<b>Physical Interface</b>		
<b>Physical Interface</b>	Name of the physical interface type.	All levels
<b>Enabled</b>	State of the interface. Possible values are described in the “Enabled Field” section under Common Output Fields Description.	All levels
<b>Interface index</b>	Physical interface index number that reflects its initialization sequence.	<b>detail extensive none</b>

Table 35: ISDN D-Channel 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>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—Size of the largest packet to be transmitted.	All levels
<b>Clocking</b>	Reference clock source of the interface.	All levels
<b>Speed</b>	Network speed on the interface.	All levels
<b>Parent</b>	Name and interface index of the interface to which a particular child interface belongs. None indicates that this is the top level.	<b>detail extensive none</b>
<b>Device flags</b>	Information about the physical device. Possible values are described in the “Device Flags” section under Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	All levels
<b>Link type</b>	Type of data transmission.	<b>detail extensive none</b>
<b>Link flags</b>	Information about the link. Possible values are described in the “Link Flags” section under Common Output Fields Description.	<b>detail extensive none</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</b>
<b>Hardware address</b>	MAC address of the hardware.	<b>detail extensive</b>
<b>Alternate link address</b>	Backup address for the link.	<b>detail extensive</b>
<b>Last flapped</b>	Date, time, and length of time since the interface changed its status from down to up.	<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 35: ISDN D-Channel show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
<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>
<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>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>ISDN Alarms</b>	ISDN alarms.	All levels
<b>ISDN Media</b>	<ul style="list-style-type: none"> <li><b>LOF</b>—Loss of frame</li> <li><b>LOS</b>—Loss of signal</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 Common Output Fields Description.	All levels

Table 35: ISDN D-Channel show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
<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>	<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>—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 logical interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the logical interface</li> </ul>	<b>detail extensive</b>
<b>Local statistics</b>	<p>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.</p>	<b>detail extensive</b>

## Sample Output

### show interfaces (ISDN D-Channel)

```
user@host> show interfaces dc-4/0/0
Physical interface: dc-4/0/0, Enabled, Physical link is Up
  Interface index: 150, SNMP ifIndex: 73
  Type: Serial, Link-level type: 55, MTU: 4092, Clocking: Internal,
  Speed: 16kbps,
  Parent: br-4/0/0 Interface index 129
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Link type      : Full-Duplex
  Link flags     : None
  Last flapped   : 2006-06-13 19:50:38 PDT (15:29:32 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  ISDN alarms    : None

Logical interface dc-4/0/0.32767 (Index 73) (SNMP ifIndex 74)
  Flags: Point-To-Point SNMP-Traps Encapsulation: 60
  Input packets : 23482
  Output packets: 21686
```

### show interfaces brief (ISDN D-Channel)

```
user@host> show interfaces dc-4/0/0 brief
Physical interface: dc-4/0/0, Enabled, Physical link is Up
  Type: Serial, Link-level type: 55, MTU: 4092, Clocking: Internal,
  Speed: 16kbps
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  ISDN alarms    : None

Logical interface dc-4/0/0.32767
  Flags: Point-To-Point SNMP-Traps Encapsulation: 60
```

### show interfaces detail (ISDN D-Channel)

```
user@host> show interfaces dc-4/0/0 detail
Physical interface: dc-4/0/0, Enabled, Physical link is Up
  Interface index: 150, SNMP ifIndex: 73, Generation: 151
  Type: Serial, Link-level type: 55, MTU: 4092, Clocking: Internal,
  Speed: 16kbps,
  Parent: br-4/0/0 Interface index 129
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  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   : 2006-06-13 19:50:38 PDT (15:29:42 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes   :          257592          0 bps
    Output bytes  :          231162          0 bps
    Input packets :          23483          0 pps
    Output packets:          21687          0 pps
  ISDN alarms    : None

Logical interface dc-4/0/0.32767 (Index 73) (SNMP ifIndex 74) (Generation 139)
```

```

Flags: Point-To-Point SNMP-Traps Encapsulation: 60
Traffic statistics:
  Input bytes :          257592
  Output bytes :         664902
  Input packets:         23483
  Output packets:        21687
Local statistics:
  Input bytes :          257592
  Output bytes :         664902
  Input packets:         23483
  Output packets:        21687

```

**show interfaces  
extensive  
(ISDN D-Channel)**

```

user@host> show interfaces dc-4/0/0 extensive
Physical interface: dc-4/0/0, Enabled, Physical link is Up
  Interface index: 150, SNMP ifIndex: 73, Generation: 151
  Type: Serial, Link-level type: 55, MTU: 4092, Clocking: Internal,
  Speed: 16kbps,
  Parent: br-4/0/0 Interface index 129
  Device flags : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  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 : 2006-06-13 19:50:38 PDT (15:29:49 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes :          257596          0 bps
    Output bytes :         231167          0 bps
    Input packets:         23484          0 pps
    Output packets:        21688          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: 5, Errors: 0, Drops: 0, MTU errors: 0,
    Resource errors: 0
  ISDN alarms : None
  ISDN media:
    Seconds      Count  State
    LOF          1874    2    OK
    LOS          1874    2    OK

Logical interface dc-4/0/0.32767 (Index 73) (SNMP ifIndex 74) (Generation 139)

Flags: Point-To-Point SNMP-Traps Encapsulation: 60
Traffic statistics:
  Input bytes :          257596
  Output bytes :         664927
  Input packets:         23484
  Output packets:        21688
Local statistics:
  Input bytes :          257596
  Output bytes :         664927
  Input packets:         23484
  Output packets:        21688

```

## show interfaces (ISDN Dialer)

<b>Syntax</b>	<pre>show interfaces <i>dlnumber</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>	(J Series routers only) Display information about the ISDN dialer interface.
<b>Options</b>	<p><b><i>dlnumber</i></b>—Display standard information about the specified ISDN dialer interface.</p> <p><b><i>brief   detail   extensive   terse</i></b>—(Optional) Display brief interface information.</p> <p><b><i>descriptions</i></b>—(Optional) Display the interface description string.</p> <p><b><i>media</i></b>—(Optional) Display media-specific information.</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 (ISDN Dialer) on page 585</a></p> <p><a href="#">show interfaces brief (ISDN Dialer) on page 585</a></p> <p><a href="#">show interfaces detail (ISDN Dialer) on page 586</a></p> <p><a href="#">show interfaces extensive (ISDN Dialer) on page 587</a></p>
<b>Output Fields</b>	<p><a href="#">Table 36 on page 579</a> lists the output fields for the <b>show interfaces (ISDN dialer)</b> command. Output fields are listed in the approximate order in which they appear.</p>

**Table 36: ISDN Dialer show interfaces Output Fields**

Field Name	Field Description	Level of Output
<b>Physical Interface</b>		
<b>Physical Interface</b>	Name of the physical interface type.	All levels
<b>Enabled</b>	State of the interface. Possible values are described in the “Enabled Field” section under Common Output Fields Description.	All levels
<b>Interface index</b>	Physical interface index number that 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 36: ISDN Dialer show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Type</b>	Interface type.	All levels
<b>Link-level type</b>	Type of encapsulation configured on the physical interface.	All levels
<b>MTU</b>	Maximum transmission unit (MTU)—Size of the largest transmitted packet.	All levels
<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.	All levels
<b>Interface flags</b>	Information about the interface.	All levels
<b>Link type</b>	Data transmission type.	detail extensive none
<b>Link flags</b>	Information about the link.	detail extensive none
<b>Physical info</b>	Information about the physical interface.	detail extensive
<b>Hold-times</b>	Current interface hold-time up and hold-time down. Value is in milliseconds.	detail extensive
<b>Current address</b>	Configured MAC address.	detail extensive
<b>Hardware address</b>	MAC address of the hardware.	detail extensive
<b>Alternate link address</b>	Backup link address.	detail extensive
<b>Last flapped</b>	Date, time, and length of time since the interface status changed from <b>down</b> to <b>up</b> .	detail extensive none
<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.	detail extensive
<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>	detail extensive



Table 36: ISDN Dialer show interfaces Output Fields (*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 the Junos OS 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>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>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 Common Output Fields Description.	All levels
<b>Encapsulation</b>	Encapsulation on the logical interface.	All levels

Table 36: ISDN Dialer show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
Dialer	<p>Information about the status and configuration of the dialer interface:</p> <ul style="list-style-type: none"> <li>• <b>State</b>—State of the interface: <b>Active</b> or <b>Inactive</b>.</li> <li>• <b>Dial pool</b>—Dial pool name.</li> <li>• <b>Dial strings</b>—Dialing number for the ISDN connection.</li> <li>• <b>Subordinate interfaces</b>—Associated B-channel interface name and SNMP index number.</li> <li>• <b>Activation delay</b>—Length of time (in seconds) to wait before enabling the interface after the primary interface has failed.</li> <li>• <b>Deactivation delay</b>—Length of time (in seconds) to wait before disabling the interface after the primary interface is operational.</li> <li>• <b>Initial route check delay</b>—Wait period (in seconds) for the software to check if the primary interface is up after the router comes up. The range is from 1 through 300 seconds. The default is 120 seconds.</li> <li>• <b>Redial delay</b>—(Available on interfaces configured for ISDN dial-out.) Delay, in seconds, between two successive calls made. The range of values is 2 to 255. The default value is 3.</li> <li>• <b>Callback wait period</b>—Time, in seconds, that the dialer waits before it calls back the caller ID. The default value is 5.</li> <li>• <b>Load threshold</b>—Bandwidth threshold percentage used for adding interfaces. Another link is added to the multilink bundle when the load reaches the threshold value you set. The range of values is 0 to 100. The default value is 100.</li> <li>• <b>Load interval</b>—Interval used to calculate the average load on the network. By default, the average interface load is calculated every 60 seconds.</li> </ul>	All levels
Bandwidth	Speed at which the interface is running.	detail extensive none
Input packets	Number of packets received on the logical interface.	None specified
Output packets	Number of packets transmitted on the logical interface.	None specified
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>—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 logical interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the logical interface</li> </ul>	detail extensive
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.	detail extensive

