



Junos[®] OS

Network Management and Monitoring Guide



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Table of Contents

	About the Documentation	liii
	Documentation and Release Notes	liii
	Using the Examples in This Manual	liii
	Merging a Full Example	liv
	Merging a Snippet	liv
	Documentation Conventions	lv
	Documentation Feedback	lvii
	Requesting Technical Support	lvii
	Self-Help Online Tools and Resources	lviii
	Opening a Case with JTAC	lviii
Part 1	Overview	
Chapter 1	Network Management Overview	3
	Understanding Device Management Functions in Junos OS	3
	Understanding Device and Network Management Features	6
	Understanding Tracing and Logging Operations	9
	Junos Space Support for Network Management	11
	Overview of Junos Space Network Management	11
	Preparing the Device for Junos Space Management	12
Chapter 2	Network Monitoring Overview	15
	Monitoring Overview	15
	Diagnostic Tools Overview	16
	J-Web Diagnostic Tools	17
	CLI Diagnostic Commands	17
Part 2	Operation, Administration, and Management Features	
Chapter 3	Ethernet OAM Link Fault Management	23
	Understanding Ethernet OAM Link Fault Management	23
	IEEE 802.3ah OAM Link-Fault Management Overview	25
	Configuring IEEE 802.3ah OAM Link-Fault Management	26
	Enabling IEEE 802.3ah OAM Support	27
	Configuring the OAM PDU Interval	28
	Configuring the OAM PDU Threshold	29
	Configuring an OAM Action Profile	30
	Configuring Threshold Values for Fault Events in an Action Profile	31
	Applying an Action Profile	32
	Setting a Remote Interface into Loopback Mode	33
	Monitoring the Loss of Link Adjacency	34
	Monitoring Protocol Status	35

	Enabling Remote Loopback Support on the Local Interface	36
	Configuring Link Discovery	37
	Configuring Threshold Values for Local Fault Events on an Interface	38
	Disabling the Sending of Link Event TLVs	39
	Detecting Remote Faults	40
	Specifying the Actions to Be Taken for Link-Fault Management Events	41
	Example: Configuring IEEE 802.3ah OAM Support on an Interface	42
	Example: Configuring Ethernet OAM Connectivity Fault Management on EX Series Switches	44
	Configuring Ethernet OAM Link Fault Management	48
Chapter 4	Ethernet OAM Connectivity Fault Management	51
	Understanding Ethernet OAM Connectivity Fault Management for Switches	51
	CFM Limitations on EX4600 Switches	52
	CFM Limitations on QFX5200 Switches and QFX5210 Switches	53
	Example: Configuring Ethernet OAM Connectivity Fault Management on EX Series Switches	53
	Configuring Ethernet OAM Connectivity Fault Management (CLI Procedure)	57
	Creating the Maintenance Domain	58
	Configuring the Maintenance Domain MIP Half Function	59
	Creating a Maintenance Association	59
	Configuring the Continuity Check Protocol	59
	Configuring a Maintenance Association End Point	60
	Configuring a Connectivity Fault Management Action Profile	61
	Configuring the Linktrace Protocol	61
Part 3	Uplink Failure Detection	
Chapter 5	Uplink Failure Detection Overview	65
	Understanding Uplink Failure Detection	65
	Uplink Failure Detection Overview	65
	Failure Detection Pair	66
Chapter 6	Configuring Uplink Failure Detection	69
	Configuring Interfaces for Uplink Failure Detection (CLI Procedure)	69
	Verifying That Uplink Failure Detection Is Working Correctly	70
Part 4	Network Monitoring Using SNMP	
Chapter 7	SNMP Overview	75
	Understanding SNMP Implementation in Junos OS	75
	A Typical SNMP Implementation	75
	The Junos OS SNMP Implementation	76
	SNMPv3 Overview	78
	SNMPv3 Overview (QFX in Standalone Mode)	79
	Loading MIB Files to a Network Management System	80
	Show SNMP	82

	Junos OS SNMP FAQ Overview	84
	Junos OS SNMP FAQs	84
	Junos OS SNMP Support FAQs	85
	Junos OS MIBs FAQs	86
	Junos OS SNMP Configuration FAQs	93
	SNMPv3 FAQs	98
	SNMP Interaction with Juniper Networks Devices FAQs	99
	SNMP Traps and Informs FAQs	101
	Junos OS Dual Routing Engine Configuration FAQs	108
	SNMP Support for Routing Instances FAQs	108
	SNMP Counters FAQs	110
	Managing Traps and Informs	111
	Generating Traps Based on SysLog Events	111
	Filtering Traps Based on the Trap Category	111
	Filtering Traps Based on the Object Identifier	112
Chapter 8	SNMP MIBs and Traps Supported by Junos OS	115
	Enterprise-Specific SNMP MIBs Supported by Junos OS	115
	Standard SNMP MIBs Supported by Junos OS	126
	Standard SNMP Traps Supported by Junos OS	146
	Standard SNMP Version 1 Traps	146
	Standard SNMP Version 2 Traps	150
	Enterprise-Specific SNMP Traps Supported by Junos OS	154
	Juniper Networks Enterprise-Specific SNMP Version 1 Traps	154
	Juniper Networks Enterprise-Specific SNMP Version 2 Traps	160
	Customized SNMP MIBs for Syslog Traps	168
	Overview of Custom SNMP MIBs	169
	Write the MIB File	169
	Convert to a YANG File	170
	CLI Commands to Use for Managing YANG Files	170
	Defining a Custom MIB for a Syslog Trap	171
	Limitations of Using Custom SNMP Traps	176
	Example Custom Syslog Trap	176
	Example Custom Syslog Trap	181
Chapter 9	Configuring Basic SNMP	187
	Configuration Statements at the [edit snmp] Hierarchy Level	188
	Configuring SNMP	192
	Optimizing the Network Management System Configuration for the Best	
	Results	196
	Changing the Polling Method from Column-by-Column to Row-by-Row . .	196
	Reducing the Number of Variable Bindings per PDU	196
	Increasing Timeout Values in Polling and Discovery Intervals	196
	Reducing Incoming Packet Rate at the snmpd	196
	Configuring Options on Managed Devices for Better SNMP Response Time . . .	197
	Enabling the stats-cache-lifetime Option	197
	Filtering Out Duplicate SNMP Requests	197
	Excluding Interfaces That Are Slow in Responding to SNMP Queries	198

Best Practices for Configuring SNMP	199
Configuring Basic Settings for SNMPv1 and SNMPv2	199
Configuring Basic Settings for SNMPv3	200
Configuring System Name, Location, Description, and Contact Information	202
Configuring the System Contact on a Device Running Junos OS	203
Configuring SNMP on a Device Running Junos OS	203
Configuring the System Location for a Device Running Junos OS	205
Configuring the System Description on a Device Running Junos OS	206
Configuring SNMP Details	206
Configuring a Different System Name	208
Configuring the Commit Delay Timer	208
Filtering Duplicate SNMP Requests	209
Configuring SNMP Communities	210
Configuring the SNMP Community String	213
Examples: Configuring the SNMP Community String	214
Adding a Group of Clients to an SNMP Community	215
Configuring a Proxy SNMP Agent	216
Configuring SNMP Traps	218
Configuring SNMP Trap Options and Groups on a Device Running Junos OS . . .	219
Configuring SNMP Trap Options	220
Configuring the Source Address for SNMP Traps	221
Configuring the Agent Address for SNMP Traps	223
Adding snmpTrapEnterprise Object Identifier to Standard SNMP Traps . . .	224
Configuring SNMP Trap Groups	224
SNMP Traps Support	227
SNMP Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis	227
SNMPv1 Traps	227
SNMPv2 Traps	231
SNMP Traps Supported on QFabric Systems	235
Example: Configuring SNMP Trap Groups	239
Configuring the Interfaces on Which SNMP Requests Can Be Accepted	239
Example: Configuring Secured Access List Checking	240
Filtering Interface Information Out of SNMP Get and GetNext Output	240
Configuring MIB Views	241
Configuring Ping Proxy MIB	242
Understanding the Integrated Local Management Interface	243
Utility MIB	244
SNMP MIBs Support	245
MIBs Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis	245
MIBs Supported on QFabric Systems	252
MIB Objects for the QFX Series	258
QFX Series Standalone Switches	258
QFabric Systems	258
QFabric System QFX3100 Director Device	258
QFabric System QFX3008-I Interconnect Device	259
QFabric System QFX3600-I Interconnect Device	259

	QFabric System Node Devices	260
	Fabric Chassis MIB	260
	Monitoring RMON MIB Tables	264
	Using the Enterprise-Specific Utility MIB to Enhance SNMP Coverage	265
	Using the Enterprise-Specific Utility MIB to Enhance SNMP Coverage	267
	Example: Configuring SNMP	269
	Configuring Health Monitoring	272
	Configuring Health Monitoring on Devices Running Junos OS	273
	Monitored Objects	274
	Minimum Health Monitoring Configuration	275
	Configuring the Falling Threshold or Rising Threshold	275
	Configuring the Interval	276
	Log Entries and Traps	276
	Configuring RMON Alarms and Events	276
	Configuring SNMP	277
	Configuring an Event	277
	Configuring an Alarm	278
Chapter 10	Configuring SNMPv3	281
	Minimum SNMPv3 Configuration on a Device Running Junos OS	282
	Example: SNMPv3 Configuration	283
	Creating SNMPv3 Users	286
	Example: Creating SNMPv3 Users	287
	Configuring the SNMPv3 Authentication Type	288
	Configuring MD5 Authentication	288
	Configuring SHA Authentication	289
	Configuring No Authentication	289
	Configuring the SNMPv3 Encryption Type	289
	Configuring the Advanced Encryption Standard Algorithm	290
	Configuring the Data Encryption Algorithm	290
	Configuring Triple DES	291
	Configuring No Encryption	291
	Defining Access Privileges for an SNMP Group	291
	Configuring the Access Privileges Granted to a Group	293
	Configuring the Group	293
	Configuring the Security Model	293
	Configuring the Security Level	293
	Associating MIB Views with an SNMP User Group	294
	Configuring the Notify View	295
	Configuring the Read View	295
	Configuring the Write View	295
	Example: Configuring the Access Privileges Granted to a Group	296
	Assigning Security Model and Security Name to a Group	297
	Configuring the Security Model	297
	Assigning Security Names to Groups	297
	Configuring the Group	298
	Example: Security Group Configuration	298
	Configuring SNMPv3 Traps on a Device Running Junos OS	299
	Configuring the SNMPv3 Trap Notification	300

	Example: Configuring SNMPv3 Trap Notification	301
	Configuring the Trap Notification Filter	301
	Configuring the Trap Target Address	302
	Configuring the Address	303
	Configuring the Address Mask	303
	Configuring the Port	304
	Configuring the Routing Instance	304
	Configuring the Trap Target Address	304
	Applying Target Parameters	305
	Example: Configuring the Tag List	305
	Defining and Configuring the Trap Target Parameters	306
	Applying the Trap Notification Filter	307
	Configuring the Target Parameters	307
	Configuring the Message Processing Model	308
	Configuring the Security Model	308
	Configuring the Security Level	308
	Configuring the Security Name	309
	Configuring SNMP Informs	309
	Configuring the Inform Notification Type and Target Address	310
	Example: Configuring the Inform Notification Type and Target Address	312
	Configuring the Remote Engine and Remote User	313
	Example: Configuring the Remote Engine ID and Remote User	314
	Configuring the Local Engine ID	317
	Configuring the SNMPv3 Community	318
	Configuring the Community Name	319
	Configuring the Context	319
	Configuring the Security Names	320
	Configuring the Tag	320
	Example: Configuring an SNMPv3 Community	320
Chapter 11	Configuring SNMP for Routing Instances	325
	Understanding SNMP Support for Routing Instances	325
	SNMP MIBs Supported for Routing Instances	326
	Support Classes for MIB Objects	336
	SNMP Traps Supported for Routing Instances	337
	Identifying a Routing Instance	338
	Enabling SNMP Access over Routing Instances	339
	Specifying a Routing Instance in an SNMPv1 or SNMPv2c Community	339
	Example: Configuring Interface Settings for a Routing Instance	340
	Configuring Access Lists for SNMP Access over Routing Instances	342
Chapter 12	Configuring SNMP Remote Operations	343
	SNMP Remote Operations Overview	343
	SNMP Remote Operation Requirements	344
	Setting SNMP Views	344
	Example: Setting SNMP Views	344
	Setting Trap Notification for Remote Operations	345
	Example: Setting Trap Notification for Remote Operations	345
	Using Variable-Length String Indexes	345
	Example: Set Variable-Length String Indexes	346

	Enabling Logging	346
	Using the Ping MIB for Remote Monitoring Devices Running Junos OS	346
	Starting a Ping Test	347
	Using Multiple Set Protocol Data Units (PDUs)	347
	Using a Single Set PDU	348
	Monitoring a Running Ping Test	348
	pingResultsTable	348
	pingProbeHistoryTable	350
	Generating Traps	350
	Gathering Ping Test Results	351
	Stopping a Ping Test	352
	Interpreting Ping Variables	352
	Using the Traceroute MIB for Remote Monitoring Devices Running Junos OS ..	353
	Starting a Traceroute Test	354
	Using Multiple Set PDUs	354
	Using a Single Set PDU	354
	Monitoring a Running Traceroute Test	355
	traceRouteResultsTable	355
	traceRouteProbeResultsTable	356
	traceRouteHopsTable	357
	Generating Traps	358
	Monitoring Traceroute Test Completion	359
	Gathering Traceroute Test Results	360
	Stopping a Traceroute Test	361
	Interpreting Traceroute Variables	362
Chapter 13	Tracing SNMP Activity	363
	Monitoring SNMP Activity and Tracking Problems That Affect SNMP Performance	
	on a Device Running Junos OS	363
	Checking for MIB Objects Registered with the snmpd	363
	Tracking SNMP Activity	365
	Monitoring SNMP Statistics	367
	Checking CPU Utilization	367
	Checking Kernel and Packet Forwarding Engine Response	368
	Tracing SNMP Activity on a Device Running Junos OS	369
	Configuring the Number and Size of SNMP Log Files	370
	Configuring Access to the Log File	371
	Configuring a Regular Expression for Lines to Be Logged	371
	Configuring the Trace Operations	371
	Example: Tracing SNMP Activity	373
Part 5	Remote Monitoring (RMON) with SNMP Alarms and Events	
Chapter 14	RMON Overview	377
	Understanding RMON	377
	RMON Overview	377
	Alarm Thresholds and Events	378
	Understanding RMON Alarms	379
	alarmTable	379
	jnxRmonAlarmTable	380

Understanding RMON Events	380
eventTable	381
Understanding RMON Alarms and Events Configuration	381
RMON MIB Event, Alarm, Log, and History Control Tables	382
Minimum RMON Alarm and Event Entry Configuration	384
Configuring an RMON Alarm Entry and Its Attributes	385
Configuring the Alarm Entry	385
Configuring the Description	386
Configuring the Falling Event Index or Rising Event Index	386
Configuring the Falling Threshold or Rising Threshold	386
Configuring the Interval	387
Configuring the Falling Threshold Interval	387
Configuring the Request Type	387
Configuring the Sample Type	388
Configuring the Startup Alarm	388
Configuring the System Log Tag	389
Configuring the Variable	389
Configuring an RMON Event Entry and Its Attributes	389
Example: Configuring an RMON Alarm and Event Entry	390
Configuring RMON History Sampling	391
Configuring RMON History Sampling Collection	391
Viewing and Clearing RMON History Statistics	391
Using alarmTable to Monitor MIB Objects	392
Creating an Alarm Entry	393
Configuring the Alarm MIB Objects	393
alarmInterval	393
alarmVariable	393
alarmSampleType	394
alarmValue	394
alarmStartupAlarm	394
alarmRisingThreshold	394
alarmFallingThreshold	394
alarmOwner	395
alarmRisingEventIndex	395
alarmFallingEventIndex	395
Activating a New Row in alarmTable	395
Modifying an Active Row in alarmTable	395
Deactivating a Row in alarmTable	396
Using eventTable to Log Alarms	396
Creating an Event Entry	396
Configuring the MIB Objects	396
eventType	397
eventCommunity	397
eventOwner	397
eventDescription	398
Activating a New Row in eventTable	398
Deactivating a Row in eventTable	398