Table 36: ISDN Dialer 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. This counter normally stabilizes in less than 1 second.	<b>detail extensive</b>
<b>Keepalive settings</b>	<p>Configured settings for keepalives.</p> <ul style="list-style-type: none"> <li><b>interval <i>seconds</i></b>—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>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 1 through 255, with a default of 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 through 255, with a default of 3.</li> </ul>	<b>detail extensive none</b>
<b>Keepalive statistics</b>	<p>Information about keepalive packets. (When no level of output is specified, the word "statistics" is not part of the field name and the phrase "last seen" 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>	<b>detail extensive none</b>
<b>LCP state</b>	<p>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>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>

Table 36: ISDN Dialer show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>CHAP state</b>	<p>Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction.</p> <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>protocol family</b>	Protocol family configured on the logical interface. If the family is <b>inet</b> , the IP address of the logical interface and the IP address on the remote side of the connection are included.	<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 Common Output Fields Description.	<b>detail extensive none</b>
<b>Addresses, Flags</b>	Information about the address flags. Possible values are described in the “Addresses Flags” section under Common Output Fields Description.	<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</b>
<b>Generation</b>	Unique number for use by Juniper Networks technical support only.	<b>detail extensive</b>

## Sample Output

### show interfaces (ISDN Dialer)

```

user@host>show interfaces d10
Physical interface: d10, Enabled, Physical link is Up
  Interface index: 153, SNMP ifIndex: 77
  Type: 27, Link-level type: PPP, MTU: 1504
  Device flags   : Present Running
  Interface flags: SNMP-Traps
  Link type      : Full-Duplex
  Link flags     : Keepalives
  Last flapped   : Never
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)

Logical interface d10.0 (Index 76) (SNMP ifIndex 78)
  Flags: Point-To-Point SNMP-Traps 0x4000 LinkAddress 23-0 Encapsulation: PPP
  Dialer:
    State: Active, Dial pool: 10
    Dial strings: 5551212
    Subordinate interfaces: bc-4/0/0:1 (Index 151)
    Activation delay: 0, Deactivation delay: 0
    Initial route check delay: 120
    Redial delay: 3
    Callback wait period: 5
    Load threshold: 0, Load interval: 60
  Bandwidth: 64kbps
  Input packets : 13
  Output packets: 10846
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive: Input: 5412 (00:00:06 ago), Output: 5416 (00:00:05 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured,
  mpls: Not-configured
  CHAP state: Closed
  Protocol inet, MTU: 1500
  Flags: None
  Addresses, Flags: Is-Preferred Is-Primary
  Destination: 10.0.40.1, Local: 10.0.40.2

```

### show interfaces brief (ISDN Dialer)

```

user@host> show interfaces d10 brief
Physical interface: d10, Enabled, Physical link is Up
  Type: 27, Link-level type: PPP, MTU: 1504, Clocking: Unspecified,
  Speed: Unspecified
  Device flags   : Present Running
  Interface flags: SNMP-Traps

Logical interface d10.0
  Flags: Point-To-Point SNMP-Traps 0x4000 LinkAddress 23-0 Encapsulation: PPP
  Dialer:
    State: Active, Dial pool: 10
    Dial strings: 5551212
    Subordinate interfaces: bc-4/0/0:1 (Index 151)
    Activation delay: 0, Deactivation delay: 0
    Initial route check delay: 120
    Redial delay: 3
    Callback wait period: 5
    Load threshold: 0, Load interval: 60
  inet 10.0.40.2      --> 10.0.40.1

```

## show interfaces detail (ISDN Dialer)

```

user@host> show interfaces d10 detail
Physical interface: d10, Enabled, Physical link is Up
  Interface index: 153, SNMP ifIndex: 77, Generation: 154
  Type: 27, Link-level type: PPP, MTU: 1504, Clocking: Unspecified,
  Speed: Unspecified
  Device flags   : Present Running
  Interface flags: SNMP-Traps
  Link type      : Full-Duplex
  Link flags     : Keepalives
  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   :          131116          40 bps
    Output bytes  :              0          0 bps
    Input packets :          10847          0 pps
    Output packets:              0          0 pps

Logical interface d10.0 (Index 76) (SNMP ifIndex 78) (Generation 142)
  Flags: Point-To-Point SNMP-Traps 0x4000 LinkAddress 23-0 Encapsulation: PPP
  Dialer:
    State: Active, Dial pool: 10
    Dial strings: 5551212
    Subordinate interfaces: bc-4/0/0:1 (Index 151)
    Activation delay: 0, Deactivation delay: 0
    Initial route check delay: 120
    Redial delay: 3
    Callback wait period: 5
    Load threshold: 0, Load interval: 60
  Bandwidth: 64kbps
  Traffic statistics:
    Input bytes   :          1092
    Output bytes  :        131459
    Input packets :           13
    Output packets:        10848
  Local statistics:
    Input bytes   :          1092
    Output bytes  :        131459
    Input packets :           13
    Output packets:        10848
  Transit statistics:
    Input bytes   :              0          0 bps
    Output bytes  :              0          0 bps
    Input packets :              0          0 pps
    Output packets:              0          0 pps
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 5413 (last seen 00:00:03 ago)
    Output: 5417 (last sent 00:00:02 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured,
  mpls: Not-configured
  CHAP state: Closed
    Protocol inet, MTU: 1500, Generation: 142, Route table: 0
    Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 10.0.40.1, Local: 10.0.40.2, Broadcast: Unspecified,
      Generation: 142

```

**show interfaces  
extensive  
(ISDN Dialer)**

```

user@host> show interfaces d10 extensive
Physical interface: d10, Enabled, Physical link is Up
  Interface index: 153, SNMP ifIndex: 77, Generation: 154
  Type: 27, Link-level type: PPP, MTU: 1504, Clocking: Unspecified,
  Speed: Unspecified
  Device flags   : Present Running
  Interface flags: SNMP-Traps
  Link type      : Full-Duplex
  Link flags     : Keepalives
  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   :           131116           0 bps
    Output bytes  :              0           0 bps
    Input packets :          10847           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

Logical interface d10.0 (Index 76) (SNMP ifIndex 78) (Generation 142)
  Flags: Point-To-Point SNMP-Traps 0x4000 LinkAddress 23-0 Encapsulation: PPP
  Dialer:
    State: Active, Dial pool: 10
    Dial strings: 5551212
    Subordinate interfaces: bc-4/0/0:1 (Index 151)
    Activation delay: 0, Deactivation delay: 0
    Initial route check delay: 120
    Redial delay: 3
    Callback wait period: 5
    Load threshold: 0, Load interval: 60
  Bandwidth: 64kbps
  Traffic statistics:
    Input bytes   :           1092
    Output bytes  :          131459
    Input packets :            13
    Output packets:          10848
  Local statistics:
    Input bytes   :           1092
    Output bytes  :          131459
    Input packets :            13
    Output packets:          10848
  Transit statistics:
    Input bytes   :              0           0 bps
    Output bytes  :              0           0 bps
    Input packets :              0           0 pps
    Output packets:              0           0 pps
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 5413 (last seen 00:00:07 ago)
    Output: 5417 (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
  Protocol inet, MTU: 1500, Generation: 142, Route table: 0
    Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 10.0.40.1, Local: 10.0.40.2, Broadcast: Unspecified,
      Generation: 142
```



## show interfaces (M Series and T Series Routers, and PTX Series Packet Transport Switches Management and Internal Ethernet)

<b>Syntax</b>	<pre>show interfaces <i>interface-name</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>Syntax (PTX Series Packet Transport Switches)</b>	<pre>show interfaces <i>interface-name</i> &lt;brief   detail   extensive   terse&gt; &lt;descriptions&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 Switches 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>interface-name</b>—Specify one of the following management interface names: fxp0, fxp1, fxp2, ixgbe0, ixgbe1, bcm0, em0, or em1. For supported Ethernet interface by chassis and Routing Engine, see Supported Routing Engines by Chassis.</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
<b>List of Sample Output</b>	<p><a href="#">show interfaces brief (Management Ethernet) on page 593</a></p> <p><a href="#">show interfaces (Management Ethernet) on page 593</a></p> <p><a href="#">show interfaces (Management Ethernet [TX Matrix Plus Router]) on page 593</a></p> <p><a href="#">show interfaces (Management Ethernet [PTX Series Packet Transport Switches]) on page 594</a></p> <p><a href="#">show interfaces detail (Management Ethernet) on page 595</a></p> <p><a href="#">show interfaces detail (Management Ethernet [TX Matrix Plus Router]) on page 595</a></p> <p><a href="#">show interfaces detail (Management Ethernet [PTX Packet Transport Switches]) on page 596</a></p> <p><a href="#">show interfaces extensive (Management Ethernet) on page 597</a></p> <p><a href="#">show interfaces extensive (Management Ethernet [TX Matrix Plus Router]) on page 598</a></p>

[show interfaces extensive \(Management Ethernet \[PTX Series Packet Transport Switches\]\)](#) on page 599

[show interfaces brief \(Management Ethernet\)](#) on page 600

[show interfaces brief \(Management Ethernet \[TX Matrix Plus Router\]\)](#) on page 600

[show interfaces brief \(Management Ethernet \[PTX Series Packet Transport Switches\]\)](#) on page 601

[show interfaces \(Internal Ethernet\)](#) on page 602

[show interfaces \(Internal Ethernet \[TX Matrix Plus Router\]\)](#) on page 602

[show interfaces detail \(Internal Ethernet\)](#) on page 603

[show interfaces detail \(Internal Ethernet \[TX Matrix Plus Router\]\)](#) on page 603

[show interfaces extensive \(internal Ethernet\)](#) on page 604

[show interfaces extensive \(internal Ethernet \[TX Matrix Plus Router\]\)](#) on page 605

**Output Fields** Table 37 on page 590 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 Packet Transport Switches. Output fields are listed in the approximate order in which they appear.