Chapter 15	Using RMON to Monitor Network Service Quality	399
	Understanding RMON for Monitoring Service Quality	399
	Setting Thresholds	399
	RMON Command-Line Interface	400
	RMON Event Table	401
	RMON Alarm Table	401
	Troubleshooting RMON	402
	Understanding Measurement Points, Key Performance Indicators, and Baseline Values	403
	Measurement Points	403
	Basic Key Performance Indicators	404
	Setting Baselines	404
	Defining and Measuring Network Availability	405
	Defining Network Availability	405
	Monitoring the SLA and the Required Bandwidth	407
	Measuring Availability	407
	Real-Time Performance Monitoring	408
	Measuring Health	410
	Measuring Performance	417
	Measuring Class of Service	419
	Inbound Firewall Filter Counters per Class	420
	Monitoring Output Bytes per Queue	421
	Dropped Traffic	422
Chapter 16	Health Monitoring with SNMP	425
	Configuring Health Monitoring on Devices Running Junos OS	425
	Monitored Objects	426
	Minimum Health Monitoring Configuration	427
	Configuring the Falling Threshold or Rising Threshold	427
	Configuring the Interval	428
	Log Entries and Traps	428
	Example: Configuring Health Monitoring	428
Part 6	Accounting Options, Source Class Usage, and Destination Class Usage Options	
Chapter 17	Accounting Options, Source Class Usage and Destination Class Usage Options Overview	431
	Accounting Options Overview	431
	Understanding Source Class Usage and Destination Class Usage Options	432
Chapter 18	Configuring Accounting Options, Source Class Usage and Destination Class Usage Options	435
	Configuration Statements at the [edit accounting-options] Hierarchy Level	435
	Accounting Options Configuration	437
	Accounting Options—Full Configuration	437
	Minimum Accounting Options Configuration	440
	Configuring Accounting-Data Log Files	444
	Configuring How Long Backup Files Are Retained	445
	Configuring the Maximum Size of the File	446

Configuring Archive Sites for the Files	446
Configuring Local Backup for Accounting Files	446
Configuring Files to Be Compressed	447
Configuring the Maximum Number of Files	447
Configuring the Storage Location of the File	447
Configuring Files to Be Saved After a Change in Mastership	448
Configuring the Start Time for File Transfer	448
Configuring the Transfer Interval of the File	449
Managing Accounting Files	449
Configuring the Interface Profile	450
Configuring Fields	451
Configuring the File Information	451
Configuring Cleared Statistics to be Reported in the Flat File	451
Configuring the Interval	452
Example: Configuring the Interface Profile	452
Configuring the Filter Profile	453
Configuring the Counters	454
Configuring the File Information	454
Configuring the Interval	455
Example: Configuring a Filter Profile	455
Example: Configuring Interface-Specific Firewall Counters and Filter Profiles . .	456
Configuring SCU or DCU	458
Creating Prefix Route Filters in a Policy Statement	458
Applying the Policy to the Forwarding Table	458
Enabling Accounting on Inbound and Outbound Interfaces	458
Configuring SCU on a Virtual Loopback Tunnel Interface	460
Example: Configuring a Virtual Loopback Tunnel Interface on a Provider Edge Router Equipped with a Tunnel PIC	460
Example: Mapping the VRF Instance Type to the Virtual Loopback Tunnel Interface	460
Example: Sending Traffic Received from the Virtual Loopback Interface Out the Source Class Output Interface	461
Configuring Class Usage Profiles	461
Configuring a Class Usage Profile	462
Configuring the File Information	462
Configuring the Interval	462
Creating a Class Usage Profile to Collect Source Class Usage Statistics . .	463
Creating a Class Usage Profile to Collect Destination Class Usage Statistics	463
Configuring the MIB Profile	464
Configuring the File Information	464
Configuring the Interval	465
Configuring the MIB Operation	465
Configuring MIB Object Names	465
Example: Configuring a MIB Profile	465
Configuring the Routing Engine Profile	466
Configuring Fields	467
Configuring the File Information	467
Configuring the Interval	467

	Example: Configuring a Routing Engine Profile	467
Part 7	Monitoring Options	
Chapter 19	Configuring Interface Alarms	471
	Alarm Overview	471
	Alarm Types	471
	Alarm Severity	472
	Alarm Conditions	472
	Interface Alarm Conditions	473
	System Alarm Conditions	476
	Monitoring Active Alarms on a Device	477
	Monitoring Alarms	478
	Example: Configuring Interface Alarms	480
Chapter 20	Configuring Real-Time Performance Monitoring	483
	RPM Overview	483
	RPM Probes	484
	RPM Tests	485
	Probe and Test Intervals	485
	Jitter Measurement with Hardware Timestamping	485
	RPM Statistics	486
	RPM Thresholds and Traps	487
	RPM for BGP Monitoring	487
	Understanding Real-Time Performance Monitoring on Switches	489
	RPM Packet Collection	489
	Tests and Probe Types	489
	Hardware Timestamps	490
	Limitations of RPM on EX Series and QFX Series Switches	492
	RPM Support for VPN Routing and Forwarding	493
	RPM Configuration Options	493
	Two-Way Active Measurement Protocol (TWAMP) Overview	497
	Implementation of TWAMP Elements	499
	Limitations	499
	Benefits of TWAMP	499
	Example: Configuring TWAMP Client and Server	500
	Guidelines for Configuring RPM Probes for IPv6	504
	Configuring the Interface for RPM Timestamping for Client/Server on a Switch (CLI Procedure)	505
	Directing RPM Probes to Select BGP Devices	507
	IPv6 RPM Probes	508
	Configuring IPv6 RPM Probes	508
	Tuning RPM Probes	509
	Monitoring RPM Probes	510
	Example: Configuring Basic RPM Probes	513
	Example: Configuring RPM Using TCP and UDP Probes	518
	Example: Configuring RPM Probes for BGP Monitoring	521
	Viewing Real-Time Performance Monitoring Information	524

Chapter 21	Configuring IP Monitoring	525
	IP Monitoring Overview	525
	Understanding IP Monitoring Test Parameters	526
	Understanding IP Monitoring Through Redundant Ethernet Interface Link Aggregation Groups	527
	Example: Configuring IP Monitoring on SRX Series Devices	527
	Example: Configuring IP Monitoring on SRX Series Devices	533
	Example: Configuring Chassis Cluster Redundancy Group IP Address Monitoring	536
Chapter 22	Configuring sFlow Monitoring Technology	541
	Overview of sFlow Technology	541
	Overview of sFlow Technology on ACX Series Routers	544
	Understanding How to Use sFlow Technology for Network Monitoring	546
	Benefits of sFlow Technology	546
	Sampling Mechanism and Architecture of sFlow Technology	546
	Adaptive Sampling for Routers	548
	Adaptive Sampling for Switches	549
	sFlow Agent Address Assignment	550
	sFlow Limitations on Routers	551
	sFlow Limitations on Switches	551
	Understanding How to Use sFlow Technology for Network Monitoring on an EX Series Switch	552
	Sampling Mechanism and Architecture of sFlow Technology on EX Series Switches	552
	Adaptive Sampling	553
	sFlow Agent Address Assignment	554
	Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches	555
	Example: Configuring sFlow Technology to Monitor Network Traffic on MX Series Routers	560
	Configuring sFlow Technology for Network Monitoring (CLI Procedure)	565
	Configuring sFlow Technology	567
	Example: Monitoring Network Traffic Using sFlow Technology	569
Chapter 23	Packet Flow Accelerator Diagnostics Software	575
	Understanding Packet Flow Accelerator Diagnostics Software and Other Utilities	575
	Understanding External and Internal Ports and Network Interface Card Ports	576
	Understanding Packet Flow Accelerator Diagnostics Software Tests and Scripts	577
	Understanding the ikondia Command	578
	Understanding Basic Functionality Tests	578
	Understanding and Running Ethernet Tests and Scripts	580
	Understanding and Using Stress Tests	585
	Understanding and Running PTP Tests	585
	Understanding QFX-PFA-4Q Module LED Tests	587
	Understanding Packet Flow Accelerator Diagnostics Utilities	587

	Sample Output for Packet Accelerator Diagnostics Software	591
	Installing Ethernet and PTP Scripts	597
	Installing Ethernet and PTP Scripts	597
	Installing Packet Flow Accelerator Diagnostics Software	599
	Installing Packet Flow Accelerator Diagnostics Software	599
	Verifying That the QFX-PFA-4Q Expansion Module Is Installed	600
	Downloading the Packet Flow Diagnostics Software	600
	Copying the Packet Flow Diagnostics Software Package to the Switch	601
	Install the Packet Flow Diagnostics Software on the Switch	601
	Configure the Guest VM Options to Launch the Guest VM on the Host	603
	Verifying That the Guest VM is Working	606
	Accessing the Guest VM	606
	Verifying That the FPGA Module Is Working	608
	Validating Connections Between QFX5100-24Q-AA Switch Network Ports and QFX-PFA-4Q Module Ports	609
	Uninstalling the Guest VM	611
Part 8	Monitoring Common Security Features	
Chapter 24	Displaying Real-Time Information from Device to Host	617
	Displaying Real-Time Monitoring Information	617
	Displaying Multicast Path Information	619
Chapter 25	Monitoring Security Policies	623
	Monitoring Security Policy Statistics	623
	Monitoring Routing Information	624
	Monitoring Route Information	624
	Monitoring RIP Routing Information	626
	Monitoring OSPF Routing Information	627
	Monitoring BGP Routing Information	629
	Monitoring Security Events by Policy	631
	Monitoring Security Features	633
	Monitoring Policies	634
	Checking Policies	636
	Monitoring Screen Counters	639
	Monitoring IDP Status	642
	Monitoring Flow Gate Information	643
	Monitoring Firewall Authentication Table	644
	Monitoring Firewall Authentication History	646
	Monitoring 802.1x	647
Chapter 26	Monitoring Application Layer Gateways Features	649
	Monitoring H.323 ALG Information	649
	Monitoring MGCP ALGs	650
	Monitoring MGCP ALG Calls	650
	Monitoring MGCP ALG Counters	651
	Monitoring MGCP ALG Endpoints	652
	Monitoring SCCP ALGs	653
	Monitoring SCCP ALG Calls	653
	Monitoring SCCP ALG Counters	654

	Monitoring SIP ALGs	656
	Monitoring SIP ALG Calls	656
	Monitoring SIP ALG Counters	656
	Monitoring SIP ALG Rate Information	658
	Monitoring SIP ALG Transactions	659
	Monitoring Voice ALG H.323	660
	Monitoring Voice ALG MGCP	662
	Monitoring Voice ALG SCCP	665
	Monitoring Voice ALG SIP	668
	Monitoring Voice ALG Summary	673
Chapter 27	Monitoring Interfaces and Switching Functions	675
	Displaying Real-Time Interface Information	675
	Monitoring Address Pools	677
	Monitoring Ethernet Switching	678
	Monitoring GVRP	679
	Monitoring Interfaces	680
	Monitoring MPLS Traffic Engineering Information	682
	Monitoring MPLS Interfaces	682
	Monitoring MPLS LSP Information	682
	Monitoring MPLS LSP Statistics	684
	Monitoring RSVP Session Information	685
	Monitoring MPLS RSVP Interfaces Information	686
	Monitoring PPP	688
	Monitoring PPPoE	688
	Monitoring Spanning Tree	692
	Monitoring the WAN Acceleration Interface	693
Chapter 28	Monitoring NAT	695
	Monitoring NAT	695
	Monitoring Source NAT Information	695
	Monitoring Destination NAT Information	701
	Monitoring Static NAT Information	703
	Monitoring NAT Incoming Table Information	704
	Monitoring Interface NAT Port Information	705
Chapter 29	Monitoring Events, Services and System	707
	Monitoring DHCP Client Bindings	707
	Monitoring Events	707
	Monitoring the System	710
	Monitoring System Properties for SRX Series Devices	710
	Monitoring Chassis Information	712
	System Health Management for SRX Series Devices	714
Chapter 30	Monitoring Unified Threat Management Features	717
	Monitoring Antivirus Scan Engine Status	717
	Monitoring Antivirus Scan Results	718
	Monitoring Antivirus Session Status	720

	Monitoring Content Filtering Configurations	721
	Monitoring Reports	722
	Threats Monitoring Report	722
	Traffic Monitoring Report	726
	Monitoring Web Filtering Configurations	728
Chapter 31	Monitoring VPNs	731
	Monitoring VPNs	731
	Monitoring IKE Gateway Information	731
	Monitoring IPsec VPN—Phase I	735
	Monitoring IPsec VPN—Phase II	736
	Monitoring IPsec VPN Information	737
Part 9	Performance Management	
Chapter 32	Ethernet Frame Delay	745
	Understanding Ethernet Frame Delay Measurements on Switches	745
	Ethernet Frame Delay Measurements	745
	Types of Ethernet Frame Delay Measurements	746
	Limitations	747
	Configuring MEP Interfaces on Switches to Support Ethernet Frame Delay Measurements (CLI Procedure)	747
	Configuring One-Way Ethernet Frame Delay Measurements on Switches (CLI Procedure)	748
	Configuring an Iterator Profile on a Switch (CLI Procedure)	749
	Triggering an Ethernet Frame Delay Measurement Session on a Switch	751
	Configuring Two-Way Ethernet Frame Delay Measurements on Switches (CLI Procedure)	752
Chapter 33	Configuring Network Analytics	753
	Network Analytics Overview	753
	Analytics Feature Overview	754
	Network Analytics Enhancements Overview	755
	Summary of CLI Changes	756
	Understanding Enhanced Network Analytics Streaming Data	761
	Google Protocol Buffer (GPB)	761
	JavaScript Object Notation (JSON)	764
	Comma-separated Values (CSV)	764
	Tab-separated Values (TSV)	764
	Queue Statistics Output for JSON, CSV, and TSV	765
	Traffic Statistics Output for JSON, CSV, and TSV	765
	Understanding Enhanced Analytics Local File Output	767
	Understanding Network Analytics Streaming Data	769
	Understanding Network Analytics Configuration and Status	772
	Prototype File for the Google Protocol Buffer Stream Format	773
	Configuring Queue Monitoring	774
	Configuring Traffic Monitoring	776
	Configuring a Local File for Network Analytics Data	777

	Configuring a Remote Collector for Streaming Analytics Data	778
	Example: Configuring Network Analytics	780
	Example: Configuring Enhanced Network Analytics Features	786
Part 10	Port Mirroring and Analyzers	
Chapter 34	Overview of Port Mirroring	801
	Understanding Port Mirroring and Analyzers on EX2300, EX3400, and EX4300	
	Switches	802
	Port Mirroring Overview	802
	Analyzer Overview	803
	Port Mirroring and Analyzer Terminologies	803
	Configuration Guidelines for Port Mirroring and Analyzers on EX2300, EX3400, and EX4300 Switches	805
	Understanding Port Mirroring on EX Series Switches	808
	Port Mirroring Overview	808
	Port Mirroring Terminology	809
	Configuration Guidelines for Port Mirroring on the Switches	811
	Understanding Port Mirroring on Routers with an Internet Processor II ASIC or T Series Internet Processor	814
	Understanding Port Mirroring	814
	Port Mirroring Overview	814
	Port Mirroring Instance Types	815
	Port-Mirroring Terminology	816
	Port Mirroring and STP	817
	Port Mirroring Constraints and Limitations	817
	Local and Remote Port Mirroring	818
	Remote Port Mirroring Only	819
	Port Mirroring Constraints on OCX Series Switches	820
	Understanding Port Mirroring	821
	Port Mirroring Overview	821
	Port-Mirroring Terminology	821
	Understanding Layer 2 Port Mirroring	822
	Understanding Layer 2 Port Mirroring Properties	823
	Packet-Selection Properties	823
	Packet Address Family	823
	Mirror Destination Properties	824
	Mirror-Once Option	824
	Application of Layer 2 Port Mirroring Types	825
	Restrictions on Layer 2 Port Mirroring	827
	Port Mirroring Constraints and Limitations	828
	Local and Remote Port Mirroring	828
	Remote Port Mirroring Only	830
	Port Mirroring Constraints on OCX Series Switches	830
Chapter 35	Configuring Port Mirroring Analyzers	833
	Understanding Port Mirroring Analyzers	834
	Analyzer Overview	835
	Statistical Analyzer Overview	835
	Default Analyzer Overview	835