**Table 37: M Series and T Series Router Management and Internal Ethernet 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 Common Output Fields Description.	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
<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 Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	All levels

Table 37: M Series and T Series Router Management and Internal Ethernet show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
Link type	Data transmission type.	detail extensive none
Link flags	Information about the link. Possible values are described in the “Link Flags” section under Common Output Fields Description.	detail extensive
Physical info	Information about the physical interface.	detail extensive
Hold-times	Current interface hold-time up and hold-time down. Value is in milliseconds.	detail extensive
Current address	Configured MAC address.	detail extensive none
Hardware address	Media access control (MAC) address of the interface.	detail extensive none
Alternate link address	Backup link address.	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
Input packets	Number of packets received on the physical interface.	None specified
Output packets	Number of packets transmitted on the physical interface.	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 logical and 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	<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>	extensive

Table 37: M Series and T Series Router Management and Internal Ethernet show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
<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 Common Output Fields Description.	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>
<b>Route table</b>	Route table in which this address exists. For example, <b>Route table:0</b> refers to 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 Common Output Fields Description.	<b>detail extensive none</b>
<b>Addresses, Flags</b>	Information about address flags. Possible values are described in the “Addresses Flags” section under Common Output Fields Description.	<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 37: M Series and T Series Router Management and Internal Ethernet 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>

## 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)

```

user@host> show interfaces em0
Physical interface: em0, Enabled, Physical link is Up
  Interface index: 8, SNMP ifIndex: 17

```

**Ethernet [TX Matrix  
Plus Router])**

```
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**

```
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
```

## Packet Transport Switches])

```

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

```

user@host> show interfaces em0 detail
Physical interface: em0, Enabled, Physical link is Up
Interface index: 8, SNMP ifIndex: 17, Generation: 2

```

**Ethernet [TX Matrix  
Plus Router])**

```
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**

```
user@host> show interfaces detail em0
```

Physical interface: em0, Enabled, Physical link is Up

Interface index: 8, SNMP ifIndex: 0, Generation: 3



## Ethernet [PTX Packet Transport Switches])

```

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

```

user@host> show interfaces fxp0 extensive
Physical interface: fxp0, Enabled, Physical link is Up
Interface index: 1, SNMP ifIndex: 1, Generation: 0

```

**(Management Ethernet)**

```
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)**

```
user@host> show interfaces em0 extensive
```

```
Physical interface: em0, Enabled, Physical link is Up
Interface index: 8, SNMP ifIndex: 17, Generation: 2
```

## Ethernet [TX Matrix Plus Router])

```

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, Runt: 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

```

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,

```

## Packet Transport Switches])

```

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

user@host> show interfaces em0 brief

```

**show interfaces brief**  
(Management  
Ethernet [TX Matrix  
Plus Router])

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

user@host> **show interfaces em0 brief**  
Physical interface: em0, Enabled, Physical link is Up  
Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,

## Packet Transport Switches])

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@aboslutely> 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

user@host> show interfaces fxp1 extensive

```



**show interfaces  
extensive  
(internal Ethernet)**

```
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**

```
user@host> show interfaces ixgbe0 extensive
Physical interface: ixgbe0, Enabled, Physical link is Up
Interface index: 2, SNMP ifIndex: 116, Generation: 3
```

(internal Ethernet [TX  
Matrix Plus Router])

```

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 (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>List of Sample Output</b>	<p><a href="#">show interfaces (SDH Mode, PPP) on page 622</a></p> <p><a href="#">show interfaces brief (SDH Mode, PPP) on page 622</a></p> <p><a href="#">show interfaces detail (SDH Mode, PPP) on page 622</a></p> <p><a href="#">show interfaces extensive (SDH Mode, PPP) on page 623</a></p> <p><a href="#">show interfaces brief (SONET Mode, Frame Relay) on page 625</a></p> <p><a href="#">show interfaces (SONET Mode, Frame Relay) on page 626</a></p> <p><a href="#">show interfaces detail (SONET Mode, Frame Relay) on page 626</a></p> <p><a href="#">show interfaces extensive (SONET Mode, Frame Relay) on page 628</a></p> <p><a href="#">show interfaces extensive (OC768-over-4xOC192 Mode) on page 631</a></p> <p><a href="#">show interfaces detail (IPv6 Tracking) on page 634</a></p> <p><a href="#">show interfaces (shared interface) on page 635</a></p>
<b>Output Fields</b>	Table 38 on page 608 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 38: 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

Table 38: SONET/SDH 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 Common Output Fields 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.	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 Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	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 Common Output Fields Description.	All levels

Table 38: 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 (hh:mm:ss ago)</i> , Output: <i>value (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 38: 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 38: 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 38: SONET/SDH show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
Label-switched interface (LSI) traffic statistics	(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>	extensive
Input errors	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>	extensive

Table 38: 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> <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 38: 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 38: 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>  <b>Transmitted SONET 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>SDH alarms</b>  <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: <b>SDH PHY</b>, <b>SDH regenerator section</b>, <b>SDH multiplex section</b>, and <b>SDH path</b>.</p>	All levels

Table 38: 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 38: 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>	<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</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>extensive</b>
<b>Transmitted SDH overhead</b>		
<b>Received 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>
<b>Transmitted path trace</b>		

Table 38: 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 Common Output Fields Description.	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 38: 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 Common Output Fields Description.	<b>detail extensive none</b>



Table 38: 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 Common Output Fields Description.	<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>	<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</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 (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 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

```

```
user@host> show interfaces so-0/0/0 detail
```

**show interfaces detail**  
**(SONET Mode,**  
**Frame Relay)**

```
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**

```
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
```



(SONET Mode,  
Frame Relay)

```

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 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**

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

## (OC768-over-4xOC192 Mode)

```

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>	show interfaces <i>interface-type</i> <brief   detail   extensive   terse> <descriptions> <media> <snmp-index <i>snmp-index</i> > <statistics>
<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><i>interface-type</i>—On M Series and T Series routers, the interface type is <i>se-fpc/pic/port</i>. On the J Series routers, the interface type is <i>se-pim/O/port</i>.</p> <p><i>brief   detail   extensive   terse</i>—(Optional) Display the specified level of output.</p> <p><i>descriptions</i>—(Optional) Display interface description strings.</p> <p><i>media</i>—(Optional) Display media-specific information about network interfaces.</p> <p><i>snmp-index snmp-index</i>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><i>statistics</i>—(Optional) Display static interface statistics.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show interfaces (Serial, EIA-530) on page 644</a> <a href="#">show interfaces brief (Serial, EIA-530) on page 644</a> <a href="#">show interfaces detail (Serial, EIA-530) on page 644</a> <a href="#">show interfaces extensive (Serial, EIA-530) on page 645</a> <a href="#">show interfaces (Serial, V.35) on page 646</a> <a href="#">show interfaces brief (Serial, V.35) on page 646</a> <a href="#">show interfaces detail (Serial, V.35) on page 647</a> <a href="#">show interfaces extensive (Serial, V.35) on page 647</a> <a href="#">show interfaces statistics detail (RS 449) on page 649</a>
<b>Output Fields</b>	Table 39 on page 637 lists the output fields for the <b>show interfaces</b> (Serial) command. Output fields are listed in the approximate order in which they appear.

Table 39: show interfaces (Serial) Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels

Table 39: show interfaces (Serial) 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 Common Output Fields 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>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</b> none
<b>Device flags</b>	Information about the physical device. Possible values are described in the “Device Flags” section under Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	All levels
<b>Link flags</b>	Information about the link. Possible values are described in the “Link Flags” section under Common Output Fields Description.	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</b> none

Table 39: show interfaces (Serial) Output Fields (*continued*)

Field Name	Field Description	Level of Output
Keepalive statistics	(PPP and HDLC) Information about keepalive packets. <ul style="list-style-type: none"> <li>• <b>Input:</b> <i>number (last seen hh:mm:ss ago)</i>—Number of keepalive packets received by PPP and the time since the last keepalive packet was received.</li> <li>• <b>Output:</b> <i>number (last seen hh:mm:ss ago)</i>—Number of keepalive packets sent by PPP and the time since the last keepalive packet was sent.</li> </ul>	detail extensive
LCP state	(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>	detail extensive none
NCP state	(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>	detail extensive none
CHAP state	(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>	detail extensive none
CoS queues	Number of CoS queues configured.	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

Table 39: show interfaces (Serial) 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>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 39: 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 39: 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 Common Output Fields Description.	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 Common Output Fields Description.	<b>detail extensive</b>

Table 39: 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 Common Output Fields Description.	<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, mpIs:
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>	<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 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>t1-<i>fpc/pic/port</i></b>, whereas the E1 interface type is <b>e1-<i>fpc/pic/port</i></b>, and DS interface type is <b>ds-<i>fpc/pic/port:channel</i></b>. On the J Series routers, the T1 interface type is <b>t1-<i>pim/O/port</i></b>, whereas the E1 interface type is <b>e1-<i>pim/O/port</i></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>Related Documentation</b>	<ul style="list-style-type: none"> <li>Understanding Interfaces on ACX Series Universal Access Routers</li> </ul>
<b>List of Sample Output</b>	<a href="#">show interfaces (T1, IMA Link) on page 664</a> <a href="#">show interfaces (T1, PPP) on page 664</a> <a href="#">show interfaces detail (T1, PPP) on page 665</a> <a href="#">show interfaces extensive (T1 CRC Errors) on page 665</a> <a href="#">show interfaces extensive (T1, PPP) on page 666</a> <a href="#">show interfaces (E1, Frame Relay) on page 667</a> <a href="#">show interfaces detail (E1, Frame Relay) on page 668</a> <a href="#">show interfaces extensive (E1, Frame Relay) on page 669</a> <a href="#">show interfaces (E1, IMA Link) on page 671</a> <a href="#">show interfaces extensive (T1, TDM-CCC-SATOP) on page 672</a> <a href="#">show interfaces extensive (DS, TDM-CCC-CESoPSN) on page 674</a>
<b>Output Fields</b>	<p><a href="#">Table 40 on page 652</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 40: 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 Common Output Fields 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.	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> .  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 Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	All levels
<b>Link flags</b>	Information about the link. Possible values are described in the “Link Flags” section under Common Output Fields Description.	All levels
<b>Hold-times</b>	Current interface hold-time up and hold-time down, in milliseconds.	<b>detail extensive</b>



Table 40: 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 40: 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>• (last seen 00:00:00 ago)—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>• (last seen 00:00:00 ago)—Time since the last keepalive packet was sent, in the format <i>hh:mm:ss</i>.</li> </ul> </li> </ul>	detail extensive none

Table 40: 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 none</b>
<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 none</b>
<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 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 40: 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 <code>n392dte</code> or <code>n393dce</code> 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: <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>

Table 40: 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 40: 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> <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 40: 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. 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 40: T1 or E1 show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>CESoPSN Configuration</b>	<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>	<b>extensive</b>
<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>—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>	<b>extensive</b>
<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>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>



Table 40: 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 Common Output Fields Description.	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 40: 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</b> none
<b>Multilink bundle</b>	Interface name for the multilink bundle, if configured.	<b>detail extensive</b> none
<b>MTU</b>	MTU size 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>	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 Common Output Fields Description.	<b>detail extensive</b> none
<b>Addresses, Flags</b>	Information about the address flags. Possible values are described in the “Addresses Flags” section under Common Output Fields Description.	<b>detail extensive</b> none
<b>Destination</b>	IP address of the remote side of the connection.	<b>detail extensive</b> none
<b>Local</b>	IP address of the logical interface.	<b>detail extensive</b> none
<b>Broadcast</b>	Broadcast address.	<b>detail extensive</b> none
<b>Generation</b>	Unique number for use by Juniper Networks technical support only.	<b>detail extensive</b> none
<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</b> none
<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</b> none

Table 40: T1 or E1 show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>CE Info</b>	<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>	<b>extensive</b>

## 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      OK
LODS           0      OK
Err-ICP        0      OK
IV             0      OK
Rx-FC          0      OK
Tx-FC          0      OK
FE-Defects     0
FE-Rx-FC       0
FE-Tx-FC       0
Rx-ICP         0
Rx-Stuff       0
Tx-ICP         11
Tx-Stuff       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 timedout    : 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 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 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
  Output bytes : 0
  Input packets: 0
  Output packets: 0
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

```

```

LODS                                0
Err-ICP                            0
IV                                  0
Rx-FC                               0
Tx-FC                               0
FE-Defects                          0
FE-Rx-FC                            0
FE-Tx-FC                            0
Rx-ICP                              0
Rx-Stuff                             0
Tx-ICP                              11
Tx-Stuff                             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
Limit
          %          bps          %          usec          Priority
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, 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      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 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>. On the J Series routers, the T3 interface type is <b>t3-pim/0/port</b>, whereas the E3 interface type is <b>e3-pim/0/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 686</a></p> <p><a href="#">show interfaces detail (T3, PPP) on page 686</a></p> <p><a href="#">show interfaces extensive (T3, PPP) on page 687</a></p> <p><a href="#">show interfaces (E3, Frame Relay) on page 688</a></p> <p><a href="#">show interfaces detail (E3, Frame Relay) on page 689</a></p> <p><a href="#">show interfaces extensive (E3, Frame Relay) on page 691</a></p>
<b>Output Fields</b>	Table 41 on page 676 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 41: 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 Common Output Fields Description.	All levels
<b>Interface index</b>	Physical interface's index number, which reflects its initialization sequence.	<b>detail extensive</b> none



Table 41: 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 Common Output Fields Description.	All levels
<b>Interface flags</b>	Information about the interface. Possible values are described in the “Interface Flags” section under Common Output Fields Description.	All levels
<b>Link flags</b>	Information about the link. Possible values are described in the “Link Flags” section under Common Output Fields Description.	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 41: 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 41: T3 or E3 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. Displayed only from the DTE.) Number of DLCIs configured from the DCE.	<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>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>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-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 41: 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 41: 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> <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 41: T3 or E3 show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>DS3 media or E3 media</b>	<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>	<b>extensive</b>
<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>Idle cycle flag</b>—Idle cycle flags.</li> <li>• <b>Start end flag</b>—Start and end flag.</li> </ul>	<b>extensive</b>

Table 41: 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 41: 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 Common Output Fields Description.	<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, <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 Common Output Fields Description.	<b>detail extensive none</b>



Table 41: 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 Common Output Fields Description.	<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
1 expedited-fo	0	0
2 assured-forw	0	0
3 network-cont	6	6

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 bps	%	Buffer usec	Priority	Limit
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](#)

user@host> show interfaces e3-1/2/0

Physical interface: e3-1/2/0, Enabled, Physical link is Up

**(E3, Frame Relay)**

```

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 timeout : 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:

```

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

```







## CHAPTER 6

# Command Summaries

- [ATM Interface Operational Mode Commands on page 695](#)
- [Channelized E1 Interface Operational Mode Commands on page 696](#)
- [Channelized OC Interface Operational Commands on page 697](#)
- [Channelized STM1 Interface Operational Mode Commands on page 697](#)
- [Channelized T1 and T3 Interface Operational Mode Commands on page 698](#)
- [Discard Interface Operational Mode Commands on page 699](#)
- [Ethernet Interface Operational Mode Commands on page 699](#)
- [ISDN Interface Operational Mode Commands on page 704](#)
- [Loopback Interface Operational Mode Commands on page 705](#)
- [Management Ethernet and Internal Ethernet Interface Operational Mode Commands on page 706](#)
- [Serial Interface Operational Mode Commands on page 707](#)
- [SONET/SDH Interface Operational Mode Commands on page 707](#)

### ATM Interface Operational Mode Commands

---

[Table 42 on page 695](#) summarizes the command-line interface (CLI) commands that you can use to monitor and troubleshoot Asynchronous Transfer Mode (ATM) interfaces on M Series and T Series routers, and ATM-over-asymmetrical digital subscriber line (ADSL) and ATM-over-symmetric high-speed digital subscriber line (SHDSL) interfaces on the J Series routers. An ATM-over-ADSL interface and an ATM-over-SHDSL interface is configured over an underlying ATM interface.

**Table 42: ATM Interface Operational Mode Commands**

Task	Command
Display status information about ATM interfaces.	<a href="#">show interfaces (ATM)</a>
Display status information about ATM-over-ADSL interfaces.	<a href="#">show interfaces (ATM-over-ADSL)</a>
Display status information about ATM-over-SHDSL interfaces.	<a href="#">show interfaces (ATM-over-SHDSL)</a>

ATM-over-ADSL interfaces are used to transport Point-to-Point Protocol over Ethernet (PPPoE) frames or Point-to-Point Protocol over ATM (PPPoA) frames over an ADSL loop and a digital subscriber line access multiplexer (DSLAM). Both PPPoE and PPPoA connect multiple hosts on an Ethernet LAN to a remote site through the J Series Services Router. The hosts share a common digital subscriber line (DSL), a cable modem, or a wireless connection to the Internet.

ATM-over-SHDSL interfaces are used to transport network traffic through a point-to-point connection to a DSL access multiplexer (DSLAM).



**NOTE:** For information about monitoring and troubleshooting PPPoE interfaces (pp0), which are used in conjunction with ATM-over-ADSL interfaces, see *PPPoE Interface Operational Mode Commands*. For more information about monitoring and troubleshooting ATM interfaces, see “Investigate ATM Interfaces” in the *Junos Interfaces Network Operations Guide*.

## Channelized E1 Interface Operational Mode Commands

Table 43 on page 696 summarizes the command-line interface (CLI) commands that you can use to monitor and troubleshoot channelized E1 interfaces. Commands are listed in alphabetical order.

**Table 43: Channelized E1 Interface Operational Mode Commands**

Task	Command
Display status information about channelized E1 interfaces.	<a href="#">show interfaces (Channelized E1)</a>
Display channelized E1 IQ interface information.	<a href="#">show interfaces (Channelized E1 IQ)</a>
Display the interface names of the physical channelized E1 IQ interface and the channels configured on each interface.	<a href="#">show interfaces controller (Channelized E1 IQ)</a>



**NOTE:** For more information about the channel type and level of channelization, and for information about the number of channels that are supported on the channelized E1 interface, see the Junos® OS Network Interfaces.

For channelization illustrations and configuration examples for channelized IQ interfaces, see the *Junos Feature Guide*.

## Channelized OC Interface Operational Commands

Table 44 on page 697 summarizes the command-line interface (CLI) commands to monitor and troubleshoot channelized OC interfaces. Commands are listed in alphabetical order.

**Table 44: Channelized OC Interface Operational Mode Commands**

Task or Information to Monitor	CLI Command
Display channelized OC3 IQ and IQE interface information.	<a href="#">show interfaces (Channelized OC3 IQ and IQE)</a>
Display status information about channelized OC12 interfaces.	<a href="#">show interfaces (Channelized OC12)</a>
Display channelized OC12 IQ and IQE interface information.	<a href="#">show interfaces (Channelized OC12 IQ and IQE)</a>
Display the interface names of the physical channelized OC3 IQ and IQE interface and the channels configured on each interface.	<a href="#">show interfaces controller (Channelized OC3 IQ and IQE)</a>
Display the interface names of the physical channelized OC12 IQ and IQE interface and the channels configured on each interface.	<a href="#">show interfaces controller (Channelized OC12 IQ and IQE)</a>
Display channelized OC48 IQ and IQE interface information.	<a href="#">show interfaces (Channelized OC48 IQ and IQE)</a>



**NOTE:** For more information about the channel type and level of channelization, and for information about the number of channels that are supported on channelized OC interfaces, see the *Junos Network Interfaces Configuration Guide*.

For channelization illustrations and configuration examples for channelized IQ and IQE interfaces, see the *Junos Feature Guide*.

## Channelized STM1 Interface Operational Mode Commands

Table 45 on page 697 summarizes the command-line interface (CLI) commands that you can use to monitor and troubleshoot channelized STM1 interfaces. Commands are listed in alphabetical order.

**Table 45: Channelized STM1 Interface Operational Mode Commands**

Task	Command
Display status information about channelized STM1 interfaces.	<a href="#">show interfaces (Channelized STM1)</a>

**Table 45: Channelized STM1 Interface Operational Mode Commands** (*continued*)

Task	Command
Display channelized STM1 IQ interface information.	<a href="#">show interfaces (Channelized STM1 IQ)</a>
Display the interface names of the physical channelized STM1 IQ interface and the channels configured on each interface.	show interfaces controller (Channelized STM1 IQ)



**NOTE:** For more information about the channel type and level of channelization, and for information about the number of channels that are supported on the channelized STM1 interface, see the *Junos Network Interfaces Configuration Guide*.

For channelization illustrations and configuration examples for channelized IQ interfaces, see the *Junos Feature Guide*.