Port Mirroring at a Group of Ports Bound to Multiple Statistical Analyzers	835
Port Mirroring Analyzer Terminology	835
Configuration Guidelines for Port Mirroring Analyzers	837
Configuring Mirroring on EX9200 Switches to Analyze Traffic (CLI Procedure)	839
Configuring an Analyzer for Local Traffic Analysis	840
Configuring an Analyzer for Remote Traffic Analysis	840
Configuring a Statistical Analyzer for Local Traffic Analysis	841
Configuring a Statistical Analyzer for Remote Traffic Analysis	843
Binding Statistical Analyzers to Ports Grouped at the FPC Level	844
Configuring an Analyzer with Multiple Destinations by Using Next-Hop Groups	845
Defining a Next-Hop Group for Layer 2 Mirroring	845
Configuring Mirroring on EX4300 Switches to Analyze Traffic (CLI Procedure)	847
Configuring an Analyzer for Local Traffic Analysis	847
Configuring an Analyzer for Remote Traffic Analysis	848
Configuring Port Mirroring	849
Configuring Port Mirroring to Analyze Traffic (CLI Procedure)	850
Configuring Port Mirroring for Local Traffic Analysis	851
Configuring Port Mirroring for Remote Traffic Analysis	852
Filtering the Traffic Entering an Analyzer	853
Verifying Input and Output for Port Mirroring Analyzers on EX Series Switches	854
Example: Configuring Port Mirroring Analyzers for Local Monitoring of Employee Resource Use	855
Example: Configuring Port Mirroring for Remote Monitoring of Employee Resource Use	859
Example: Configuring Mirroring to Multiple Interfaces for Remote Monitoring of Employee Resource Use on EX9200 Switches	870
Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use Through a Transit Switch on EX9200 Switches	879
Example: Configuring Mirroring for Local Monitoring of Employee Resource Use on EX4300 Switches	886
Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use on EX4300 Switches	893
Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use Through a Transit Switch on EX4300 Switches	903
Chapter 36 Configuring Port Mirroring Instances	913
Layer 2 Port Mirroring Global Instance	913
Configuring the Global Instance of Layer 2 Port Mirroring	914
Layer 2 Port Mirroring Named Instances	916
Layer 2 Port Mirroring Named Instances Overview	916
Mirroring at Ports Grouped at the FPC Level	917
Mirroring at Ports Grouped at the PIC Level	917
Mirroring at a Group of Ports Bound to Multiple Named Instances	918
Defining a Named Instance of Layer 2 Port Mirroring	919

	Disabling Layer 2 Port Mirroring Instances	923
	Configuring Inline Port Mirroring	924
Chapter 37	Configuring Port Mirroring for Physical Interfaces	927
	Precedence of Multiple Levels of Layer 2 Port Mirroring on a Physical Interface	927
	Binding Layer 2 Port Mirroring to Ports Grouped at the FPC Level	929
	Binding Layer 2 Port Mirroring to Ports Grouped at the PIC Level	931
	Examples: Layer 2 Port Mirroring at Multiple Levels of the Chassis	932
	Layer 2 Port Mirroring at the FPC Level	933
	Layer 2 Port Mirroring at the PIC Level	933
	Layer 2 Port Mirroring at the FPC and PIC Levels	933
	Configuring Layer 2 Port Mirroring Over GRE Interface	934
	Example: Configuring Layer 2 Port Mirroring Over a GRE Interface	935
Chapter 38	Configuring Port Mirroring for Logical Interfaces	941
	Layer 2 Port Mirroring Firewall Filters	942
	Layer 2 Port Mirroring Firewall Filters Overview	942
	Mirroring of Packets Received or Sent on a Logical Interface	943
	Mirroring of Packets Forwarded or Flooded to a VLAN	943
	Mirroring of Packets Forwarded or Flooded to a VPLS Routing Instance	944
	Defining a Layer 2 Port-Mirroring Firewall Filter	944
	Defining a Layer 2 Port-Mirroring Firewall Filter	947
	Configuring Protocol-Independent Firewall Filter for Port Mirroring	950
	Example: Mirroring Employee Web Traffic with a Firewall Filter	952
	Understanding Layer 2 Port Mirroring of PE Router Logical Interfaces	956
	Understanding Layer 2 Port Mirroring of PE Router Aggregated Ethernet Interfaces	957
	Layer 2 Port Mirroring of PE Router or PE Switch Logical Interfaces	958
	Layer 2 Port Mirroring of PE Router or PE Switch Aggregated Ethernet Interfaces	960
	Applying Layer 2 Port Mirroring to a Logical Interface	961
	Applying Layer 2 Port Mirroring to a Logical Interface	964
	Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a Bridge Domain	967
	Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VPLS Routing Instance	969
	Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VPLS Routing Instance	971
	Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VLAN	974
	Example: Layer 2 Port Mirroring at a Logical Interface	976
	Example: Layer 2 Port Mirroring at a Logical Interface	979
	Example: Layer 2 Port Mirroring for a Layer 2 VPN	981
	Example: Layer 2 Port Mirroring for a Layer 2 VPN	984
	Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links	986
	Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links	989

Chapter 39	Configuring Port Mirroring for Multiple Destinations	993
	Understanding Layer 2 Port Mirroring to Multiple Destinations Using Next-Hop Groups	993
	Defining a Next-Hop Group for Layer 2 Port Mirroring	994
	Defining a Next-Hop Group on MX Series Routers for Port Mirroring	995
	Example: Configuring Multiple Port Mirroring with Next-Hop Groups on M, MX and T Series Routers	998
	Example: Layer 2 Port Mirroring to Multiple Destinations	1001
Chapter 40	Configuring Port Mirroring for Remote Destinations	1007
	Layer 2 Port Mirroring to Remote Destination by Using Destination as VLAN . .	1007
	Configuration Layer 2 Port Mirroring to a Remote VLAN	1007
	Configuring Port Mirroring to a Remote VLAN	1008
	Example: Configuring Layer 2 Port Mirroring to Remote VLAN	1010
Chapter 41	Configuring Port Mirroring Local and Remote Analysis	1017
	Configuring Port Mirroring	1017
	Configuring Port Mirroring for Local Analysis	1018
	Configuring Port Mirroring for Remote Analysis	1019
	Filtering the Traffic Entering an Analyzer	1019
	Examples: Configuring Port Mirroring for Local Analysis	1020
	Example: Mirroring Employee Web Traffic with a Firewall Filter	1023
	Example: Configuring Port Mirroring for Local Analysis	1026
	Example: Configuring Port Mirroring for Remote Analysis	1032
Chapter 42	Monitoring Port Mirroring	1037
	Displaying Layer 2 Port-Mirroring Instance Settings and Status	1037
	Displaying Next-Hop Group Settings and Status	1037
Chapter 43	Troubleshooting Port Mirroring	1039
	Troubleshooting Port Mirroring	1039
	Port Mirroring Constraints and Limitations	1039
	Local and Remote Port Mirroring	1039
	Remote Port Mirroring Only	1041
	Port Mirroring Constraints on OCX Series Switches	1041
	Egress Port Mirroring with VLAN Translation	1042
	Egress Port Mirroring with Private VLANs	1043
	Troubleshooting Port Mirroring Configuration Error Messages	1043
	An Analyzer Configuration Returns a "Multiple interfaces cannot be configured as a member of Analyzer output VLAN" Error Message . .	1044
Part 11	System Log Messages	
Chapter 44	Overview to System Logging	1049
	Junos OS System Log Overview	1049
	Overview of Junos OS System Log Messages	1050
	Junos OS System Log Configuration Hierarchy	1050
	Junos OS System Logging Facilities and Message Severity Levels	1051
	Junos OS Default System Log Settings	1053
	Junos OS Platform-Specific Default System Log Messages	1054

	Interpreting Messages Generated in Standard Format	1055
	Managing Host OS System Log and Core Files	1056
	Viewing Log Files On the Host OS System	1057
	Copying Log Files From the Host System To the Switch	1057
	Viewing Core Files On the Host OS System	1057
	Copying Core Files From the Host System To the Switch	1058
	Cleaning Up Temporary Files on the Host OS	1058
Chapter 45	Configuring System Logging for a Single-Chassis System	1061
	Single-Chassis System Logging Configuration Overview	1061
	Overview of Single-Chassis System Logging Configuration	1063
	Junos OS System Log Configuration Hierarchy	1065
	Junos OS System Log Configuration Statements	1065
	Junos OS Minimum System Logging Configuration	1066
	Example: Configuring System Log Messages	1067
	Logging Messages in Structured-Data Format	1069
	Specifying Log File Size, Number, and Archiving Properties	1070
	Including Priority Information in System Log Messages	1072
	System Log Facility Codes and Numerical Codes Reported in Priority Information	1073
	Including the Year or Millisecond in Timestamps	1075
	Using Regular Expressions to Refine the Set of Logged Messages	1076
	Junos System Log Regular Expression Operators for the match Statement	1078
	Disabling the System Logging of a Facility	1079
	Examples: Configuring System Logging	1080
	Examples: Assigning an Alternative Facility	1081
Chapter 46	Configuring System Logging for a TX Matrix or TX Matrix Plus Router	1083
	Configuring System Logging for a TX Matrix Router	1083
	Configuring System Logging for a TX Matrix Plus Router	1085
	Configuring Message Forwarding to the TX Matrix Router	1087
	Configuring Message Forwarding to the TX Matrix Plus Router	1088
	Impact of Different Local and Forwarded Severity Levels on System Log Messages on a TX Matrix Router	1089
	Messages Logged When the Local and Forwarded Severity Levels Are the Same	1089
	Messages Logged When the Local Severity Level Is Lower	1090
	Messages Logged When the Local Severity Level Is Higher	1091
	Impact of Different Local and Forwarded Severity Levels on System Log Messages on a TX Matrix Plus Router	1092
	Messages Logged When the Local and Forwarded Severity Levels Are the Same	1092
	Messages Logged When the Local Severity Level Is Lower	1092
	Messages Logged When the Local Severity Level Is Higher	1093
	Configuring Optional Features for Forwarded Messages on a TX Matrix Router	1094
	Including Priority Information in Forwarded Messages	1094
	Adding a Text String to Forwarded Messages	1095

	Using Regular Expressions to Refine the Set of Forwarded Messages	1095
	Configuring Optional Features for Forwarded Messages on a TX Matrix Plus Router	1095
	Including Priority Information in Forwarded Messages	1096
	Adding a Text String to Forwarded Messages	1096
	Using Regular Expressions to Refine the Set of Forwarded Messages	1097
	Configuring System Logging Differently on Each T640 Router in a Routing Matrix	1097
	Configuring System Logging Differently on Each T1600 or T4000 Router in a Routing Matrix	1098
Chapter 47	Directing System Log Messages to a Remote Destination	1101
	Specifying the Facility and Severity of Messages to Include in the Log	1101
	Directing System Log Messages to a Log File	1103
	Directing System Log Messages to a User Terminal	1104
	Directing System Log Messages to the Console	1105
	Directing System Log Messages to a Remote Machine or the Other Routing Engine	1105
	Directing System Log Messages to a Remote Machine	1106
	Specifying an Alternative Source Address for System Log Messages Directed to a Remote Destination	1107
	Adding a Text String to System Log Messages Directed to a Remote Destination	1107
	Changing the Alternative Facility Name for System Log Messages Directed to a Remote Destination	1108
	Default Facilities for System Log Messages Directed to a Remote Destination	1110
	Alternate Facilities for System Log Messages Directed to a Remote Destination	1110
	Examples: Assigning an Alternative Facility to System Log Messages Directed to a Remote Destination	1111
	Directing Messages to a Remote Destination from the Routing Matrix Based on the TX Matrix Router	1112
	Directing Messages to a Remote Destination from the Routing Matrix Based on a TX Matrix Plus Router	1113
Chapter 48	Displaying System Log Files	1115
	Displaying a Log File from a Single-Chassis System	1115
	Log File Sample Content	1116
	Displaying a Log File from a Routing Matrix	1117
Chapter 49	Displaying and Interpreting System Log Message Descriptions	1119
	Displaying and Interpreting System Log Message Descriptions	1119
	The message-source Field on a Single-Chassis System	1121
	The message-source Field on a TX Matrix Platform	1121
	The message-source Field on a T640 Routing Node in a Routing Matrix	1123
	Interpreting Messages Generated in Standard Format by a Junos OS Process or Library	1124
	Interpreting Messages Generated in Standard Format by Services on a PIC . . .	1125

	Interpreting Messages Generated in Structured-Data Format	1126
	Examples: Displaying System Log Message Descriptions	1131
Chapter 50	Configuring System Logging for a Security Device	1133
	Understanding System Logging for Security Devices	1133
	Control Plane and Data Plane Logs	1133
	Redundant System Log Server	1134
	Understanding Stream Logging for Security Devices	1135
	Understanding Binary Format for Security Logs	1136
	Understanding On-Box Logging and Reporting	1137
	Overview	1137
	Understanding On-box logging and Reporting	1139
	On-Box Reporting Features	1140
	Chassis Cluster Scenario	1140
	Monitoring Reports	1141
	Threats Monitoring Report	1141
	Traffic Monitoring Report	1146
	Configuring On-Box Binary Security Log Files	1148
	Configuring Off-Box Binary Security Log Files	1150
	Sending System Log Messages to a File	1151
	Setting the System to Send All Log Messages Through eventd	1151
	Setting the System to Stream Security Logs Through Revenue Ports	1152
Chapter 51	Monitoring Log Messages	1157
	Monitoring System Log Messages	1157
Part 12	Network Management and Troubleshooting	
Chapter 52	Monitoring and Troubleshooting	1161
	Pinging Hosts	1161
	Monitoring Traffic Through the Router or Switch	1162
	Displaying Real-Time Statistics About All Interfaces on the Router or Switch	1162
	Displaying Real-Time Statistics About an Interface on the Router or Switch	1163
	Dynamic Ternary Content Addressable Memory Overview	1165
	Understanding Dynamic Ternary Content Addressable Memory	1165
	Applications using Dynamic TCAM Infrastructure	1165
	Features Using TCAM Resource	1166
	Monitoring TCAM Resource Usage	1168
	Example: Monitoring and Troubleshooting the TCAM Resource	1169
	Service Scaling on ACX5048 and ACX5096 Routers	1174
	Understanding and Configuring the Unified Forwarding Table	1175
	Using the Unified Forwarding Table to Optimize Address Storage	1175
	Configuring the Unified Forwarding Table to Optimize Address Storage Using Profiles	1176
	Troubleshooting and Monitoring TCAM Resource in ACX Series Routers	1177

Chapter 53	Troubleshooting of System Performance with Resource Monitoring Methodology	1179
	Resource Monitoring Usage Computation Overview	1179
	Resource Monitoring and Usage Computation For Trio-Based Line Cards	1180
	Resource Monitoring and Usage Computation For I-Chip-Based Line Cards	1180
	Diagnosing and Debugging System Performance by Configuring Memory	
	Resource Usage Monitoring on MX Series Routers	1182
	Troubleshooting the Mismatch of jnxNatObjects Values for MS-DPC and MS-MIC	1185
	Managed Objects for Ukernel Memory for a Packet Forwarding Engine in an FPC Slot	1186
	Managed Objects for Packet Forwarding Engine Memory Statistics Data	1186
	Managed Objects for Next-Hop, Jtree, and Firewall Filter Memory for a Packet Forwarding Engine in an FPC Slot	1186
	jnxPfeMemoryErrorsTable	1187
	pfeMemoryErrors	1187
Chapter 54	Configuring Data Path Debugging and Trace Options	1189
	Understanding Data Path Debugging for SRX Series Devices	1189
	Understanding Security Debugging Using Trace Options	1190
	Understanding Flow Debugging Using Trace Options	1191
	Debugging the Data Path (CLI Procedure)	1191
	Setting Flow Debugging Trace Options (CLI Procedure)	1192
	Setting Security Trace Options (CLI Procedure)	1193
	Displaying Log and Trace Files	1194
	Displaying Output for Security Trace Options	1195
	Displaying Multicast Trace Operations	1195
	J-Web Traceroute Results and Output Summary	1196
	Displaying a List of Devices	1197
	Example: Configuring End-to-End Debugging on SRX Series Device	1199
Chapter 55	Using MPLS to Diagnose LSPs, VPNs, and Layer 2 Circuits	1205
	MPLS Connection Checking Overview	1205
	Understanding Ping MPLS	1207
	MPLS Enabled	1207
	Loopback Address	1207
	Source Address for Probes	1207
	Using the ping Command	1208
	Pinging Layer 2 Circuits	1210
	Pinging Layer 2 VPNs	1211
	Pinging Layer 3 VPNs	1213
	Pinging RSVP-Signaled LSPs and LDP-Signaled LSPs	1214
Chapter 56	Using Packet Capture to Analyze Network Traffic	1217
	Packet Capture Overview	1217
	Packet Capture on Device Interfaces	1218
	Firewall Filters for Packet Capture	1219
	Packet Capture Files	1219