## Channelized T1 and T3 Interface Operational Mode Commands

Table 46 on page 698 summarizes the command-line interface (CLI) commands that you can use to monitor and troubleshoot channelized T1 and T3 interfaces. Commands are listed in alphabetical order.

**Table 46: Channelized T1 and T3 Interface Operational Mode Commands**

Task	Command
Display status information about channelized DS3-to-DS0 interfaces.	<a href="#">show interfaces (Channelized DS3-to-DS0)</a>
Display status information about channelized DS3-to-DS1 interfaces.	<a href="#">show interfaces (Channelized DS3-to-DS1)</a>
Display channelized T1 IQ interface information.	<a href="#">show interfaces (Channelized T1 IQ)</a>
Display channelized T3 IQ interface information.	<a href="#">show interfaces (Channelized T3 IQ)</a>
Display the interface names of the physical channelized T1 IQ interface and the channels configured on each interface.	show interfaces controller (Channelized T1 IQ)
Display the interface names of the physical channelized T3 IQ interface and the channels configured on each interface.	show interfaces controller (Channelized T3 IQ)



**NOTE:** For more information about the channel type and level of channelization, and for information about the number of channels that are supported on the different types of channelized T1 and T3 interfaces, see the *Junos Network Interfaces Configuration Guide*.

For more information on monitoring and troubleshooting channelized DS3-to-DS0 and DS3-to-DS1 interfaces, see the *Junos Interfaces Network Operations Guide*.

For channelization illustrations and configuration examples for channelized IQ interfaces, see the *Junos Feature Guide*.

## Discard Interface Operational Mode Commands

Table 47 on page 699 summarizes the command-line interface (CLI) command that you can use to monitor and troubleshoot the discard (**dsc**) interface.

**Table 47: Discard Interface Operational Mode Commands**

Task	Command
Monitor the discard interface.	<code>show interfaces (Discard)</code>

The discard interface is not a physical interface, but a virtual interface that discards packets. You can configure one discard interface. 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. Traffic routed out of the discard interface is silently discarded.

If an output filter is attached to the interface, the action specified by the filter causes the packets to be logged or counted before the traffic is discarded. For a complete discussion about using the discard interface to protect your network against DoS attacks, see the *Junos Policy Framework Configuration Guide*.

Statistics and media displayed by the **show interfaces** command are not relevant for the discard interface and always show values of **0**.

## Ethernet Interface Operational Mode Commands

Table 48 on page 699 summarizes the command-line interface (CLI) commands that you can use to monitor and troubleshoot aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces. Commands are listed in alphabetical order.

**Table 48: Ethernet Interface Operational Mode Commands**

Task	Command
Clear dynamic VLAN interfaces.	<code>clear auto-configuration interfaces</code>

Table 48: Ethernet Interface Operational Mode Commands (*continued*)

Task	Command
Clear a specified dynamic agent circuit identifier (ACI) interface set configured on the router. You can clear only those ACI interface sets that have no subscriber interface members.	clear auto-configuration interfaces interface-set
Clear Link Aggregation Control Protocol (LACP) statistics.	clear lacp statistics
Clear Link Aggregation Control Protocol (LACP) timeout entries.	clear lacp timeouts
Clear learned MAC addresses from the hardware and MAC database. Static MAC addresses are not cleared.	clear interfaces mac-database
Clear statistics that are collected for every MAC address, including policer statistics, on a given physical or logical interface.	clear interfaces mac-database statistics
Clear statistics that are collected for interface sets.	clear interfaces interface-set statistics
Clear the existing continuity measurement and restart counting the operational uptime.	clear oam ethernet connectivity-fault-management continuity-measurement
Clear ITU-T Y.1731 Ethernet frame delay measurement (ETH-DM) delay statistics and ETH-DM frame counts. (MX Series routers)	clear oam ethernet connectivity-fault-management delay-statistics
Clear Operation, Administration, and Management (OAM) and connectivity fault management (CFM) linktrace database information.	clear oam ethernet connectivity-fault-management linktrace path-database
Clear all loss statistics maintained by CFM for a given maintenance domain and maintenance association.	clear oam ethernet connectivity-fault-management loss-statistics
Clear connectivity-fault-management policer statistics.	clear oam ethernet connectivity-fault-management policer
Clear all statistics maintained by CFM. (Routers that support IEEE 802.1ag OAM CFM)  In addition, for interfaces that support ITU-T Y.1731 Ethernet frame delay measurement (ETH-DM), also clear any ETH-DM statistics and frame counts for CFM maintenance association end points (MEPs).	clear oam ethernet connectivity-fault-management statistics
Clear Operation, Administration, and Management (OAM) link fault management state information and restart the link discovery process on Ethernet interfaces.	clear oam ethernet link-fault-management state



Table 48: Ethernet Interface Operational Mode Commands (*continued*)

Task	Command
Clear Operation, Administration, and Management (OAM) statistics link fault management statistics for Ethernet interfaces.	clear oam ethernet link-fault-management statistics
Clear the statistics for all Ethernet ring protection groups or a specific Ethernet ring protection group.	clear protection-group ethernet-ring statistics
Check the reachability of a remote IEEE 802.1ag OAM maintenance association end point (MEP) or maintenance association intermediate point (MIP).	ping ethernet
Manually rebalance the subscribers on an aggregated Ethernet bundle with targeted distribution enabled.	request interface rebalance (Aggregated Ethernet for Subscriber Management)
Manually revert egress traffic from the designated backup link to the designated primary link of an aggregated Ethernet interface for which link protection is enabled, or manually switch egress traffic from the primary link to the backup link.	request interface (revert   switchover) (Aggregated Ethernet Link Protection)
Force LACP link switchover.	request lacp link-switchover
Clear the lockout, force switch, manual switch, exercise, and wait-to-restore states.	request protection-group ethernet-aps clear
Test if APS is operating correctly.	request protection-group ethernet-aps exercise
Force traffic to switch from the active path to the alternate path.	request protection-group ethernet-aps force-switch
Lock the protection path, forcing the use of the working path.	request protection-group ethernet-aps lockout
Force traffic to switch from the active path to the alternate path.	request protection-group ethernet-aps manual-switch
Display status information about aggregated Fast Ethernet or Gigabit Ethernet router interfaces.	show interfaces (Aggregated Ethernet)  show interfaces (far-end-interval)
Display status information about Fast Ethernet interfaces.	<a href="#">show interfaces (Fast Ethernet)</a>
Display status information about the specified Gigabit Ethernet interface.	<a href="#">show interfaces (Gigabit Ethernet)</a>
Display status information about 10-Gigabit Ethernet router interfaces.	<a href="#">show interfaces (10-Gigabit Ethernet)</a>

Table 48: Ethernet Interface Operational Mode Commands (*continued*)

Task	Command
Display IPv6 interface statistics for IPv6 traffic traversing through the IQ2 and IQ2E PICs on standalone T640 routers and on T640 routers in a TX Matrix or in a TXP Matrix.	show interfaces extensive
Display IPv6 interface statistics for IPv6 traffic traversing through the IQ2 PICs on M10i and M120 routers.	
Display IPv6 interface statistics for IPv6 traffic traversing through the IQ2E PICs on M10i, M120, and M320 routers.	
Display information about Gigabit Ethernet or 10-Gigabit Ethernet router interface sets.	show interfaces interface-set (Ethernet Interface Set)
Display information about Gigabit Ethernet or 10-Gigabit Ethernet router interface set queues.	show interfaces interface-set queue
Display the transceiver temperature, laser bias current, laser output power, receive optical power, and related alarms for 10-Gigabit Ethernet dense wavelength-division multiplexing (DWDM) interfaces.	show interfaces diagnostics optics (Gigabit Ethernet, 10-Gigabit Ethernet, and 100 Gigabit Ethernet)
Display information about integrated routing and bridging interfaces.	show interfaces irb
Display status information about the distribution of subscribers on different links in an aggregated Ethernet bundle.	show interfaces targeting (Aggregated Ethernet for Subscriber Management)
Display Link Aggregation Control Protocol (LACP) information for aggregated, Fast Ethernet, or Gigabit Ethernet router interfaces.	show lacp interfaces
Display Link Aggregation Control Protocol (LACP) statistics.	show lacp statistics
Display Link Aggregation Control Protocol timeout entries.	show lacp timeouts
Display MAC address information for Gigabit Ethernet router interfaces.	show interfaces mac-database (Gigabit Ethernet)
Display information on a specified interface that is part of a multichassis link aggregation configuration.	show interfaces mc-ae
Display ETH-DM statistics for CFM MEPs. (MX Series routers, Ethernet DPCs).	show oam ethernet connectivity-fault-management delay-statistics
Display IEEE 802.1ag OAM connectivity fault management forwarding state information for Ethernet interfaces.	show oam ethernet connectivity-fault-management forwarding-state

Table 48: Ethernet Interface Operational Mode Commands (*continued*)

Task	Command
<p>Display OAM connectivity fault management information for Ethernet interfaces.</p> <p>For interfaces that support ETH-DM, also display any ETH-DM frame counts when the <b>detail</b> or <b>extensive</b> option is included. In all other cases, ETH-DM frame counts are zero.</p>	show oam ethernet connectivity-fault-management interfaces
<p>Display OAM connectivity fault management linktrace path database information.</p>	show oam ethernet connectivity-fault-management linktrace path-database
<p>Display OAM connectivity fault management maintenance association end point (MEP) database information.</p> <p>For interfaces that support ETH-DM, also display any ETH-DM frame counts. In all other cases, ETH-DM frame counts are zero.</p>	show oam ethernet connectivity-fault-management mep-database
<p>Display ETH-DM statistics and frame counts for CFM MEPs. (MX Series routers, Ethernet DPCs)</p>	show oam ethernet connectivity-fault-management mep-statistics
<p>Display ETH-LM statistics for on-demand mode only.</p>	show oam ethernet connectivity-fault-management loss-statistics
<p>Display information about maintenance intermediate points (MIPs) for the Ethernet OAM 802.1ag standard for connectivity fault management (CFM).</p>	show oam ethernet connectivity-fault-management mip
<p>Display OAM connectivity fault management path database information for hosts configured with MEP.</p>	show oam ethernet connectivity-fault-management path-database
<p>Displays connectivity-fault-management policer statistics.</p>	show oam ethernet connectivity-fault-management policer
<p>Display OAM Ethernet Virtual Connection (EVC) information for hosts configured with Ethernet Local Management Interface (E-LMI). (MX series only)</p>	show oam ethernet evc
<p>Display OAM fault management statistics for Ethernet interfaces.</p>	show oam ethernet link-fault-management
<p>Display OAM Ethernet Local Management Interface status information for an LMI configured interface. (MX series only)</p>	show oam ethernet lmi