	Analysis of Packet Capture Files	1219
	Example: Enabling Packet Capture on a Device	1220
	Example: Configuring Packet Capture on an Interface	1224
	Example: Configuring a Firewall Filter for Packet Capture	1225
	Example: Configuring Packet Capture for Datapath Debugging	1228
	Disabling Packet Capture	1231
	Deleting Packet Capture Files	1231
	Changing Encapsulation on Interfaces with Packet Capture Configured	1232
	Displaying Packet Headers	1234
Chapter 57	Troubleshooting Security Devices	1239
	Recovering the Root Password for SRX Series Devices	1239
	Troubleshooting DNS Name Resolution in Logical System Security Policies (Master Administrators Only)	1241
	Troubleshooting the Link Services Interface	1242
	Determine Which CoS Components Are Applied to the Constituent Links	1242
	Determine What Causes Jitter and Latency on the Multilink Bundle	1244
	Determine If LFI and Load Balancing Are Working Correctly	1244
	Determine Why Packets Are Dropped on a PVC Between a Juniper Networks Device and a Third-Party Device	1251
	Troubleshooting Security Policies	1252
	Synchronizing Policies Between Routing Engine and Packet Forwarding Engine	1252
	Checking a Security Policy Commit Failure	1252
	Verifying a Security Policy Commit	1253
	Debugging Policy Lookup	1253
	Understanding Log Error Messages for Troubleshooting ISSU-Related Problems	1253
	Chassisd Process Errors	1254
	Understanding Common Error Handling for ISSU	1254
	ISSU Support-Related Errors	1257
	Initial Validation Checks Failure	1257
	Installation-Related Errors	1258
	Redundancy Group Failover Errors	1259
	Kernel State Synchronization Errors	1259
Part 13	Configuration Statements	
Chapter 58	Configuration Statements: Real-Time Performance Monitoring	1263
	data-fill	1264
	data-size	1265
	destination-port	1266
	dscp-code-point (Services)	1267
	hardware-timestamp	1268
	history-size	1269
	moving-average-size	1270
	one-way-hardware-timestamp	1271
	port (RPM)	1272
	probe	1273

probe-count	1275
probe-interval	1276
probe-limit	1277
probe-server	1278
probe-type	1279
routing-instance	1280
routing-instances	1281
rpm (Interfaces)	1282
rpm (Services)	1283
source-address (Services)	1286
tcp	1287
test	1288
test-interval	1290
thresholds	1291
traps	1293
udp	1295
Chapter 59	Configuration Statements: Ethernet OAM Link Fault Management . . . 1297
action (OAM LFM)	1299
action (OAM)	1299
action-profile (Applying to OAM CFM, for EX Series Switch Only)	1300
action-profile	1301
age	1302
allow-remote-loopback	1303
apply-action-profile	1303
auto-discovery (EX Series Switch Only)	1304
calculation-weight	1305
connectivity-fault-management (EX Series Switch Only)	1306
continuity-check (EX Series Switch Only)	1308
cycle-time	1309
delay	1310
delay-variation	1311
ethernet (Protocols OAM)	1312
event (LFM)	1318
event-thresholds	1319
event-thresholds	1320
fast-aps-switch	1321
frame-error	1322
frame-period	1323
frame-period	1324
frame-period-summary	1325
frame-period-summary	1326
hold-interval (OAM CFM, for EX Series Switch Only)	1327
hold-interval (OAM)	1328
interface (OAM CFM, for EX Series Switch Only)	1329
interface (OAM Link-Fault Management)	1330
interval (EX Series Switch Only)	1332
iteration-period	1333
level (EX Series Switch Only)	1334

	link-adjacency-loss	1334
	link-discovery	1335
	link-down	1335
	link-event-rate	1336
	link-fault-management	1337
	negotiation-options	1338
	no-allow-link-events	1338
	oam	1339
	path-database-size (EX Series Switch Only)	1341
	pdu-interval	1342
	pdu-threshold	1343
	performance-monitoring (OAM LFM)	1344
	protocol-down	1345
	protocol-down	1345
	remote-loopback	1346
	remote-mep (EX Series Switch Only)	1347
	send-critical-event	1347
	sla-iterator-profiles (OAM LFM)	1348
	symbol-period	1349
	syslog (OAM Action)	1350
	traceoptions (Individual Interfaces)	1351
	version-ipfix (Services)	1358
Chapter 60	Configuration Statements: sFlow Technology	1359
	adaptive-sample-rate	1360
	agent-id	1361
	agent-id (QFX Series)	1362
	collector	1363
	collector (QFX Series sFlow Technology)	1364
	disable (sFlow Monitoring Technology)	1365
	interfaces (sFlow)	1366
	interfaces (sFlow)	1368
	polling-interval	1369
	polling-interval (QFX Series)	1370
	sample-rate	1371
	sample-rate (QFX Series)	1372
	sflow (QFX Series)	1373
	sflow	1375
	source-ip	1378
	source-ip (QFX Series)	1379
	traceoptions (sFlow Technology)	1380
	udp-port	1382
	udp-port (QFX Series)	1383
Chapter 61	Configuration Statements: Accounting Options, Source Class Usage and Destination Class Usage Options	1385
	accounting-options	1387
	allow-clear (Accounting Options)	1390
	archive-sites	1391
	backup-on-failure (Accounting Options)	1392

	class-usage-profile	1393
	cleanup-interval (Accounting Options)	1394
	compress (Accounting Options)	1395
	counters	1395
	destination-classes	1396
	egress-stats (Flat-File Accounting Options)	1397
	fields (Flat-File Accounting Options)	1399
	fields (for Interface Profiles)	1401
	fields (for Routing Engine Profiles)	1402
	file (Associating with a Profile)	1403
	file (Configuring a Log File)	1404
	file (Flat-File Accounting Options)	1405
	files	1406
	filter-profile	1407
	flat-file-profile (Accounting Options)	1408
	format (Flat-File Accounting Options)	1410
	general-param (Flat-File Accounting Options)	1411
	ingress-stats (Flat-File Accounting Options)	1413
	interface-profile	1414
	interval	1415
	interval (Flat-File Accounting Options)	1416
	l2-stats (Flat-File Accounting Options)	1417
	mib-profile	1418
	mpls (Security Forwarding Options)	1419
	nonpersistent	1420
	object-names	1421
	operation	1422
	overall-packet (Flat-File Accounting Options)	1423
	push-backup-to-master (Accounting Options)	1424
	routing-engine-profile	1425
	schema-version (Flat-File Accounting Options)	1426
	size	1427
	source-classes	1428
	start-time	1429
	traceoptions (System Accounting)	1430
	transfer-interval	1432
Chapter 62	Configuration Statements: Chassis Cluster	1433
	cluster (Chassis)	1434
	global-threshold	1437
	global-weight	1438
	ip-monitoring	1439
	ip-monitoring (Services)	1441
	next-hop	1442
Chapter 63	Configuration Statements: Datapath Debug	1443
	action-profile	1444
	capture-file (Security)	1446
	datapath-debug	1447
	flow (Security Flow)	1449

	icmp	1451
	maximum-capture-size (Datapath Debug)	1451
	traceoptions (Security Datapath Debug)	1452
Chapter 64	Configuration Statements: Health Monitoring	1455
	falling-threshold	1456
	health-monitor	1457
	idp (SNMP)	1458
	routing-engine (SNMP Resource Level)	1459
	interval	1460
	rising-threshold	1461
Chapter 65	Configuration Statements: Resource Monitoring for Memory Regions ..	1463
	free-fw-memory-watermark (Resource Monitor)	1464
	free-heap-memory-watermark (Resource Monitor)	1465
	free-nh-memory-watermark (Resource Monitor)	1466
	high-cos-queue-threshold	1467
	high-threshold (Resource Monitor)	1468
	no-load-throttle (Resource Monitor)	1468
	no-logging (Resource Monitor)	1469
	no-throttle (Resource Monitor)	1470
	resource-category jtree (Resource Monitor)	1471
	resource-monitor	1472
	subscribers-limit (Resource Monitor)	1474
	traceoptions (Resource Monitor)	1475
Chapter 66	Configuration Statements: Security Alarms	1477
	decryption-failures	1477
	idp (Security Alarms)	1478
Chapter 67	Configuration Statements: Network Analytics	1479
	address (Analytics Collector)	1480
	agent (Analytics)	1481
	analytics	1483
	collector (Analytics)	1488
	depth-threshold	1489
	export-profiles	1491
	file (Analytics)	1493
	inputs (Analytics)	1495
	interface (Export Profiles)	1498
	interfaces (Analytics Resource)	1499
	interfaces (Analytics)	1500
	latency-threshold	1502
	local (Analytics Collector)	1503
	outputs (Analytics)	1504
	queue-statistics	1506
	resource (Analytics)	1508
	resource-profiles (Analytics)	1509
	service-agents (Analytics)	1511
	streaming-servers	1513

Chapter 68

system (Analytics Resource)	1515
system (Export Profiles)	1516
traceoptions (Analytics)	1517
traceoptions (Analytics Agent)	1518
traffic-statistics	1520
Configuration Statements: SNMP	1523
access (SNMP)	1527
access-list	1528
address (SNMP)	1529
address-mask	1530
agent-address	1531
alarm-id	1532
alarm (SNMP RMON)	1533
alarm-list-name	1534
alarm-management	1535
alarm-state	1536
authentication-md5	1537
authentication-none	1538
authentication-password	1539
authentication-sha	1540
authorization	1541
authorization	1542
bucket-size	1543
categories	1544
client-list	1545
client-list-name	1546
clients	1547
commit-delay	1548
community (SNMP)	1549
community	1550
community (RMON)	1551
community-name	1552
contact (SNMP)	1553
description	1554
description	1555
description (RMON)	1556
destination-port	1557
engine-id	1558
enterprise-oid	1559
event	1560
event	1561
falling-event-index	1562
falling-event-index (RMON)	1563
falling-threshold (Health Monitor)	1564
falling-threshold (RMON)	1565
falling-threshold	1566
falling-threshold-interval	1567
falling-threshold-interval	1568

filter-duplicates	1569
filter-interfaces	1570
group (Defining Access Privileges for an SNMPv3 Group)	1571
group (Configuring Group Name)	1572
health-monitor	1573
history	1574
interface (SNMP)	1575
interface (SNMP RMON History)	1576
interval	1577
interval (Health Monitor)	1578
interval (SNMP RMON)	1579
local-engine	1580
location (SNMP)	1581
logical-system	1582
logical-system-trap-filter	1583
message-processing-model	1583
name	1584
nonvolatile	1585
notify	1586
notify-filter (Applying to the Management Target)	1587
notify-filter (Configuring the Profile Name)	1588
notify-view	1589
oid (SNMPv3)	1590
oid	1591
owner	1592
parameters	1593
port	1594
privacy-3des	1595
privacy-aes128	1596
privacy-des	1597
privacy-none	1598
privacy-password	1599
proxy (snmp)	1600
read-view	1601
remote-engine	1602
request-type	1603
request-type	1604
retry-count	1605
rising-event-index	1606
rising-event-index	1607
rising-threshold	1608
rising-threshold (Health Monitor)	1609
rising-threshold (RMON)	1610
rmon	1611
rmon	1612
routing-instance	1613
routing-instance-access	1614
sample-type	1615
sample-type	1616

startup-alarm	1617
security-level (Defining Access Privileges)	1618
security-level (Generating SNMP Notifications)	1619
security-model (Access Privileges)	1620
security-model (Group)	1621
security-model (SNMP Notifications)	1622
security-name (Community String)	1623
security-name (Security Group)	1624
security-name (SNMP Notifications)	1625
security-to-group	1626
snmp	1627
snmp-community	1631
snmp-value-match-msmic (Services NAT Options)	1632
source-address	1633
startup-alarm	1634
syslog-subtag	1635
syslog-subtag	1635
tag (Configuring Notification Targets)	1636
tag-list	1637
target-address	1638
target-parameters	1639
targets	1640
timeout	1641
traceoptions (SNMP)	1642
traceoptions (SNMP)	1644
trap-group	1646
trap-options	1648
type (RMON Notification)	1649
type	1650
type	1651
user	1652
usm	1653
v3	1655
vacm	1658
variable	1659
variable	1660
version (SNMP)	1661
view (Associating a MIB View with a Community)	1662
view (Configuring a MIB View)	1663
write-view	1664
Chapter 69 Configuration Statements: SNMPv3	1665
address	1667
address-mask	1667
authentication-key	1668
authentication-md5	1669
authentication-none	1670
authentication-password	1671
authentication-sha	1672

community-name	1673
context (SNMPv3)	1674
engine-id	1675
group (Configuring Group Name)	1676
group (Defining Access Privileges for an SNMPv3 Group)	1677
retry-count	1678
timeout	1679
local-engine	1680
message-processing-model	1681
notify	1682
notify-filter (Applying to the Management Target)	1683
notify-filter (Configuring the Profile Name)	1684
notify-view	1685
oid	1686
parameters	1687
port	1688
privacy-3des	1689
privacy-aes128	1690
privacy-des	1691
privacy-key	1692
privacy-none	1693
privacy-password	1694
read-view	1695
remote-engine	1696
routing-instance	1697
security-level (Defining Access Privileges)	1698
security-level (Generating SNMP Notifications)	1699
security-model (Access Privileges)	1700
security-model (Group)	1701
security-model (SNMP Notifications)	1702
security-name (Community String)	1703
security-name (Security Group)	1704
security-name (SNMP Notifications)	1705
security-to-group	1706
snmp-community	1707
tag	1708
tag-list	1709
target-address	1710
target-parameters	1711
type	1712
user	1713
usm	1714
v3	1716
vacm	1719
write-view	1720
Chapter 70	
Configuration Statements: Uplink Failure Detection	1721
action (Uplink Failure Detection)	1721
group (Uplink Failure Detection)	1722

Chapter 71

link-to-disable	1722
link-to-monitor	1723
traceoptions (Uplink Failure Detection)	1724
uplink-failure-detection	1725
Configuration Statements: Port Mirroring and Analyzers	1727
analyzer (Port Mirroring)	1729
analyzer	1731
bridge-domain (Analyzer)	1733
disable (Forwarding Options)	1734
disable-all-instances	1735
ethernet-switching (Port Mirroring)	1735
egress	1736
egress (Analyzer)	1737
ethernet-switching-options	1738
family (Port Mirroring)	1744
family (Port Mirroring)	1746
forwarding-options	1748
inet (Port Mirroring)	1754
ingress (Analyzer)	1755
ingress (Port Mirroring)	1756
ingress (vlans)	1756
input	1757
input (Analyzer)	1758
input (Port Mirroring)	1759
instance	1760
instance (Port Mirroring)	1761
interface (Analyzer)	1763
interface (Next-Hop Group)	1764
interface (Port Mirroring)	1765
interface (Port Mirroring)	1766
ip-address (Port Mirroring)	1767
maximum-packet-length	1768
mirror-once	1770
next-hop-group (Analyzer)	1770
next-hop-group (Port Mirroring)	1771
no-tag	1772
no-tag	1772
no-tag	1773
no-filter-check	1773
no-filter-check	1774
output	1775
output (Mirroring)	1776
output (Port Mirroring)	1777
output (Port Mirroring)	1778
port-mirroring	1779
rate (Forwarding Options)	1783
routing-instance	1784
routing-instance (Port Mirroring)	1784

	run-length	1785
	vlan (Mirroring)	1786
	vlan (Port Mirroring)	1787
	vlan (Port Mirroring)	1788
Chapter 72	Configuration Statements: TWAMP	1789
	twamp-server	1790
	twamp-client	1792
Chapter 73	Configuration Statements: System Logging	1795
	allow-duplicates	1797
	archive (All System Log Files)	1798
	archive (Individual System Log File)	1800
	cache (Security Log)	1802
	category (Security Logging)	1803
	console (System Logging)	1804
	destination-override	1805
	event-rate	1806
	exclude (Security Log)	1807
	exclude-hostname	1808
	explicit-priority	1808
	facility-override (Security)	1809
	file (Security Log)	1810
	file (System Logging)	1811
	files	1812
	host (Security Log)	1813
	host (System)	1814
	limit (Security Log)	1816
	log (Security)	1817
	log (Services)	1821
	log-prefix (System)	1822
	log-rotate-frequency	1823
	match	1824
	match-string	1825
	mode (Security Log)	1826
	no-remote-trace (System)	1827
	pic-services-logging	1828
	port (Syslog)	1829
	rate-cap	1830
	report (Security Log)	1831
	routing-instance (Syslog)	1832
	security-log	1833
	security-log-percent-full	1834
	severity (Security Log)	1835
	size (System)	1836
	stream (Security Log)	1837
	structured-data	1839
	syslog (System)	1840
	system	1842
	time-format	1843

	traceoptions (Security Log)	1845
	tracing	1847
	transport (Security Log)	1848
	ukern-trace	1849
	user (System Logging)	1850
	world-readable	1851
Chapter 74	Configuration Statement: App-Engine	1853
	routing-instance	1854
Part 14	Operational Commands	
Chapter 75	Operational Commands: General	1857
	monitor traffic	1858
	ping	1870
	show pfe statistics bridge	1876
	traceroute	1881
Chapter 76	Operational Commands: Realtime Performance Monitoring	1887
	show services rpm active-servers	1888
	show services rpm history-results	1889
	show services rpm probe-results	1893
Chapter 77	Operational Commands: Analyzers and Port Mirroring	1903
	show analyzer	1904
Chapter 78	Operational Commands: sFlow Monitoring Technology	1907
	clear sflow collectors statistics	1908
	clear sflow collector statistics (QFX Series)	1909
	show sflow	1910
	show sflow (QFX Series)	1912
	show sflow collector	1914
	show sflow collector (QFX Series)	1915
	show sflow interface	1917
	show sflow interface (QFX Series)	1919
Chapter 79	Operational Commands: Ethernet OAM Connectivity Fault Management	1923
	clear oam ethernet connectivity-fault-management delay-statistics	1924
	clear oam ethernet connectivity-fault-management sla-iterator-statistics	1926
	clear oam ethernet connectivity-fault-management statistics	1927
	monitor ethernet delay-measurement	1928
	show oam ethernet connectivity-fault-management delay-statistics	1933
	show oam ethernet connectivity-fault-management forwarding-state	1937
	show oam ethernet connectivity-fault-management interfaces	1941
	show oam ethernet connectivity-fault-management path-database	1948
	show oam ethernet connectivity-fault-management mep-database	1951
	show oam ethernet connectivity-fault-management mip	1957
	show oam ethernet connectivity-fault-management sla-iterator-statistics	1959
Chapter 80	Operational Commands: Ethernet OAM Link Fault Management	1969
	show oam ethernet link-fault-management	1970

Chapter 81	Operational Commands: Uplink Failure Detection	1975
	show uplink-failure-detection	1976
Chapter 82	Operational Commands: RPM	1979
	show services rpm active-servers	1980
	show services rpm history-results	1981
	show services rpm probe-results	1985
Chapter 83	Operational Commands: SNMP	1995
	clear snmp statistics	1996
	request snmp spoof-trap	1998
	show snmp health-monitor	2004
	show snmp inform-statistics	2011
	show snmp mib	2013
	show snmp rmon	2017
	show snmp rmon history	2022
	show snmp statistics	2026
	show snmp v3	2034
Chapter 84	Operational Commands: Port Mirroring	2037
	show analyzer	2038
Chapter 85	Operational Commands: Network Analytics	2041
	show services analytics agent	2042
Chapter 86	Operational Commands: System Logging	2045
	clear log	2046
	clear security log	2048
	clear security log file	2050
	clear security log stream file	2051
	monitor list	2052
	monitor start	2054
	monitor stop	2056
	show log	2057
	show security log	2061
	show security log file	2064
	show security log severity	2066
	show security log query	2067
Chapter 87	Monitoring Operational Commands	2069
	clear chassis cluster ip-monitoring failure-count	2071
	clear chassis cluster ip-monitoring failure-count ip-address	2072
	clear ilmi statistics	2073
	clear interfaces statistics	2074
	clear services rpm twamp server connection	2075
	clear snmp history	2076
	clear snmp statistics	2077
	request pppoe connect	2079
	request pppoe disconnect	2080
	request services ip-monitoring preempt-restore policy	2081
	request services rpm twamp start	2082

request services rpm twamp stop	2083
request snmp spoof-trap	2084
request support information	2090
show chassis alarms	2100
show chassis cluster ip-monitoring status redundancy-group	2102
show interfaces snmp-index	2105
show interfaces summary	2106
show ilmi statistics	2108
show security alarms	2111
show security datapath-debug capture	2116
show security datapath-debug counter	2117
show security monitoring	2118
show security monitoring fpc fpc-number	2120
show security monitoring performance session	2123
show security monitoring performance spu	2124
show services ip-monitoring status	2126
show services rpm twamp client connection	2130
show services rpm twamp client history-results	2132
show services rpm twamp client probe-results	2134
show services rpm twamp client session	2139
show services rpm twamp server connection	2141
show services rpm twamp server session	2143
show snmp health-monitor	2145
show snmp inform-statistics	2152
show snmp mib	2154
show snmp rmon	2158
show snmp statistics	2163
show snmp stats-response-statistics	2171
show snmp v3	2173
show system alarms	2176
show system alarms	2177
show system resource-monitor fpc	2180

List of Figures

Part 2	Operation, Administration, and Management Features	
Chapter 4	Ethernet OAM Connectivity Fault Management	51
	Figure 1: Relationship Among MEPs, MIPs, and Maintenance Domain Levels	52
Part 3	Uplink Failure Detection	
Chapter 5	Uplink Failure Detection Overview	65
	Figure 2: Uplink Failure Detection Configuration on Switches	66
Part 4	Network Monitoring Using SNMP	
Chapter 7	SNMP Overview	75
	Figure 3: SNMP Communication Flow	77
Chapter 10	Configuring SNMPv3	281
	Figure 4: Inform Request and Response	310
Chapter 11	Configuring SNMP for Routing Instances	325
	Figure 5: SNMP Data for Routing Instances	326
Part 5	Remote Monitoring (RMON) with SNMP Alarms and Events	
Chapter 14	RMON Overview	377
	Figure 6: Setting Thresholds	378
Chapter 15	Using RMON to Monitor Network Service Quality	399
	Figure 7: Setting Thresholds	400
	Figure 8: Network Entry Points	404
	Figure 9: Regional Points of Presence	405
	Figure 10: Measurements to Each Router	406
	Figure 11: Network Behavior During Congestion	420
Part 7	Monitoring Options	
Chapter 20	Configuring Real-Time Performance Monitoring	483
	Figure 12: RPM Timestamps	491
	Figure 13: Four Elements of TWAMP	498
	Figure 14: The Elements of TWAMP Implemented as Client and Server	499
	Figure 15: Sample RPM Graphs	510
Chapter 21	Configuring IP Monitoring	525
	Figure 16: IP Monitoring on an SRX Series Device Topology Example	529

Chapter 22	Configuring sFlow Monitoring Technology	541
	Figure 17: sFlow Technology Monitoring System	556
	Figure 18: sFlow Technology Monitoring System	561
	Figure 19: sFlow Technology Monitoring System	570
Chapter 23	Packet Flow Accelerator Diagnostics Software	575
	Figure 20: Ports on the QFX5100-24Q-AA switch and QFX-PFA-4Q module . .	576
Part 10	Port Mirroring and Analyzers	
Chapter 35	Configuring Port Mirroring Analyzers	833
	Figure 21: Network Topology for Local Port Mirroring Example	857
	Figure 22: Network Topology for Remote Port Mirroring and Analysis	861
	Figure 23: Remote Mirroring Example Network Topology Using Multiple VLAN Member Interfaces in the Next-Hop Group	872
	Figure 24: Network Monitoring for Remote Mirroring Through a Transit Switch	880
	Figure 25: Network Topology for Local Mirroring Example	887
	Figure 26: Remote Mirroring Network Topology Example	894
	Figure 27: Remote Mirroring Through a Transit Switch Network—Sample Topology	905
Chapter 37	Configuring Port Mirroring for Physical Interfaces	927
	Figure 28: Example Layer 2 Port Mirroring over GRE Interface	936
Chapter 38	Configuring Port Mirroring for Logical Interfaces	941
	Figure 29: Network Topology for Local Port Mirroring Example	952
Chapter 39	Configuring Port Mirroring for Multiple Destinations	993
	Figure 30: Active Flow Monitoring—Multiple Port Mirroring with Next-Hop Groups Topology Diagram	998
Chapter 40	Configuring Port Mirroring for Remote Destinations	1007
	Figure 31: Remote Mirroring Network Topology Example	1011
Chapter 41	Configuring Port Mirroring Local and Remote Analysis	1017
	Figure 32: Network Topology for Local Port Mirroring Example	1021
	Figure 33: Network Topology for Local Port Mirroring Example	1028
Part 12	Network Management and Troubleshooting	
Chapter 57	Troubleshooting Security Devices	1239
	Figure 34: PPP and MLPPP Headers	1247

List of Tables

	About the Documentation	liii
	Table 1: Notice Icons	lv
	Table 2: Text and Syntax Conventions	lvi
Part 1	Overview	
Chapter 1	Network Management Overview	3
	Table 3: Device Management Features in Junos OS	4
	Table 4: Device and Network Management Features on the QFX Series, OCX Series, and EX4600	6
Chapter 2	Network Monitoring Overview	15
	Table 5: J-Web Interface Troubleshoot Options	17
	Table 6: CLI Diagnostic Command Summary	18
Part 4	Network Monitoring Using SNMP	
Chapter 7	SNMP Overview	75
	Table 7: Monitored Object Instances	92
Chapter 8	SNMP MIBs and Traps Supported by Junos OS	115
	Table 8: Enterprise-specific MIBs supported by Junos OS	115
	Table 9: Standard MIBs supported by Junos OS	126
	Table 10: Standard Supported SNMP Version 1 Traps	147
	Table 11: Standard Supported SNMP Version 2 Traps	150
	Table 12: Juniper Networks Enterprise-Specific Supported SNMP Version 1 Traps	155
	Table 13: Juniper Networks Enterprise-Specific Supported SNMP Version 2 Traps	161
	Table 14: MIB Roots for Custom MIB Modules	169
Chapter 9	Configuring Basic SNMP	187
	Table 15: Standard SNMP Version 1 Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis	228
	Table 16: Enterprise-Specific SNMPv1 Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis	230
	Table 17: Standard SNMPv2 Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis	232
	Table 18: Enterprise-Specific SNMPv2 Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis	234
	Table 19: Standard SNMPv2 Traps Supported on QFabric Systems	236
	Table 20: Enterprise-Specific SNMPv2 Traps Supported on QFabric Systems	237

	Table 21: Standard MIBs Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis	245
	Table 22: Juniper Networks Enterprise-Specific MIBs Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis	250
	Table 23: Standard MIBs Supported on QFabric Systems	252
	Table 24: Juniper Networks Enterprise-Specific MIBs Supported on QFabric Systems	256
	Table 25: Fabric Chassis MIB Tables and Objects	261
	Table 26: Fabric Chassis MIB SNMPv2 Traps	263
	Table 27: Monitored Object Instances	274
Chapter 10	Configuring SNMPv3	281
	Table 28: Values to Use in Example	315
Chapter 11	Configuring SNMP for Routing Instances	325
	Table 29: MIB Support for Routing Instances (Juniper Networks MIBs)	326
	Table 30: Class 1 MIB Objects (Standard and Juniper MIBs)	330
	Table 31: Class 2 MIB Objects (Standard and Juniper MIBs)	334
	Table 32: Class 3 MIB Objects (Standard and Juniper MIBs)	335
	Table 33: Class 4 MIB Objects (Standard and Juniper MIBs)	336
Chapter 12	Configuring SNMP Remote Operations	343
	Table 34: Results in pingProbeHistoryTable: After the First Ping Test	351
	Table 35: Results in pingProbeHistoryTable: After the First Probe of the Second Test	352
	Table 36: Results in pingProbeHistoryTable: After the Second Ping Test	352
	Table 37: traceRouteProbeHistoryTable	361
Chapter 13	Tracing SNMP Activity	363
	Table 38: SNMP Tracing Flags	372
Part 5	Remote Monitoring (RMON) with SNMP Alarms and Events	
Chapter 14	RMON Overview	377
	Table 39: RMON Event Table	382
	Table 40: RMON Alarm Table	383
	Table 41: jnxRmon Alarm Table	383
	Table 42: RMON History Control Table	384
Chapter 15	Using RMON to Monitor Network Service Quality	399
	Table 43: RMON Event Table	401
	Table 44: RMON Alarm Table	402
	Table 45: jnxRmon Alarm Extensions	402
	Table 46: Real-Time Performance Monitoring Configuration Options	408
	Table 47: Health Metrics	410
	Table 48: Counter Values for vlan-ccc Encapsulation	416
	Table 49: Performance Metrics	417
	Table 50: Inbound Traffic Per Class	421
	Table 51: Inbound Counters	421
	Table 52: Outbound Counters for ATM Interfaces	422
	Table 53: Outbound Counters for Non-ATM Interfaces	422

	Table 54: Dropped Traffic Counters	422
Chapter 16	Health Monitoring with SNMP	425
	Table 55: Monitored Object Instances	426
Part 6	Accounting Options, Source Class Usage, and Destination Class Usage Options	
Chapter 17	Accounting Options, Source Class Usage and Destination Class Usage Options Overview	431
	Table 56: Types of Accounting Profiles	431
Part 7	Monitoring Options	
Chapter 19	Configuring Interface Alarms	471
	Table 57: Interface Alarm Conditions	473
	Table 58: System Alarm Conditions and Corrective Actions	476
	Table 59: Alarms Monitoring Page	478
Chapter 20	Configuring Real-Time Performance Monitoring	483
	Table 60: RPM Statistics	486
	Table 61: RPM Configuration Summary	493
	Table 62: Summary of Key RPM Output Fields	511
Chapter 21	Configuring IP Monitoring	525
	Table 63: Test Parameters and Default Values	526
	Table 64: Threshold Supported and Description	527
Chapter 23	Packet Flow Accelerator Diagnostics Software	575
	Table 65: External and Internal Ports on the QFX5100-24Q-AA Switch and the QFX-PFA-4Q Module	576
	Table 66: Base Tests	579
	Table 67: Ethernet Tests and Scripts	580
	Table 68: 10-Gigabit Ethernet Channel Mappings on the QFX-PFA-4Q module F-ports	581
	Table 69: 10-Gigabit Ethernet Channel Mappings on the QFX-PFA-4Q module C-ports	582
	Table 70: Exact Connectivity Between C-Ports and A-Ports	583
	Table 71: Stress Tests	585
	Table 72: PTP Tests	586
	Table 73: PTP Script	586
	Table 74: QFX-PFA-4Q Module LED Test	587
	Table 75: Utilities	588
	Table 76: Command-Line Arguments	590
	Table 77: File Format Details	591
	Table 78: Dual In-Line Memory Modules	591
	Table 79: Validating Ports	609
Part 8	Monitoring Common Security Features	
Chapter 24	Displaying Real-Time Information from Device to Host	617

	Table 80: CLI traceroute monitor Command Options	617
	Table 81: CLI traceroute monitor Command Output Summary	618
	Table 82: CLI mtrace from-source Command Options	620
	Table 83: CLI mtrace from-source Command Output Summary	621
Chapter 25	Monitoring Security Policies	623
	Table 84: Filtering Route Messages	624
	Table 85: Summary of Key Routing Information Output Fields	625
	Table 86: Summary of Key RIP Routing Output Fields	626
	Table 87: Summary of Key OSPF Routing Output Fields	628
	Table 88: Summary of Key BGP Routing Output Fields	630
	Table 89: View Policy Log Fields	632
	Table 90: Policy Events Detail Fields	633
	Table 91: Security Policies Monitoring Output Fields	634
	Table 92: Check Policies Output	637
	Table 93: Summary of Key Screen Counters Output Fields	639
	Table 94: Summary of IDP Status Output Fields	642
	Table 95: Summary of Key Flow Gate Output Fields	643
	Table 96: Summary of Key Firewall Authentication Table Output Fields	644
	Table 97: Summary of Key Firewall Authentication History Output Fields	646
	Table 98: Summary of Dot1X Output Fields	648
Chapter 26	Monitoring Application Layer Gateways Features	649
	Table 99: Summary of Key H.323 Counters Output Fields	649
	Table 100: Summary of Key MGCP Calls Output Fields	651
	Table 101: Summary of Key MGCP Counters Output Fields	651
	Table 102: Summary of Key MGCP Endpoints Output Fields	653
	Table 103: Summary of Key SCCP Calls Output Fields	654
	Table 104: Summary of Key SCCP Counters Output Fields	654
	Table 105: Summary of Key SIP Calls Output Fields	656
	Table 106: Summary of Key SIP Counters Output Fields	657
	Table 107: Summary of Key SIP Rate Output Fields	659
	Table 108: Summary of Key SIP Transactions Output Fields	659
	Table 109: ALG H.323 Monitoring Page	660
	Table 110: Voice ALG MGCP Monitoring Page	663
	Table 111: Voice ALG SCCP Monitoring Page	665
	Table 112: Voice ALG SIP Monitoring Page	668
	Table 113: Voice ALG Summary Monitoring Page	673
Chapter 27	Monitoring Interfaces and Switching Functions	675
	Table 114: CLI monitor interface Output Control Keys	675
	Table 115: CLI monitor interface traffic Output Control Keys	676
	Table 116: Address Pools Monitoring Page	677
	Table 117: Summary of Ethernet Switching Output Fields	679
	Table 118: GVRP Monitoring Page	680
	Table 119: Summary of Key MPLS Interface Information Output Fields	682
	Table 120: Summary of Key MPLS LSP Information Output Fields	683
	Table 121: Summary of Key MPLS LSP Statistics Output Fields	684
	Table 122: Summary of Key RSVP Session Information Output Fields	685
	Table 123: Summary of Key RSVP Interfaces Information Output Fields	687