**Table 48: Ethernet Interface Operational Mode Commands** (*continued*)

Task	Command
Display OAM Ethernet Local Management Interface statistics for an LMI configured interface. (MX series only)	show oam ethernet lmi statistics
Display protection group Ethernet ring Automatic Protection Switching (APS).	show protection-group ethernet-ring aps
Display data channel information for all Ethernet ring protection groups or for a specific Ethernet ring protection group.	show protection-group ethernet-ring data-channel
Display protection group Ethernet ring interfaces.	show protection-group ethernet-ring interface
Display protection group Ethernet ring nodes.	show protection-group ethernet-ring node-state
Display protection group Ethernet ring statistics.	show protection-group ethernet-ring statistics
Display all data channel logical interfaces and the VLAN IDs controlled by a ring instance data channel.	show protection-group ethernet-ring vlan
Trace the path between two Ethernet OAM end points.	traceroute ethernet

## ISDN Interface Operational Mode Commands

Table 49 on page 704 summarizes the command-line interface (CLI) commands that you can use to monitor and troubleshoot Integrated Services Digital Network (ISDN) interfaces. Commands are listed in alphabetical order.

**Table 49: ISDN Interface Operational Mode Commands**

Task	Command
Clear ISDN Q.921 statistics.	clear isdn q921 statistics
Clear ISDN Q.931 statistics.	clear isdn q931 statistics
Display ISDN services default software values.	show dialer defaults
Display ISDN dialer interface information.	show dialer interfaces
Display ISDN dialer pool information.	show dialer pools
Display ISDN B-channel interface information.	<a href="#">show interfaces (ISDN B-Channel)</a>
Display ISDN Basic Rate Interface (BRI) information.	<a href="#">show interfaces (ISDN BRI)</a>

Table 49: ISDN Interface Operational Mode Commands (*continued*)

Task	Command
Display ISDN D-channel interface information.	<code>show interfaces (ISDN D-channel)</code>
Display ISDN dialer interface information.	<code>show interfaces (ISDN Dialer)</code>
Display ISDN calls.	<code>show isdn calls</code>
Display ISDN call history.	<code>show isdn history</code>
Display Layer 2 ISDN status and statistics.	<code>show isdn q921 statistics</code>
Display Layer 3 ISDN status and statistics.	<code>show isdn q931 statistics</code>
Display ISDN status information.	<code>show isdn status</code>



**NOTE:** ISDN is supported on the J Series Services Routers only. J Series routers can be configured to "fail over" to an ISDN interface when the primary connection experiences interruptions in Internet connectivity. The following interfaces support ISDN backup connectivity: E1, E3, Fast Ethernet, generic routing encapsulation (GRE), Point-to-Point Protocol over Ethernet (PPPoE), serial, T1, and T3. For information about how to configure ISDN interfaces, see the *J Series Services Router Basic LAN and WAN Access Configuration Guide* or the *Junos Network Interfaces Configuration Guide*.

## Loopback Interface Operational Mode Commands

Table 50 on page 705 summarizes the command-line interface (CLI) command that you can use to monitor and troubleshoot the local loopback interface (lo0).

Table 50: Loopback Interface Operational Mode Command

Task	Command
Monitor the loopback interface.	<code>show interfaces (Loopback)</code>

The Junos OS automatically configures one local loopback interface (lo0), choosing the first interface to come online as the default. You can also configure the loopback interface and one or more addresses on the interface. If you configure the loopback interface, it is automatically used for unnumbered interfaces.

A local loopback loops packets, including both data and timing information, back on the local Physical Interface Card (PIC) or Physical Interface Module (PIM). When you configure a local loopback, the interface transmits packets to the channel services unit (CSU) built into the interface. These packets are transmitted onto the circuit toward the far-end

device. The PIC or PIM receives back its own transmission and ignores any data sent from the physical circuit and the CSU.

To test a local loopback, issue the **show interfaces *interface-name*** command. If PPP keepalives transmitted on the interface are received by the PIC or PIM, the **Device Flags** field contains the output **Loop-Detected**.

For more information about using the loopback interface to monitor and troubleshoot various interface types, see the *Junos Interfaces Network Operations Guide*.

## Management Ethernet and Internal Ethernet Interface Operational Mode Commands

Table 51 on page 706 summarizes the command-line interface (CLI) commands that you can use to monitor and troubleshoot the management Ethernet interface and, in the case of M Series and T Series routers, the internal Ethernet interface.

**Table 51: Management Ethernet and Internal Ethernet Interface Operational Mode Commands**

Task	Command
Monitor the M Series and T Series router management Ethernet and internal Ethernet interfaces.	<a href="#">show interfaces (M Series and T Series Routers, and PTX Series Packet Transport Switches Management and Internal Ethernet)</a>
Monitor the J Series router management Ethernet interface.	show interfaces (J Series Router Management Ethernet)

On the M Series and T Series routers other than the TX Matrix Plus router and T1600 routers in a routing matrix, the Junos OS automatically creates the router's management Ethernet interface, **fxp0**, which is an out-of-band management interface for connecting to the router, and the internal Ethernet interface, **fxp1**, which connects the Routing Engine to the Packet Forwarding Engine. If the platform has redundant Routing Engines, another internal Ethernet interface, **fxp2**, is created to connect the second Routing Engine (**re1**) to the Packet Forwarding Engine.

On TX Matrix Plus Routers and T1600 routers 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.

On a TX Matrix Plus router, the Routing Engine (RE-TXP-SFC) and Control Board (TXP-CB) 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**, for the two 10-Gigabit Ethernet ports on the Routing Engine.

For more information about the management Ethernet interface and internal Ethernet interfaces on a TX Matrix Plus router and T1600 routers configured in a routing matrix, see the *Junos Network Interfaces Configuration Guide*.

On J Series routers, the Junos OS automatically creates the router's management Ethernet interface, **fe-0/0/0**, which is an out-of-band management interface for connecting to the router.

## Serial Interface Operational Mode Commands

Table 52 on page 707 summarizes the command-line interface (CLI) command that you can use to monitor and troubleshoot serial interfaces.

**Table 52: Serial Interface Operational Mode Commands**

Task	Command
Display status information about serial interfaces.	<a href="#">show interfaces (Serial)</a>

## SONET/SDH Interface Operational Mode Commands

Table 53 on page 707 summarizes the command-line interface (CLI) commands that you can use to monitor and troubleshoot aggregated SONET/SDH interfaces and SONET/SDH interfaces. Commands are listed in alphabetical order.

**Table 53: SONET/SDH Interface Operational Mode Commands**

Task	Command
Monitor Automatic Protection Switching (APS) information.	show aps
Display status information about aggregated SONET/SDH interfaces.	show interfaces (Aggregated SONET/SDH)
Display status information about SONET/SDH interfaces.	<a href="#">show interfaces (SONET/SDH)</a>
Display the transceiver temperature, laser bias current, laser output power, receive optical power, and related alarms for SONET interfaces.	show interfaces diagnostics optics (SONET)

For more information about monitoring and troubleshooting SONET interfaces, see “Investigate SONET Interfaces” in the *Junos Interfaces Network Operations Guide*.





## PART 4

# Index

- [Index on page 711](#)



# Index

## Symbols

#, comments in configuration statements.....	xviii
( ), in syntax descriptions.....	xviii
10-Gigabit Ethernet interfaces	
MTU sizes.....	55
802.1Q VLANs	
mixed VLAN tagging.....	188, 245
VLAN tagging.....	333
802.1Q/Ethernet 802.3 encapsulation	
encapsulation overhead.....	51
802.1Q/Ethernet SNAP encapsulation	
encapsulation overhead.....	51
802.3ad statement.....	115
< >, in syntax descriptions.....	xviii
[ ], in configuration statements.....	xviii
{ }, in configuration statements.....	xviii
(pipe), in syntax descriptions.....	xviii

## A

access profile	
configuring.....	67
default CHAP secret.....	67
access-profile statement.....	116
usage guidelines.....	66, 68
accounting profiles	
physical interfaces.....	86
example configuration.....	86
accounting-profile statement.....	117
usage guidelines.....	86
acfc statement.....	117
usage guidelines.....	74
acknowledge-retries statement.....	118
acknowledge-timer statement.....	119
usage guidelines.....	119
action-red-differential-delay statement.....	119
usage guidelines.....	119
address and control field compression.....	74
ADSL	
ATM-over-ADSL interfaces	
status information, displaying.....	408
advertise-interval statement.....	120

aggregate-ports statement.....	122
aggregated-ether-options statement.....	121
aggregated-sonet-options statement.....	122
alarm statement.....	124
annex statement.....	125
aps statement.....	126
annex-b.....	125
Asynchronous Transfer Mode See ATM	
asynchronous-notification statement.....	127
ATM cell-relay encapsulation	
encapsulation overhead.....	51
ATM encapsulation	
ATM PVC encapsulation.....	51, 61
keepalives.....	81
ATM interfaces	
encapsulation.....	61
MTU sizes.....	52, 54, 56
status information, displaying.....	373
ATM PVC encapsulation.....	51, 61
atm-encapsulation statement.....	127
atm-options statement.....	128
ATM-over-ADSL interfaces	
status information, displaying.....	408
ATM-over-SHDSL interfaces	
status information, displaying.....	416
ATM-to-Ethernet interworking.....	334
ATM2 IQ interfaces	
MTU sizes.....	54, 56
authentication-key statement.....	129
auto-negotiation statement	
Gigabit Ethernet.....	130
auto-reconnect statement.....	131

## B

backup-interface statement.....	132
bandwidth-limit statement	
policer for Gigabit Ethernet interface.....	132
bchannel-allocation statement.....	133
bert-algorithm statement.....	134
bert-error-rate statement.....	136
bert-period statement.....	138
braces, in configuration statements.....	xviii
brackets	
angle, in syntax descriptions.....	xviii
square, in configuration statements.....	xviii
buildout statement	
E3 or T3 over ATM interfaces.....	139
T1 interfaces.....	140

burst-size-limit statement	
policer for Gigabit Ethernet interface.....	141
byte encoding.....	142
byte-encoding statement.....	142
bytes statement.....	143

## C

C-bit parity mode.....	144
calling-number statement.....	144
cbit-parity statement.....	144
cbr statement.....	145
cell-bundle-size statement.....	146
channelized DS3-to-DS0 interfaces	
status information, displaying.....	425
channelized DS3-to-DS1 interfaces	
status information, displaying.....	436
channelized E1 interfaces	
status information, displaying.....	444
channelized E1 IQ interfaces	
status information, displaying.....	439
channelized OC12 interfaces	
status information, displaying.....	459
channelized OC12 IQ interfaces	
status information, displaying.....	455
channelized OC12 IQE interfaces	
status information, displaying.....	455
channelized OC3 IQ interfaces	
status information, displaying.....	463
channelized OC3 IQE interfaces	
status information, displaying.....	463
Channelized SONET/SDH OC3/STM1 (Multi-Rate) interfaces	
MTU sizes.....	56
channelized STM1 interfaces	
status information, displaying.....	485
channelized STM1 IQ interfaces	
status information, displaying.....	482
channelized T1 IQ interfaces	
status information, displaying.....	500
channelized T3 IQ interfaces	
status information, displaying.....	513
CHAP.....	66, 68
configuring default CHAP secret.....	67
example configuration.....	68, 71
chap statement.....	147
usage guidelines.....	66, 68

Cisco HDLC encapsulation.....	60
configuring on physical interfaces.....	61
encapsulation overhead.....	51
keepalives.....	81
classifier statement.....	148
clock sources.....	83, 150
clock-rate statement.....	149
clocking statement.....	150
usage guidelines.....	83
clocking-mode statement.....	151
comments, in configuration statements.....	xviii
compatibility-mode statement.....	152
compression statement	
usage guidelines.....	74, 76
connections	
configuration statements.....	113
control-polarity statement.....	153
control-signal statement.....	154
conventions	
text and syntax.....	xvii
core-dump statement.....	154
usage guidelines.....	87
crc-major-alarm-threshold statement.....	155
crc-minor-alarm-threshold statement.....	156
cts statement.....	157
cts-polarity statement.....	157
curly braces, in configuration statements.....	xviii
current statement.....	158
customer support.....	xix
contacting JTAC.....	xix

## D

damping	
interface transitions.....	88
data circuit-terminating equipment <i>See</i> DCE	
data terminal equipment <i>See</i> DTE	
data-input statement.....	159
dcd statement.....	160
dcd-polarity statement.....	160
DCE.....	84, 161
dce statement.....	161
usage guidelines.....	84
dce-options statement.....	161
default-chap-secret statement.....	162
description statement.....	163
example configuration.....	47
usage guidelines.....	46
dialin statement.....	164

- 
- disable statement.....165
    - physical interfaces
      - usage guidelines.....90
  - disabling
    - keepalives.....81
    - physical interfaces.....90
    - example configuration.....91
  - discard interface
    - status information, displaying.....515
  - documentation
    - comments on.....xix
  - drop-timeout statement.....166
  - DS interfaces
    - status information, displaying.....651
  - ds0-options statement.....167
  - DS3 IQ interfaces
    - MTU sizes.....53, 54
  - DS3/E3 interfaces
    - MTU sizes.....56
  - dsr statement.....168
  - dsr-polarity statement.....168
  - dte-options statement.....169
  - dtr statement.....170
  - dtr-circuit statement.....169
  - dtr-polarity statement.....171
  - dump-on-flow-control statement.....171
  - dynamic-profile statement
    - MLPPP.....172
    - PPP.....172
  - E**
  - E1 interfaces
    - MTU sizes.....52, 53, 54
    - status information, displaying.....651
  - e1-options statement.....173
  - E3 interfaces
    - encapsulation.....61
    - MTU sizes.....52, 53, 54
    - status information, displaying.....676
  - E3 IQ interfaces
    - MTU sizes.....53, 54
  - e3-options statement.....174
  - encapsulation.....60
    - Ethernet 802.3.....51
    - example configuration.....65
    - on physical interfaces.....61
    - overheads.....51
    - See also ATM encapsulation
  - encapsulation statement
    - physical interface.....175
    - physical interfaces
      - usage guidelines.....61
  - encoding
    - byte.....142
  - encoding statement.....179
  - epd-threshold statement
    - physical interface.....180
  - es-options statement.....180
  - Ethernet CCC and TCC encapsulation
    - physical interfaces.....61
  - Ethernet CCC encapsulation
    - encapsulation overhead.....51
  - Ethernet interfaces
    - mixed VLAN tagging.....188, 245
    - status information, displaying
      - Fast Ethernet.....521
      - Gigabit Ethernet.....346, 538
      - internal.....589
      - management.....589
    - VLAN tagging.....333
  - Ethernet over ATM encapsulation
    - encapsulation overhead.....51
    - physical interfaces.....61
  - Ethernet SNAP encapsulation
    - encapsulation overhead.....51
  - Ethernet TCC
    - encapsulation
      - encapsulation overhead.....51
  - ethernet-policer-profile statement.....181
  - ethernet-switch-profile statement.....182
  - extended VLAN
    - CCC
      - encapsulation.....61
      - encapsulation overhead.....51
    - TCC
      - encapsulation.....61
      - encapsulation overhead.....51
  - external clock sources.....83, 150
  - F**
  - facility-override statement.....183
  - Fast Ethernet interfaces
    - interface speed.....78
    - link modes.....48
    - MTU sizes.....52, 53, 54
    - status information, displaying.....521
    - VLAN tagging.....333

fast-aps-switch statement.....	185	inactivity-timeout statement.....	203
fastether-options statement.....	184	indication statement.....	203
fcs statement.....	186	indication-polarity statement.....	204
feac-loop-respond statement.....	187	ingress-rate-limit statement.....	204
flexible-vlan-tagging statement.....	188	input-priority-map statement.....	205
flow-control statement.....	189	interface range	
font conventions.....	xvii	expanding member and member range	
force statement.....	190	statements.....	40
fragment-threshold statement.....	191	interface ranges.....	35
Frame Relay encapsulation.....	60	configuration.....	36
DCE.....	84, 161	inheritance range priorities.....	43
encapsulation overhead.....	51	inheriting common configuration.....	43
keepalives.....	81	under other hierarchies.....	44
physical interfaces.....	61	interface statement	
Frame Relay ether type encapsulation		CoS.....	205
physical interfaces.....	61	interface transitions	
framing statement		damping.....	88
E1, E3, and T1 interfaces.....	192	interface-range statement	
		usage guidelines.....	36
<b>G</b>		interface-type statement.....	207
Gigabit Ethernet interfaces		interfaces	
MTU sizes.....	52, 53, 54, 55	clock sources.....	83, 150
status information, displaying.....	346, 538	configuration statements.....	93
VLAN tagging.....	333	descriptive text.....	163
Gigabit Ethernet IQ PIC		disabling.....	90
traffic and MAC statistics.....	346	encapsulation See encapsulation	
gigether-options statement.....	193	mixed VLAN tagging.....	188, 245
gratuitous-arp-reply statement.....	194	interfaces statement.....	206
		internal clock sources.....	83, 150
<b>H</b>		internal Ethernet interface	
HDLC encapsulation		status information, displaying.....	589
Cisco HDLC encapsulation.....	61	invert-data statement.....	208
hello-timer statement.....	195	ISDN	
high-plp-max-threshold statement.....	195	B-channel interfaces, displaying.....	562
high-plp-threshold statement.....	196	BRI interfaces, displaying.....	568
hold-time statement		D-channel interfaces, displaying.....	573
APS.....	196	dialer interfaces, displaying.....	579
damping interface transitions		ISDN interfaces	
usage guidelines.....	88	calling-number.....	144
Physical Interface.....	197		
SONET/SDH Defect Triggers.....	198	<b>K</b>	
host statement.....	199	keepalives	
		disabling.....	81
<b>I</b>		keepalives statement.....	209
idle-cycle-flag statement.....	200	usage guidelines.....	81
ieee802.1p statement.....	201	<b>L</b>	
ignore-all statement.....	201	lacp statement	
ignore-l3-incompletes statement.....	202	Aggregated Ethernet.....	210
ilmi statement.....	202		

- 
- Layer 3 incomplete errors.....202
  - LCP
    - address and control field compression.....74
    - protocol field compression.....76
  - leaky bucket properties.....14, 85
  - line-encoding statement.....211
  - line-protocol statement.....212
  - line-rate statement.....212
  - linear-red-profile statement.....213
  - linear-red-profiles statement.....214
  - link modes.....48
  - link protection
    - non-revertive statement.....247
    - revertive statement.....283
  - link-layer-overhead statement.....214
  - link-mode statement.....215
    - usage guidelines.....48, 78
  - link-protection statement.....217
  - LMI packets *See* keepalives
  - lmi statement
    - Frame Relay keepalives.....220
  - lmi-type statement.....221
  - Local Management Interface packets *See* keepalives
  - local name, configuring.....67, 70
  - local password, configuring.....70
  - local-name statement.....222
    - usage guidelines.....66, 68
  - local-password statement.....223
  - lockout statement.....223
  - log-prefix statement.....224
  - logical systems
    - configuration statements.....109
  - long-buildout statement.....224
  - loop-timing statement.....225
  - loopback statement
    - ADSL, DS0, E1/E3, SONET/SDH, SHDSL, and T1/T3.....226
    - Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet.....228
    - serial.....229
  - loss-priority statement.....229
  - low-plp-max-threshold statement.....230
  - low-plp-threshold statement.....231
- M**
- mac statement.....232
  - mac-learn-enable statement.....233
  - management Ethernet interface
    - configuring for M Series and T Series routers.....77
    - configuring J Series Gigabit Ethernet interfaces.....78
    - interface speed.....77
    - link modes.....48
  - manuals
    - comments on.....xix
  - maximum transmission unit *See* MTU
  - media MTUs.....48
    - See also* MTU
  - member interfaces
    - expanding.....42
    - inheritance.....41
  - member statement
    - usage guidelines.....36
  - member-range statement
    - usage guidelines.....36
  - minimum-links statement.....234
  - mixed VLAN tagging.....188, 245
  - mlfr-uni-nni-bundle-options statement.....235
  - MLPPP
    - dynamic profile attachment.....172
  - MLPPP statements
    - dynamic-profile.....172
  - modem-options statement.....236
  - monitor-session statement
    - usage guidelines.....72
  - monitoring services interfaces
    - physical interface properties.....87
  - mpls statement.....236
  - mrru statement.....237
  - MTU
    - physical interfaces.....48
  - mtu statement.....238
    - usage guidelines.....48
  - Multi-Rate Ethernet interfaces
    - MTU sizes.....55
  - multicast-statistics
    - aggregated Ethernet interfaces.....240
    - aggregated SONET interfaces.....240
  - multiservice-options statement.....241
    - usage guidelines.....87
- N**
- n391 statement.....242
  - n392 statement.....243
  - n393 statement.....244