	Table 124: Summary of Key PPPoE Output Fields	688
	Table 125: Spanning Tree Monitoring Page	692
Chapter 28	Monitoring NAT	695
	Table 126: Source NAT Monitoring Page	695
	Table 127: Summary of Key Destination NAT Output Fields	701
	Table 128: Summary of Key Static NAT Output Fields	703
	Table 129: Summary of Key Incoming Table Output Fields	705
	Table 130: Summary of Key Interface NAT Output Fields	705
Chapter 29	Monitoring Events, Services and System	707
	Table 131: Summary of Key DHCP Client Binding Output Fields	707
	Table 132: Events Monitoring Page	708
Chapter 30	Monitoring Unified Threat Management Features	717
	Table 133: Statistics Tab Output in the Threats Report	722
	Table 134: Activities Tab Output in the Threats Report	724
	Table 135: Traffic Report Output	727
Chapter 31	Monitoring VPNs	731
	Table 136: Summary of Key IKE SA Information Output Fields	731
	Table 137: IPsec VPN—Phase I Monitoring Page	735
	Table 138: IPsec VPN—Phase II Monitoring Page	736
	Table 139: Summary of Key IPsec VPN Information Output Fields	738
Part 9	Performance Management	
Chapter 33	Configuring Network Analytics	753
	Table 140: Network Analytics CLI Changes	756
	Table 141: GPB Stream Format Message Header Information	762
	Table 142: Streamed Queue Statistics Data Output Fields	765
	Table 143: Streamed Traffic Statistics Data Output Fields	765
	Table 144: Output Fields for Queue Statistics in Local Analytics File	767
	Table 145: Output Fields for Traffic Statistics in Local Analytics File	768
	Table 146: Streamed Queue Statistics Data Output Fields	770
	Table 147: Streamed Traffic Statistics Data Output Fields	771
	Table 148: Configuration and Status Output in Junos OS Release 13.2X51-D10 and 13.2X50-D15	772
Part 10	Port Mirroring and Analyzers	
Chapter 34	Overview of Port Mirroring	801
	Table 149: Mirroring Terminologies	803
	Table 150: Configuration Guidelines for Port Mirroring and Analyzers on EX2300, EX3400, and EX4300 Switches	805
	Table 151: Port Mirroring Terminology	809
	Table 152: Configuration Guidelines for Port Mirroring	811
	Table 153: Port Mirroring Terms and Definitions	816
	Table 154: Port Mirroring Terms and Definitions	821
	Table 155: Application of Layer 2 Port Mirroring Types	825
Chapter 35	Configuring Port Mirroring Analyzers	833

	Table 156: Analyzer Terminology	835
	Table 157: Configuration Guidelines for Port Mirroring Analyzers	837
Chapter 38	Configuring Port Mirroring for Logical Interfaces	941
	Table 158: Application of Layer 2 Port Mirroring Firewall Filters on PE Routers and PE Switches	956
	Table 159: Application of Layer 2 Port Mirroring Firewall Filters on PE Devices . .	959
Part 11	System Log Messages	
Chapter 44	Overview to System Logging	1049
	Table 160: Junos OS System Logging Facilities	1051
	Table 161: System Log Message Severity Levels	1052
	Table 162: Default System Logging Settings	1053
	Table 163: Fields in Standard-Format Messages	1056
Chapter 45	Configuring System Logging for a Single-Chassis System	1061
	Table 164: Minimum Configuration Statements for System Logging	1066
	Table 165: Facility Codes Reported in Priority Information	1073
	Table 166: Numerical Codes for Severity Levels Reported in Priority Information	1074
	Table 167: Regular Expression Operators for the match Statement	1077
	Table 168: Regular Expression Operators for the match Statement	1078
Chapter 46	Configuring System Logging for a TX Matrix or TX Matrix Plus Router . .	1083
	Table 169: Example: Local and Forwarded Severity Level Are Both info	1090
	Table 170: Example: Local Severity Is notice, Forwarded Severity Is critical . .	1090
	Table 171: Example: Local Severity Is critical, Forwarded Severity Is notice . . .	1091
	Table 172: Example: Local and Forwarded Severity Level Are Both info	1092
	Table 173: Example: Local Severity Is notice, Forwarded Severity Is critical . . .	1093
	Table 174: Example: Local Severity Is critical, Forwarded Severity Is notice . . .	1093
Chapter 47	Directing System Log Messages to a Remote Destination	1101
	Table 175: Junos OS System Logging Facilities	1102
	Table 176: System Log Message Severity Levels	1103
	Table 177: Default Facilities for Messages Directed to a Remote Destination . .	1110
	Table 178: Facilities for the facility-override Statement	1111
Chapter 49	Displaying and Interpreting System Log Message Descriptions	1119
	Table 179: Fields in System Log Message Descriptions	1120
	Table 180: Format of message-source Field in Messages Logged on TX Matrix Platform	1122
	Table 181: Format of message-source Field in Messages Logged on TX Matrix Platform	1123
	Table 182: Fields in Standard-Format Messages Generated by a Junos OS process or Library	1124
	Table 183: Fields in Messages Generated by a PIC	1125
	Table 184: Fields in Structured-Data Messages	1127
	Table 185: Facility and Severity Codes in the priority-code Field	1128
	Table 186: Platform Identifiers in the platform Field	1130
Chapter 50	Configuring System Logging for a Security Device	1133

	Table 187: Statistics Tab Output in the Threats Report	1141
	Table 188: Activities Tab Output in the Threats Report	1144
	Table 189: Traffic Report Output	1146
Part 12	Network Management and Troubleshooting	
Chapter 52	Monitoring and Troubleshooting	1161
	Table 190: Output Control Keys for the monitor interface Command	1164
	Table 191: Features Using TCAM Resource	1166
	Table 192: Show and Clear Commands to Monitor and Troubleshoot Dynamic TCAM	1169
	Table 193: Unified Forwarding Table Profiles	1175
	Table 194: Layer 3 Host Table	1176
	Table 195: Layer 3 LPM Table	1176
	Table 196: Commands to Monitor and Troubleshoot TCAM Resource in ACX Series	1177
Chapter 53	Troubleshooting of System Performance with Resource Monitoring Methodology	1179
	Table 197: jnxPfeMemoryUKernTable	1186
	Table 198: jnxPfeMemory Table	1186
	Table 199: jnxPfeMemoryForwardingTable	1187
	Table 200: jnxPfeMemoryErrorsTable	1187
	Table 201: pfeMemoryErrors	1188
Chapter 54	Configuring Data Path Debugging and Trace Options	1189
	Table 202: CLI mtrace monitor Command Output Summary	1196
	Table 203: J-Web Traceroute Results and Output Summary	1196
	Table 204: CLI traceroute Command Options	1198
Chapter 55	Using MPLS to Diagnose LSPs, VPNs, and Layer 2 Circuits	1205
	Table 205: Options for Checking MPLS Connections	1206
	Table 206: CLI ping Command Options	1208
	Table 207: CLI ping mpls l2circuit Command Options	1210
	Table 208: CLI ping mpls l2vpn Command Options	1211
	Table 209: CLI ping mpls l3vpn Command Options	1213
	Table 210: CLI ping mpls ldp and ping mpls lsp-end-point Command Options	1214
Chapter 56	Using Packet Capture to Analyze Network Traffic	1217
	Table 211: CLI monitor traffic Command Options	1234
	Table 212: CLI monitor traffic Match Conditions	1236
	Table 213: CLI monitor traffic Logical Operators	1237
	Table 214: CLI monitor traffic Arithmetic, Binary, and Relational Operators	1237
Chapter 57	Troubleshooting Security Devices	1239
	Table 215: CoS Components Applied on Multilink Bundles and Constituent Links	1242
	Table 216: PPP and MLPPP Encapsulation Overhead	1247
	Table 217: Number of Packets Transmitted on a Queue	1250
	Table 218: ISSU-Related Errors and Solutions	1254

Part 13	Configuration Statements	
Chapter 59	Configuration Statements: Ethernet OAM Link Fault Management	1297
	Table 219: Options for traceoptions	1354
Chapter 71	Configuration Statements: Port Mirroring and Analyzers	1727
	Table 220: Unified Forwarding Table Profiles	1752
Part 14	Operational Commands	
Chapter 75	Operational Commands: General	1857
	Table 221: Match Conditions for the monitor traffic Command	1860
	Table 222: Logical Operators for the monitor traffic Command	1862
	Table 223: Arithmetic and Relational Operators for the monitor traffic Command	1863
	Table 224: show pfe statistics bridge Output Fields	1876
	Table 225: traceroute Output Fields	1883
Chapter 76	Operational Commands: Realtime Performance Monitoring	1887
	Table 226: show services rpm active-servers Output Fields	1888
	Table 227: show services rpm history-results Output Fields	1890
	Table 228: show services rpm probe-results Output Fields	1894
Chapter 77	Operational Commands: Analyzers and Port Mirroring	1903
	Table 229: show analyzer Output Fields	1904
Chapter 78	Operational Commands: sFlow Monitoring Technology	1907
	Table 230: show sflow Output Fields	1910
	Table 231: show sflow Output Fields	1912
	Table 232: show sflow collector Output Fields	1914
	Table 233: show sflow collector Output Fields	1915
	Table 234: show sflow interface Output Fields	1917
	Table 235: show sflow interface Output Fields	1919
Chapter 79	Operational Commands: Ethernet OAM Connectivity Fault Management	1923
	Table 236: monitor ethernet delay-measurement one-way Output Fields	1930
	Table 237: monitor ethernet delay-measurement two-way Output Fields	1930
	Table 238: show oam ethernet connectivity-fault-management delay-statistics and mep-statistics Output Fields	1934
	Table 239: show oam ethernet connectivity-fault-management forwarding-state Output Fields	1937
	Table 240: show oam ethernet connectivity-fault-management interfaces Output Fields	1941
	Table 241: show oam ethernet connectivity-fault-management linktrace path-database Output Fields	1948
	Table 242: show oam ethernet connectivity-fault-management mep-database Output Fields	1952
	Table 243: show oam ethernet connectivity-fault-management mip Output Fields	1957

	Table 244: show oam ethernet connectivity-fault-management sla-iterator-statistics Output Fields	1960
Chapter 80	Operational Commands: Ethernet OAM Link Fault Management	1969
	Table 245: show oam ethernet link-fault-management Output Fields	1970
Chapter 81	Operational Commands: Uplink Failure Detection	1975
	Table 246: show uplink-failure-detection Output Fields	1976
Chapter 82	Operational Commands: RPM	1979
	Table 247: show services rpm active-servers Output Fields	1980
	Table 248: show services rpm history-results Output Fields	1982
	Table 249: show services rpm probe-results Output Fields	1986
Chapter 83	Operational Commands: SNMP	1995
	Table 250: show snmp health-monitor Output Fields	2004
	Table 251: show snmp inform-statistics Output Fields	2011
	Table 252: show snmp mib Output Fields	2014
	Table 253: show snmp rmon Output Fields	2018
	Table 254: show smp rmon history Output Fields	2022
	Table 255: show snmp statistics Output Fields	2027
	Table 256: show snmp statistics subagents Output Fields	2030
	Table 257: show snmp v3 Output Fields	2035
Chapter 84	Operational Commands: Port Mirroring	2037
	Table 258: show analyzer Output Fields	2038
Chapter 85	Operational Commands: Network Analytics	2041
	Table 259: show services analytics agent Output Fields	2042
Chapter 86	Operational Commands: System Logging	2045
	Table 260: monitor list Output Fields	2052
	Table 261: monitor start Output Fields	2054
	Table 262: show security log Output Fields	2062
	Table 263: show security log file Output Fields	2064
	Table 264: show security log severity Output Fields	2066
Chapter 87	Monitoring Operational Commands	2069
	Table 265: Sample show Commands Called by the request support information command on an MX Series Router	2092
	Table 266: Sample show Commands Called by the request support information command on an EX Series 9200 Switch	2093
	Table 267: Sample show Commands Called by the request support information command on SRX Series devices	2094
	Table 268: show chassis alarms Output Fields	2100
	Table 269: show chassis cluster ip-monitoring status Output Fields	2102
	Table 270: show chassis cluster ip-monitoring status redundancy group Reason Fields	2103
	Table 271: show interfaces summary Output Fields	2106
	Table 272: show ilmi statistics Output Fields	2109
	Table 273: show security alarms	2112
	Table 274: show security monitoring fpc fpc-number Output Fields	2120

Table 275: show services ip-monitoring status Output Fields	2126
Table 276: show services rpm twamp client connection Output Fields	2130
Table 277: show services rpm twamp client history-results Output Fields	2132
Table 278: show services twamp client probe-results Output Fields	2134
Table 279: show services rpm twamp client session Output Fields	2139
Table 280: show services rpm twamp server connection Output Fields	2141
Table 281: show services rpm twamp server session Output Fields	2143
Table 282: show snmp health-monitor Output Fields	2145
Table 283: show snmp inform-statistics Output Fields	2152
Table 284: show snmp mib Output Fields	2155
Table 285: show snmp rmon Output Fields	2159
Table 286: show snmp statistics Output Fields	2164
Table 287: show snmp statistics subagents Output Fields	2167
Table 288: show snmp stats-response-statistics Output Fields	2171
Table 289: show snmp v3 Output Fields	2174
Table 290: show system alarms Output Fields	2178
Table 291: show system resource-monitor fpc Output Fields	2181

About the Documentation

- Documentation and Release Notes on page liii
- Using the Examples in This Manual on page liii
- Documentation Conventions on page lv
- Documentation Feedback on page lvii
- Requesting Technical Support on page lvii

Documentation and Release Notes

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

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 <https://www.juniper.net/books>.

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 [CLI Explorer](#).

Documentation Conventions

Table 1 on page lv defines notice icons used in this guide.

Table 1: Notice Icons







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

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

Table 2: Text and Syntax Conventions

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

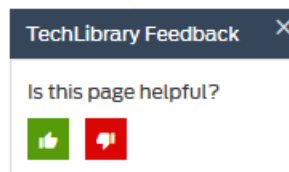
Table 2: Text and Syntax Conventions (continued)

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

Documentation Feedback

We encourage you to provide feedback so that we can improve our documentation. You can use either of the following methods:

- Online feedback system—Click TechLibrary Feedback, on the lower right of any page on the [Juniper Networks TechLibrary](#) site, and do one of the following:



- Click the thumbs-up icon if the information on the page was helpful to you.
- Click the thumbs-down icon if the information on the page was not helpful to you or if you have suggestions for improvement, and use the pop-up form to provide feedback.
- E-mail—Send your comments to techpubs-comments@juniper.net. Include the document or topic name, URL or page number, and software version (if applicable).

Requesting Technical Support

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

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <https://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <https://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: <https://www.juniper.net/customers/support/>
- Search for known bugs: <https://prsearch.juniper.net/>
- Find product documentation: <https://www.juniper.net/documentation/>
- Find solutions and answer questions using our Knowledge Base: <https://kb.juniper.net/>
- Download the latest versions of software and review release notes: <https://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <https://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum: <https://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <https://www.juniper.net/cm/>

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

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 <https://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 <https://www.juniper.net/support/requesting-support.html>.

PART 1

Overview

- [Network Management Overview on page 3](#)
- [Network Monitoring Overview on page 15](#)

CHAPTER 1

Network Management Overview

- [Understanding Device Management Functions in Junos OS on page 3](#)
- [Understanding Device and Network Management Features on page 6](#)
- [Understanding Tracing and Logging Operations on page 9](#)
- [Junos Space Support for Network Management on page 11](#)

Understanding Device Management Functions in Junos OS

After you have installed a device into your network, you need to manage the device within your network. Device management can be divided into five tasks:

- Fault management—Monitor the device; detect and fix faults.
- Configuration management—Configure device attributes.
- Accounting management—Collect statistics for accounting purposes.
- Performance management—Monitor and adjust device performance.
- Security management—Control device access and authenticate users.

The Junos[®] operating system (Junos OS) network management features work in conjunction with an operations support system (OSS) to manage the devices within the network. Junos OS can assist you in performing these management tasks, as described in [Table 3 on page 4](#).

Table 3: Device Management Features in Junos OS

Task	Junos OS Feature
Fault management	<p>Monitor and see faults using:</p> <ul style="list-style-type: none"> Operational mode commands—For more information about operational mode commands, see the CLI Explorer. SNMP MIBs—For more information about SNMP MIBs supported by Junos OS, see ““Standard SNMP MIBs Supported by Junos OS” on page 126” and ““Enterprise-Specific SNMP MIBs Supported by Junos OS” on page 115. Standard SNMP traps—For more information about standard SNMP traps, see the “Standard SNMP Traps Supported by Junos OS” on page 146. Enterprise-specific SNMP traps—For more information about enterprise-specific traps, see ““Enterprise-Specific SNMP Traps Supported by Junos OS” on page 154”. System log messages—For more information about how to configure system log messages, see the <i>Junos OS Administration Library</i>. For more information about how to view system log messages, see the System Log Explorer.
Configuration management	<ul style="list-style-type: none"> Configure router attributes using the command-line interface (CLI), the Junos XML management protocol, and the NETCONF XML management protocol. For more information about configuring the router using the CLI, see the <i>Junos OS Administration Library</i>. For more information about configuring the router using the APIs, see the <i>Junos XML Management Protocol Guide</i> and <i>NETCONF XML Management Protocol Guide</i>. Configuration Management MIB—For more information about the Configuration Management MIB, see Configuration Management MIB.

Table 3: Device Management Features in Junos OS (continued)

Task	Junos OS Feature
Accounting management	<p>Perform the following accounting-related tasks:</p> <ul style="list-style-type: none"> Collect statistics for interfaces, firewall filters, destination classes, source classes, and the Routing Engine. For more information about collecting statistics, see “Accounting Options Configuration” on page 437. Use interface-specific traffic statistics and other counters, available in the Standard Interfaces MIB, Juniper Networks enterprise-specific extensions to the Interfaces MIB, and media-specific MIBs, such as the enterprise-specific ATM MIB. Use per-ATM virtual circuit (VC) counters, available in the enterprise-specific ATM MIB. For more information about the ATM MIB, see ATM MIB. Group source and destination prefixes into source classes and destination classes and count packets for those classes. Collect destination class and source class usage statistics. For more information about classes, see “Destination Class Usage MIB” and “Source Class Usage MIB”, “Configuring Class Usage Profiles” on page 461, the <i>Junos OS Network Interfaces Library for Routing Devices</i>, and the <i>Junos OS Routing Protocols Library</i>. Count packets as part of a firewall filter. For more information about firewall filter policies, see “Enterprise-Specific SNMP MIBs Supported by Junos OS” on page 115 and the <i>Junos OS Routing Protocols Library</i>. Sample traffic, collect the samples, and send the collection to a host running the CAIDA cflowd utility. For more information about CAIDA and cflowd, see the <i>Junos OS Routing Protocols Library for Security Devices</i>.
Performance management	<p>Monitor performance in the following ways:</p> <ul style="list-style-type: none"> Use operational mode commands. For more information about monitoring performance using operational mode commands, see the CLI Explorer. Use firewall filter. For more information about performance monitoring using firewall filters, see the <i>Junos OS Routing Protocols Library</i>. Sample traffic, collect the samples, and send the samples to a host running the CAIDA cflowd utility. For more information about CAIDA and cflowd, see the <i>Junos OS Routing Protocols Library</i>. Use the enterprise-specific Class-of-Service MIB. For more information about this MIB, see Class-of-Service MIB.
Security management	<p>Assure security in your network in the following ways:</p> <ul style="list-style-type: none"> Control access to the router and authenticate users. For more information about access control and user authentication, see the <i>Junos OS Administration Library</i>. Control access to the router using SNMPv3 and SNMP over IPv6. For more information, see “Configuring the Local Engine ID” on page 317 and “Tracing SNMP Activity on a Device Running Junos OS” on page 369.

- Related Documentation**
- [Understanding the Integrated Local Management Interface on page 243](#)
 - [Understanding the SNMP Implementation in Junos OS](#)
 - [Understanding Measurement Points, Key Performance Indicators, and Baseline Values on page 403](#)
 - [Accounting Options Overview on page 431](#)

Understanding Device and Network Management Features

After you install a QFX Series product, OCX Series device, or EX4600 switch in your network, you need to manage the device. The products support features that you use to manage the device within the network, including the management of configuration, system performance, fault monitoring, and remote access.

[Table 4 on page 6](#) lists the device and network management features on the QFX Series, OCX Series, and EX4600.

Table 4: Device and Network Management Features on the QFX Series, OCX Series, and EX4600

Feature	Typical Uses	Documentation
AI-Scripts and Advanced Insight Manager (AIM)—Automatically detect and monitor faults on the switch, and depending on the configuration on the AIM application, send notifications of potential problems, and submit problem reports to Juniper Support Systems.	Fault management	Advanced Insight Scripts (AI-Scripts) Release Notes
Alarms and LEDs on the switch—Show status of hardware components and indicate warning or error conditions.	Fault management	Chassis Alarm Messages on a QFX3500 Device
Firewall filters—Control the packets that are sent to and from the network, balance network traffic, and optimize performance.	Performance management	<ul style="list-style-type: none"> • Routing Policies, Firewall Filters, and Traffic Policers Feature Guide • Overview of Firewall Filters
In-band management—Enables connection to the switch using the same interfaces through which customer traffic flows. Communication between the switch and a remote console is typically enabled using SSH and Telnet services. SSH provides secure encrypted communications, whereas Telnet provides unencrypted, and therefore less secure, access to the switch.	Remote access management	<ul style="list-style-type: none"> • Configuring SSH Service for Remote Access to the Router or Switch • Configuring Telnet Service for Remote Access to a Router or Switch

Table 4: Device and Network Management Features on the QFX Series, OCX Series, and EX4600 (continued)

Feature	Typical Uses	Documentation
Juniper Networks Junos OS automation scripts—Configuration and operations automation tools provided by Junos OS. These tools include commit scripts, operation scripts, event scripts, and event policies. Commit scripts enforce custom configuration rules, whereas operation scripts, event policies, and event scripts automate network troubleshooting and management.	<ul style="list-style-type: none"> • Configuration management • Performance management • Fault management 	<i>Automation Scripting Feature Guide</i>
Junos OS command-line interface (CLI)—CLI configuration statements that enable you to configure the switch based on your networking requirements, such as security, service, and performance.	<ul style="list-style-type: none"> • Configuration management • Performance management • User access management • Remote access management 	<i>Junos OS CLI User Guide</i>
Junos Space software—Multipurpose GUI-based network management system that includes a base platform, the Network Application Platform, and other optional applications such as Ethernet Design, Service Now, Service Insight, and Virtual Control.	<ul style="list-style-type: none"> • Configuration management • Performance management • Fault management 	<ul style="list-style-type: none"> • Junos Space Support for Network Management on page 11 • Junos Space Network Application Platform User Guide
NOTE: Junos Space does not support the OCX Series.		
Junos XML API—XML representation of Junos OS configuration statements and operational mode commands. Junos XML configuration tag elements are the content to which the Junos XML protocol operations apply. Junos XML operational tag elements are equivalent in function to operational mode commands in the CLI, which you can use to retrieve status information for a device. The Junos XML API also includes tag elements that are the counterpart to Junos CLI configuration statements.	<ul style="list-style-type: none"> • Configuration management • Performance management • Fault management 	<ul style="list-style-type: none"> • Junos XML API Configuration Developer Reference • Junos XML API Operational Developer Reference
NETCONF XML management protocol—XML-based management protocol that client applications use to request and change configuration information on routing, switching, and security platforms running Junos OS. The NETCONF XML management protocol defines basic operations that are equivalent to Junos OS CLI configuration mode commands. Client applications use the protocol operations to display, edit, and commit configuration statements (among other operations), just as administrators use CLI configuration mode commands such as show , set , and commit to perform those operations.	<ul style="list-style-type: none"> • Configuration management • Performance management • Fault management 	<i>NETCONF XML Management Protocol Developer Guide</i>

Table 4: Device and Network Management Features on the QFX Series, OCX Series, and EX4600 (continued)

Feature	Typical Uses	Documentation
<p>Operational mode commands—May be used to do the following:</p> <ul style="list-style-type: none"> Monitor switch performance. For example, the show chassis routing-engine command shows the CPU utilization of the Routing Engine. High CPU utilization of the Routing Engine can affect performance of the switch. View current activity and status of the device or network. For example, you can use the ping command to monitor and diagnose connectivity problems, and the traceroute command to locate points of failure on the network. 	<ul style="list-style-type: none"> Performance management Fault management 	CLI Explorer
<p>Out-of-band management—Enables connection to the switch through a management interface. Out-of-band management is supported on two dedicated management Ethernet interfaces as well as on the console and auxiliary ports. The management Ethernet interfaces connect directly to the Routing Engine. No transit traffic is allowed through the interfaces, separating customer and management traffic and ensuring that congestion or failures in the transit network do not affect the management of the switch.</p>	Remote access management	<ul style="list-style-type: none"> Connecting a Device to a Network for Out-of-Band Management Connecting a QFX Series Device to a Management Console Configuring Console and Auxiliary Port Properties
<p>SNMP Configuration Management MIB—Provides notification for configuration changes in the form of SNMP traps. Each trap contains the time at which the configuration change was committed, the name of the user who made the change, and the method by which the change was made. A history of the last 32 configuration changes is kept in jnxCmChgEvent Table.</p>	Configuration management	SNMP MIB Explorer
<p>SNMP MIBs and traps—Enable the monitoring of network devices from a central location. Use SNMP requests such as get and walk to monitor and view system activity.</p> <p>The QFX3500 switch supports SNMP Version 1 (v1), v2, and v3, and both standard and Juniper Networks enterprise-specific MIBs and traps.</p>	Fault management	<ul style="list-style-type: none"> SNMP MIB Explorer Understanding SNMP Implementation in Junos OS on page 75

Table 4: Device and Network Management Features on the QFX Series, OCX Series, and EX4600 (continued)

Feature	Typical Uses	Documentation
System log messages—Log details of system and user events, including errors. You can specify the severity and type of system log messages you wish to view or save, and configure the output to be sent to local or remote hosts.	<ul style="list-style-type: none"> Fault management User access management 	<ul style="list-style-type: none"> System Log Explorer Overview of Junos OS System Log Messages on page 1050 Overview of Single-Chassis System Logging Configuration on page 1063

Understanding Tracing and Logging Operations

Tracing and logging operations enable you to track events that occur in the switch—both normal operations and error conditions—and to track the packets that are generated by or passed through the switch. The results of tracing and logging operations are placed in files in the `/var/log` directory on the switch.

The Junos OS supports remote tracing for the following processes:

- chassisd—Chassis-control process
- eventd—Event-processing process
- cosd—Class-of-service process

You configure remote tracing by using the **tracing** statement at the **[edit system]** hierarchy level.



NOTE: The **tracing** statement is not supported on the QFX3000 QFabric system.

If you enabled remote tracing but wish to disable it for specific processes on the switch, use the **no-remote-trace** statement at the **[edit process-name traceoptions]** hierarchy level. This feature does not alter local tracing functionality in any way, and logging files are stored on the switch.

Logging operations use a system logging mechanism similar to the UNIX syslogd utility to record systemwide, high-level operations, such as interfaces going up or down and users logging in to or out of the switch. You configure these operations by using the **syslog** statement at the **[edit system]** hierarchy level and by using the **options** statement at the **[edit ethernet-switching-options]** hierarchy level.

Tracing operations record more detailed information about the operations of the switch, including packet forwarding and routing information. To configure tracing operations, use the **traceoptions** statement.



NOTE: The **traceoptions** statement is not supported on the QFX3000 QFabric system.

You can define tracing operations in different portions of the switch configuration:

- **SNMP agent activity tracing operations**—Define tracing of the activities of SNMP agents on the switch. You configure SNMP agent activity tracing operations at the **[edit snmp]** hierarchy level.
- **Global switching tracing operations**—Define tracing for all switching operations. You configure global switching tracing operations at the **[edit ethernet-switching-options]** hierarchy level of the configuration.
- **Protocol-specific tracing operations**—Define tracing for a specific routing protocol. You configure protocol-specific tracing operations in the **[edit protocols]** hierarchy when configuring the individual routing protocol. Protocol-specific tracing operations override any equivalent operations that you specify in the global **traceoptions** statement. If there are no equivalent operations, they supplement the global tracing options. If you do not specify any protocol-specific tracing, the routing protocol inherits all the global tracing operations.
- **Tracing operations within individual routing protocol entities**—Some protocols allow you to define more granular tracing operations. For example, in Border Gateway Protocol (BGP), you can configure peer-specific tracing operations. These operations override any equivalent BGP-wide operations or, if there are no equivalents, supplement them. If you do not specify any peer-specific tracing operations, the peers inherit, first, all the BGP-wide tracing operations and, second, the global tracing operations.
- **Interface tracing operations**—Define tracing for individual interfaces and for the interface process itself. You define interface tracing operations at the **[edit interfaces]** hierarchy level of the configuration.
- **Remote tracing**—To enable system-wide remote tracing, configure the **destination-override syslog host** statement at the **[edit system tracing]** hierarchy level. This specifies the remote host running the system log process (syslogd), which collects the traces. Traces are written to files on the remote host in accordance with the syslogd configuration in **/etc/syslog.conf**. By default, remote tracing is not configured.

To override the system-wide remote tracing configuration for a particular process, include the **no-remote-trace** statement at the **[edit process-name traceoptions]** hierarchy. When **no-remote-trace** is enabled, the process does local tracing.

To collect traces, use the local0 facility as the selector in the **/etc/syslog.conf** file on the remote host. To separate traces from various processes into different files, include the process name or trace-file name (if it is specified at the **[edit process-name traceoptions file]** hierarchy level) in the Program field in the **/etc/syslog.conf** file. If your system log server supports parsing hostname and program name, then you can separate traces from the various processes.



NOTE: During a commit check, warnings about the **traceoptions** configuration (for example, mismatch in trace file sizes or number of trace files) are not displayed on the console. However, these warnings are logged in the system log messages when the new configuration is committed.

- Related Documentation**
- [Overview of Junos OS System Log Messages on page 1050](#)

Junos Space Support for Network Management

The Juniper Networks Junos Space application, running on a JA1500 appliance or a Junos Space Virtual Appliance, is a comprehensive platform for building and deploying applications for collaboration, productivity, and network infrastructure and operations management. Junos Space provides a runtime environment implemented as a fabric of virtual and physical appliances.

The following subsections describe Junos Space support for network management”

- [Overview of Junos Space Network Management on page 11](#)
- [Preparing the Device for Junos Space Management on page 12](#)

Overview of Junos Space Network Management

The Junos Space Network Management Platform software comprises various applications for network management and configuration, including:

- Junos Space Administration—Provides management of Junos Space fabric, databases, licenses, applications, authentication servers, tags, permission labels, DMI schemas, and troubleshooting.
- Network Director—Provides unified management of supported Juniper Networks devices in your network. By providing full network life cycle management, Network Director simplifies the discovery, configuration, visualization, monitoring, and administration of large networks.
- Service Automation—Provides an end-to-end solution designed to streamline operations and enable proactive network management for Junos OS devices. The solution consists of Advanced Insight Scripts (AI-Scripts), Junos Space Service Now and Service Insight applications, and Juniper Support Systems (JSS).



NOTE: Do not install Junos Space and AI-Scripts on the control plane network EX4200 switches or EX4200 Virtual Chassis in a QFX3000 QFabric system

Before you can use Junos Space Network Director to manage the QFX Series device, you must ensure that the configuration on the device meets the requirements for all managed devices. For example:

- The device configuration has a static management IP address that is reachable from the Junos Space server.
- There is a user with full administrative privileges for Junos Space administration.

- SNMP is enabled (only if you plan on using SNMP as part of the device discovery).
- In Junos Space, set up a default device management interface (DMI) schema for the QFX Series device.

For more information about Network Director requirements, see the *Network Director Quick Start Guide* at:

https://www.juniper.net/documentation/en_US/network-director1.5/information-products/pathway-pages/index.html

For more information about Junos Space, go to:

https://www.juniper.net/documentation/en_US/release-independent/junos-space/index.html

Preparing the Device for Junos Space Management

Before you can use the Juniper Networks Junos Space application to manage the QFX Series device, you must ensure that the configuration on the device meets the following requirements for device discovery in Junos Space:

- The device configuration has a static management IP address that is reachable from the Junos Space server.
- There is a user with full administrative privileges for Junos Space administration.
- SNMP is enabled (only if you plan on using SNMP as part of the device discovery).
- In Junos Space, set up a default device management interface (DMI) schema for the QFX Series device.



NOTE: Do not install Junos Space and AI-Scripts (AIS) on the control plane network EX4200 switches or EX4200 Virtual Chassis in a QFX3000 QFabric system

To prepare the device before using Junos Space:

1. Perform the initial configuration of the device through the console port using the Junos OS CLI. This task includes the configuration of a static management IP address and a user with root administrative privileges.

For the QFX3500 switch, see *Configuring a QFX3500 Device as a Standalone Switch*.

For the QFabric system, see *QFabric System Initial and Default Configuration Information* and *Performing the QFabric System Initial Setup on a QFX3100 Director Group*.

2. (Optional) Configure SNMP if you plan on using SNMP to probe devices during device discovery.

See “[Configuring SNMP](#)” on page 192.

3. (Optional) Enable SSH if you wish to use the Secure Console feature in Junos Space.

See *Configuring SSH Service for Remote Access to the Router or Switch*.

4. In Junos Space, set up a default DMI schema. For more information about managing DMI schemas, see:

https://www.juniper.net/documentation/en_US/junos-space3/platform/information/products/pathway/pages/junos-space-initialization-pw.pdf

**Related
Documentation**

- *Configuring a QFX3500 Device as a Standalone Switch*
- *QFabric System Initial and Default Configuration Information*
- *Performing the QFabric System Initial Setup on a QFX3100 Director Group*

**Related
Documentation**

- [Configuring SNMP on page 192](#)
- *Configuring SSH Service for Remote Access to the Router or Switch*

CHAPTER 2

Network Monitoring Overview

- [Monitoring Overview on page 15](#)
- [Diagnostic Tools Overview on page 16](#)

Monitoring Overview

Junos OS supports a suite of J-Web tools and CLI operational mode commands for monitoring the system health and performance of your device. Monitoring tools and commands display the current state of the device. To use the J-Web user interface and CLI operational tools, you must have the appropriate access privileges.

You can use the J-Web Monitor option to monitor a device. J-Web results appear in the browser.