native-vlan-id statement.....	245	passive access, configuring.....	68, 71
neighbor statement.....	246	passive statement	
no unidirectional statement.....	323	CHAP.....	258
no-asynchronous-notification statement.....	127	PAP.....	258
no-cbit-parity statement.....	144	usage guidelines.....	66, 68
no-core-dump statement.....	154	passive-monitor-mode statement.....	259
usage guidelines.....	87	path-trace statement.....	260
no-feac-loop-respond statement.....	187	payload-scrambler statement.....	261
no-flow-control statement.....	189	per-unit-scheduler statement.....	263
no-gratuitous-arp-reply statement.....	194	periodic statement.....	262
no-gratuitous-arp-request statement.....	246	pfc statement.....	264
no-keepalives statement.....	247	usage guidelines.....	76
usage guidelines.....	81	physical interfaces	
no-long-buildout statement.....	224	accounting profiles.....	86
no-loop-timing statement.....	225	example configuration.....	86
no-loopback statement.....	228	byte encoding.....	142
no-mac-learn-enable statement.....	233	C-bit parity mode.....	144
no-partition statement.....	248	clock sources.....	83, 150
no-payload-scrambler statement.....	261	DCE.....	84, 161
no-source-filtering statement.....	298	descriptive text.....	46, 163
no-syslog statement		disabling.....	90
usage guidelines.....	87	encapsulation.....	60
no-termination-request statement.....	249	keepalives.....	81
no-traps statement.....	320	leaky bucket properties.....	14, 85
usage guidelines.....	89	link modes.....	48
no-unframed statement.....	322	media MTU size.....	48
no-z0-increment statement.....	341	mixed VLAN tagging.....	188, 245
non-revertive statement.....	247	PPP CHAP.....	66, 68
		SNMP notifications.....	89
<b>O</b>		speed.....	77, 78, 79
OAM cells See keepalives		statements.....	19
oam-liveness statement.....	250	transitions, damping.....	88
oam-period statement.....	251	unidirectional mode	
oc-slice statement.....	252	unidirectional link mode.....	15, 89
open-timeout statement.....	252	VLAN tagging.....	333
optics-options statement.....	253	pic-type statement.....	264
alarm.....	124	plp-to-clp statement.....	266
warning.....	336	plp1 statement.....	265
output-priority-map statement.....	254	Point-to-Point Protocol encapsulation.....	60
overflow statement		encapsulation overhead.....	51
configuring.....	85	keepalives.....	81
receive bucket.....	254	on physical interfaces.....	61
transmit bucket.....	255	PPP CHAP.....	66, 68
		policer statement	
<b>P</b>		CoS.....	267
paired-group statement.....	255	pool statement.....	268
pap statement.....	256	pop-all-labels statement.....	269
parentheses, in syntax descriptions.....	xviii		
partition statement.....	257		



**PPP**

address and control field compression.....	74
dynamic profile attachment.....	172
protocol field compression.....	76
PPP statements	
dynamic-profile.....	172
ppp-options statement.....	270
usage guidelines.....	66, 68
PPPD processes, trace operations.....	73
premium	
policer.....	272
premium statement	
output priority map.....	271
preserve-interface statement.....	273
primary statement	
AS PIC or Multiservices PIC interfaces.....	273
priority	
schedulers.....	274
promiscuous-mode statement.....	274
protect-circuit statement.....	275
protocol field compression.....	76
protocol MTUs.....	48
<i>See also</i> MTU	
protocols connections	
configuration statements.....	113
pseudowires	
mixed VLAN tagging.....	188

**Q**

queue-depth statement.....	275
queue-length statement.....	276

**R**

rate statement.....	277
configuring.....	85
receive-bucket statement.....	277
configuring.....	85
red-differential-delay statement.....	278
redundancy-options statement.....	279
remote-loopback-respond statement.....	280
request statement.....	281
required-depth statement.....	282
revert-time statement.....	283
revertive statement.....	283
rfc-2615 statement.....	284
rts statement.....	284
rts-polarity statement.....	285
rtvbr statement.....	286

**S**

scheduler-maps statement.....	287
SDH interfaces	
MTU sizes.....	52, 53, 54
secondary statement.....	287
serial interfaces	
status information, displaying.....	637
serial-options statement.....	288
services statement.....	289
services-options statement.....	290
shaping statement.....	291
SHDSL	
ATM-over-SHDSL interfaces	
status information, displaying.....	416
shdsl-options statement.....	292
show interfaces (10-Gigabit Ethernet)	
command.....	346
show interfaces (ATM) command.....	373
show interfaces (ATM-over-ADSL)	
command.....	408
show interfaces (ATM-over-SHDSL)	
command.....	416
show interfaces (Channelized DS3-to-DS0)	
command.....	425
show interfaces (Channelized DS3-to-DS1)	
command.....	436
show interfaces (Channelized E1 IQ)	
command.....	439
show interfaces (Channelized E1) command.....	444
show interfaces (Channelized OC12 IQ)	
command.....	455
show interfaces (Channelized OC12)	
command.....	459
show interfaces (Channelized OC3 IQ and IQE)	
command.....	463
show interfaces (Channelized STM1 IQ)	
command.....	482
show interfaces (Channelized STM1)	
command.....	485
show interfaces (Channelized T1 IQ)	
command.....	500
show interfaces (Channelized T3 IQ)	
command.....	513
show interfaces (discard) command.....	515
show interfaces (Fast Ethernet) command.....	521
show interfaces (Gigabit Ethernet) command.....	538
show interfaces (ISDN B-channel) command.....	562
show interfaces (ISDN BRI) command.....	568
show interfaces (ISDN D-channel) command.....	573

show interfaces (ISDN dialer) command.....	579
show interfaces (M Series and T Series Management and Internal Ethernet) command.....	589
show interfaces (Serial) command.....	637
show interfaces (SONET/SDH) command.....	608
show interfaces (T1, E1, or DS) command.....	651
show interfaces (T3 or E3) command.....	676
snext statement.....	293
snr-margin statement.....	294
SONET interfaces	
clock sources.....	83
damping interface transitions.....	88
encapsulation.....	61
leaky bucket properties.....	14, 85
MTU sizes.....	52, 53, 54
sonet-options statement.....	295
SONET/SDH interfaces	
interface speed.....	79
status information, displaying standard.....	608
source-address-filter statement.....	297
source-filtering statement.....	298
speed statement	
Ethernet.....	299
MX Series DPC.....	300
SONET/SDH.....	301
usage guidelines.....	77, 78, 79
spid1 statement.....	301
spid2 statement.....	302
stacked-vlan-tagging statement.....	302
start-end-flag statement.....	303
static-tei-val statement.....	304
support, technical See technical support	
switch-options statement.....	305
switch-port statement	
access switching.....	306
switch-type statement.....	307
switching-mode statement.....	304
syntax conventions.....	xvii
syslog statement	
usage guidelines.....	87
system-priority statement	
LACP.....	308
<b>T</b>	
T1 interfaces	
byte encoding.....	142
MTU sizes.....	52, 53, 54
status information, displaying.....	651
t1-options statement.....	309
T3 interfaces	
C-bit parity mode.....	144
encapsulation.....	61
MTU sizes.....	52, 53, 54
status information, displaying.....	676
t3-options statement.....	312
t310 statement.....	310
t391 statement.....	310
t392 statement.....	311
tag-protocol-id statement	
TPIDs expected to be sent or received.....	313
TCC	
encapsulation.....	64
technical support	
contacting JTAC.....	xix
tei-option statement.....	313
threshold statement.....	314
configuring.....	85
timeslots statement.....	315
tm statement.....	316
tm-polarity statement.....	316
traceoptions statement	
interfaces.....	317
PPPD processes.....	73
tracing operations	
PPPD.....	73
transitions	
damping.....	88
translational cross-connect encapsulation See TCC, encapsulation	
transmit clock sources.....	83
transmit-bucket statement.....	318
configuring.....	85
transmit-clock statement.....	319
transmit-weight statement	
ATM2 IQ CoS Forwarding Class.....	319
traps statement.....	320
usage guidelines.....	89
Tri-Rate Ethernet interfaces	
interface speed.....	79
MTU sizes.....	55
trigger statement.....	321
trigger-link-failure statement.....	322

**U**

unframed statement.....	322
unidirectional link mode.....	89
overview.....	15
unidirectional statement.....	323
unit statement.....	324

**V**

vbr statement.....	331
vc-cos-mode statement.....	332
VLAN CCC encapsulation	
encapsulation overhead.....	51
physical interfaces.....	61
VLAN tagging.....	333
vlan-tagging statement.....	333
vlan-tags-outer statement.....	333
vlan-vci-tagging statement.....	334
vpi statement	
ATM CCC cell-relay promiscuous mode.....	334
vtmapping statement.....	335

**W**

warning statement.....	336
wavelength statement.....	337
working-circuit statement.....	340

**Y**

yellow-differential-delay statement.....	341
------------------------------------------	-----

**Z**

z0-increment statement.....	341
-----------------------------	-----