You can also monitor the device with CLI operational mode commands. CLI command output appears on the screen of your console or management device, or you can filter the output to a file. For operational commands that display output, such as the **show** commands, you can redirect the output into a filter or a file. When you display help about these commands, one of the options listed is **|**, called a *pipe*, which allows you to filter the command output.

For example, if you enter the **show configuration** command, the complete device configuration appears on the screen. To limit the display to only those lines of the configuration that contain **address**, enter the **show configuration** command using a pipe into the **match** filter:

```
user@host> show configuration | match address
address-range low 192.168.3.2 high 192.168.3.254;
address-range low 192.168.71.71 high 192.168.71.254;
address 192.168.71.70/21;
address 192.168.2.1/24;
address 127.0.0.1/32;
```

For a complete list of the filters, type a command, followed by the pipe, followed by a question mark (?):

```
user@host> show configuration | ?
```

Possible completions:

compare	Compare configuration changes with prior version
count	Count occurrences
display	Show additional kinds of information
except	Show only text that does not match a pattern
find	Search for first occurrence of pattern
hold	Hold text without exiting the prompt
last	Display end of output only
match	Show only text that matches a pattern
no-more	Don't paginate output
request	Make system-level requests
resolve	Resolve IP addresses
save	Save output text to file
trim	Trim specified number of columns from start of line

You can specify complex expressions as an option for the **match** and **except** filters.



NOTE: To filter the output of configuration mode commands, use the filter commands provided for the operational mode commands. In configuration mode, an additional filter is supported.

- Related Documentation**
- [Monitoring Interfaces on page 680](#)
 - [Diagnostic Tools Overview on page 16](#)

Diagnostic Tools Overview

Juniper Networks devices support a suite of J-Web tools and CLI operational mode commands for evaluating system health and performance. Diagnostic tools and commands test the connectivity and reachability of hosts in the network.

- Use the J-Web Diagnose options to diagnose a device. J-Web results appear in the browser.
- Use CLI operational mode commands to diagnose a device. CLI command output appears on the screen of your console or management device, or you can filter the output to a file.

To use the J-Web user interface and CLI operational tools, you must have the appropriate access privileges.

This section contains the following topics:

- [J-Web Diagnostic Tools on page 17](#)
- [CLI Diagnostic Commands on page 17](#)

J-Web Diagnostic Tools

The J-Web diagnostic tools consist of the options that appear when you select **Troubleshoot** and **Maintain** in the task bar. [Table 5 on page 17](#) describes the functions of the Troubleshoot options.

Table 5: J-Web Interface Troubleshoot Options

Option	Function
Troubleshoot Options	
Ping Host	Allows you to ping a remote host. You can configure advanced options for the ping operation.
Ping MPLS	Allows you to ping an MPLS endpoint using various options.
Traceroute	Allows you to trace a route between the device and a remote host. You can configure advanced options for the traceroute operation.
Packet Capture	Allows you to capture and analyze router control traffic.
Maintain Options	
Files	Allows you to manage log, temporary, and core files on the device.
Upgrade	Allows you to upgrade and manage Junos OS packages.
Licenses	Displays a summary of the licenses needed and used for each feature that requires a license. Allows you to add licenses.
Reboot	Allows you to reboot the device at a specified time.

CLI Diagnostic Commands

The CLI commands available in operational mode allow you to perform the same monitoring, troubleshooting, and management tasks you can perform with the J-Web user interface. Instead of invoking the tools through a graphical interface, you use operational mode commands to perform the tasks.

You can perform certain tasks only through the CLI. For example, you can use the **mtrace** command to display trace information about a multicast path from a source to a receiver, which is a feature available only through the CLI.

To view a list of top-level operational mode commands, type a question mark (?) at the command-line prompt.

At the top level of operational mode are the broad groups of CLI diagnostic commands listed in [Table 6 on page 18](#).

Table 6: CLI Diagnostic Command Summary

Command	Function
Controlling the CLI Environment	
set option	Configures the CLI display.
Diagnosis and Troubleshooting	
clear	Clears statistics and protocol database information.
mtrace	Traces information about multicast paths from source to receiver.
monitor	Performs real-time debugging of various Junos OS components, including the routing protocols and interfaces.
ping	Determines the reachability of a remote network host.
ping mpls	Determines the reachability of an MPLS endpoint using various options.
test	Tests the configuration and application of policy filters and AS path regular expressions.
traceroute	Traces the route to a remote network host.
Connecting to Other Network Systems	
ssh	Opens secure shell connections.
telnet	Opens Telnet sessions to other hosts on the network.
Management	
copy	Copies files from one location on the device to another, from the device to a remote system, or from a remote system to the device.
restart option	Restarts the various system processes, including the routing protocol, interface, and SNMP processes.
request	Performs system-level operations, including stopping and rebooting the device and loading Junos OS images.
start	Exits the CLI and starts a UNIX shell.
configuration	Enters configuration mode.
quit	Exits the CLI and returns to the UNIX shell.

- Related Documentation**
- [MPLS Connection Checking Overview on page 1205](#)
 - [Understanding Ping MPLS on page 1207](#)
 - [Using the J-Web Ping Host Tool](#)

- [Using the ping Command on page 1208](#)

PART 2

Operation, Administration, and Management Features

- [Ethernet OAM Link Fault Management on page 23](#)
- [Ethernet OAM Connectivity Fault Management on page 51](#)

CHAPTER 3

Ethernet OAM Link Fault Management

- [Understanding Ethernet OAM Link Fault Management on page 23](#)
- [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
- [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
- [Enabling IEEE 802.3ah OAM Support on page 27](#)
- [Configuring the OAM PDU Interval on page 28](#)
- [Configuring the OAM PDU Threshold on page 29](#)
- [Configuring an OAM Action Profile on page 30](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Monitoring Protocol Status on page 35](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Configuring Link Discovery on page 37](#)
- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Detecting Remote Faults on page 40](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)
- [Example: Configuring Ethernet OAM Connectivity Fault Management on EX Series Switches on page 44](#)
- [Configuring Ethernet OAM Link Fault Management on page 48](#)

Understanding Ethernet OAM Link Fault Management

Juniper Networks Junos operating system (Junos OS) for Juniper Networks allows the Ethernet interfaces on these switches to support the IEEE 802.3ah standard for the Operation, Administration, and Maintenance (OAM) of Ethernet in access networks. The standard defines OAM link fault management (LFM). You can configure IEEE 802.3ah OAM LFM on point-to-point Ethernet links that are connected either directly or through

Ethernet repeaters. The IEEE 802.3ah standard meets the requirement for OAM capabilities even as Ethernet moves from being solely an enterprise technology to a WAN and access technology, and the standard remains backward-compatible with existing Ethernet technology.

Ethernet OAM provides the tools that network management software and network managers can use to determine how a network of Ethernet links is functioning. Ethernet OAM should:

- Rely only on the media access control (MAC) address or virtual LAN identifier for troubleshooting.
- Work independently of the actual Ethernet transport and function over physical Ethernet ports or a virtual service such as pseudowire.
- Isolate faults over a flat (or single operator) network architecture or nested or hierarchical (or multiprovider) networks.

The following OAM LFM features are supported:

- Discovery and Link Monitoring

The discovery process is triggered automatically when OAM is enabled on the interface. The discovery process permits Ethernet interfaces to discover and monitor the peer on the link if it also supports the IEEE 802.3ah standard. You can specify the discovery mode used for IEEE 802.3ah OAM support. In active mode, the interface discovers and monitors the peer on the link if the peer also supports IEEE 802.3ah OAM functionality. In passive mode, the peer initiates the discovery process. After the discovery process has been initiated, both sides participate in discovery. The switch performs link monitoring by sending periodic OAM protocol data units (PDUs) to advertise OAM mode, configuration, and capabilities.

You can specify the number of OAM PDUs that an interface can miss before the link between peers is considered down.

- Remote Fault Detection

Remote fault detection uses flags and events. Flags are used to convey the following: Link Fault means a loss of signal, Dying Gasp means an unrecoverable condition such as a power failure, and Critical Event means an unspecified vendor-specific critical event. You can specify the periodic OAM PDU sending interval for fault detection. The switch uses the Event Notification OAM PDU to notify the remote OAM device when a problem is detected. You can specify the action to be taken by the system when the configured link-fault event occurs.

- Remote Loopback Mode

Remote loopback mode ensures link quality between the switch and a remote peer during installation or troubleshooting. In this mode, when the interface receives a frame that is not an OAM PDU or a pause frame, it sends it back on the same interface on which it was received. The link appears to be in the active state. You can use the returned loopback acknowledgement to test delay, jitter, and throughput.

Junos OS can place a remote DTE into loopback mode (if remote loopback mode is supported by the remote DTE). When you place a remote DTE into loopback mode,

the interface receives the remote loopback request and puts the interface into remote loopback mode. When the interface is in remote loopback mode, all frames except OAM PDUs are looped back without any changes made to the frames. OAM PDUs continue to be sent and processed.

IEEE 802.3ah OAM Link-Fault Management Overview

Ethernet interfaces capable of running at 100 Mbps or faster on EX Series switches, PTX Series, MX Series, M Series (except M5 and M10 routers), and T Series routers support the IEEE 802.3ah standard for Operation, Administration, and Management (OAM). You can configure IEEE 802.3ah OAM on Ethernet point-to-point direct links or links across Ethernet repeaters. The IEEE 802.3ah standard meets the requirement for OAM capabilities as Ethernet moves from being solely an enterprise technology to being a WAN and access technology, as well as being backward-compatible with existing Ethernet technology. Junos OS supports IEEE 802.3ah link-fault management.

The features of link-fault management are:

- Discovery
- Link monitoring
- Remote fault detection
- Remote loopback

Starting in Junos OS Release 17.3R1, the Ethernet link fault management daemon (lfmd) runs on the backup Routing Engine as well when graceful Routing Engine switchover (GRES) is configured.

The following features are not supported:

- Ethernet running on top of a Layer 2 protocol, such as Ethernet over ATM, is not supported in OAM configurations.
- Remote loopback is not supported on the 10-Gigabit Ethernet LAN/WAN PIC with SFP+.
- The remote loopback feature mentioned in section 57.2.11 of IEEE 802.3ah is not supported on T4000 routers.



NOTE: Aggregated Ethernet member links will now use the physical MAC address as the source MAC address in 802.3ah OAM packets.

Release History Table

Release	Description
17.3R1	Starting in Junos OS Release 17.3R1, the Ethernet link fault management daemon (lfmd) runs on the backup Routing Engine as well when graceful Routing Engine switchover (GRES) is configured.

Related Documentation

- [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
- [Enabling IEEE 802.3ah OAM Support on page 27](#)
- [Configuring Link Discovery on page 37](#)
- [Configuring the OAM PDU Interval on page 28](#)
- [Configuring the OAM PDU Threshold on page 29](#)
- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Detecting Remote Faults on page 40](#)
- [Configuring an OAM Action Profile on page 30](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Monitoring Protocol Status on page 35](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Enabling Nonstop Routing for Ethernet Link Fault Management on Backup Routers](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Configuring IEEE 802.3ah OAM Link-Fault Management

You can configure threshold values for fault events that trigger the sending of link event TLVs when the values exceed the threshold. To set threshold values for fault events on an interface, include the **event-thresholds** statement at the **[edit protocols oam ethernet link-fault-management interface]** hierarchy level.

You can also configure OAM threshold values within an action profile and apply the action profile to multiple interfaces. To create an action profile, include the **action-profile** statement at the **[edit protocols oam ethernet link-fault-management]** hierarchy level.

You can configure Ethernet OAM either on an aggregate interface or on each of its member links. However, we recommend that you configure Ethernet OAM on the aggregate interface, and this will internally enable Ethernet OAM on the member links.

To view OAM statistics, use the **show oam ethernet link-fault-management** operational mode command. To clear OAM statistics, use the **clear oam ethernet link-fault-management statistics** operational mode command. To clear link-fault management state information and restart the link discovery process on Ethernet interfaces, use the **clear oam ethernet link-fault-management state** operational mode command. For more information about these commands, see the [CLI Explorer](#).

**Related
Documentation**

- [event-thresholds on page 1320](#)
- [action-profile](#)
- [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
- [Enabling IEEE 802.3ah OAM Support on page 27](#)
- [Configuring Link Discovery on page 37](#)
- [Configuring the OAM PDU Interval on page 28](#)
- [Configuring the OAM PDU Threshold on page 29](#)
- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Detecting Remote Faults on page 40](#)
- [Configuring an OAM Action Profile on page 30](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Monitoring Protocol Status on page 35](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Enabling IEEE 802.3ah OAM Support

To enable IEEE 802.3ah OAM support, include the **interface** statement at the **[edit protocols oam ethernet link-fault-management]** hierarchy level:

```
[edit protocols oam ethernet link-fault-management interface interface-name]
```

When you enable IEEE 802.3ah OAM on a physical interface, the discovery process is automatically triggered.

**Related
Documentation**

- [link-fault-management](#)
- [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)

- [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
- [Configuring Link Discovery on page 37](#)
- [Configuring the OAM PDU Interval on page 28](#)
- [Configuring the OAM PDU Threshold on page 29](#)
- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Detecting Remote Faults on page 40](#)
- [Configuring an OAM Action Profile on page 30](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Monitoring Protocol Status on page 35](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Configuring the OAM PDU Interval

Periodic OAM PDUs are sent to perform link monitoring.

You can specify the periodic OAM PDU sending interval for fault detection.

To configure the sending interval, include the **pdu-interval** statement at the **[edit protocol oam ethernet link-fault-management interface *interface-name*]** hierarchy level:

```
[edit protocol oam ethernet link-fault-management interface interface-name]  
pdu-interval interval;
```

The periodic OAM PDU interval range is from 100 through 1000 milliseconds. The default sending interval is 1000 milliseconds.

Related Documentation

- [pdu-interval on page 1342](#)
- [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
- [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
- [Enabling IEEE 802.3ah OAM Support on page 27](#)
- [Configuring Link Discovery on page 37](#)
- [Configuring the OAM PDU Threshold on page 29](#)

- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Detecting Remote Faults on page 40](#)
- [Configuring an OAM Action Profile on page 30](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Monitoring Protocol Status on page 35](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Configuring the OAM PDU Threshold

You can specify the number of OAM PDUs that an interface can miss before the link between peers is considered down.

To configure the number of PDUs that can be missed from the peer, include the **pdu-threshold** statement at the **[edit protocol oam ethernet link-fault-management interface *interface-name*]** hierarchy level:

```
[edit protocol oam ethernet link-fault-management interface interface-name]  
pdu-threshold threshold-value;
```

The threshold value range is from 3 through 10. The default is three PDUs.

Related Documentation

- [pdu-threshold on page 1343](#)
- [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
- [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
- [Enabling IEEE 802.3ah OAM Support on page 27](#)
- [Configuring Link Discovery on page 37](#)
- [Configuring the OAM PDU Interval on page 28](#)
- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Detecting Remote Faults on page 40](#)
- [Configuring an OAM Action Profile on page 30](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)

- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Monitoring Protocol Status on page 35](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Configuring an OAM Action Profile

You can create an action profile to define event fault flags and thresholds and the action to be taken. You can then apply the action profile to one or more interfaces.

To configure an action profile, include the **action-profile** statement at the **[edit protocols oam ethernet link-fault-management]** hierarchy level:

```
action-profile profile-name {
  action {
    syslog;
    link-down;
    send-critical-event;
  }
  event {
    link-adjacency-loss;
    link-event-rate {
      frame-error count;
      frame-period count;
      frame-period-summary count;
      symbol-period count;
    }
    protocol-down;
  }
}
```



NOTE: Starting from Junos OS Release 14.2, whenever link-fault management (LFM) with an action profile is configured to mark the interface as down (by including the link-down statement at the [edit protocols oam ethernet link-fault-management] hierarchy level), the port is placed in the blocked state (STP state). In such a state of the interface, data traffic is not transmitted out on that interface. Because the connectivity-fault management (CFM) downstream maintenance MEPs come up on blocked ports, the CFM sessions come up properly. However, the interface is down and the interface status TLV does not contain the correct status. Only if you configure the port status TLV, the actual status of the port is reflected. The interface status TLV does not carry the actual state of the port.

Release History Table

Release	Description
14.2	Starting from Junos OS Release 14.2

Related Documentation

- [action-profile on page 1301](#)
- [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
- [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
- [Enabling IEEE 802.3ah OAM Support on page 27](#)
- [Configuring Link Discovery on page 37](#)
- [Configuring the OAM PDU Interval on page 28](#)
- [Configuring the OAM PDU Threshold on page 29](#)
- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Detecting Remote Faults on page 40](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Monitoring Protocol Status on page 35](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Configuring Threshold Values for Fault Events in an Action Profile

You can configure link event thresholds for received error events that trigger the action specified in the **action** statement. You can then apply the action profile to one or more interfaces.

To configure link event thresholds, include the **link-event-rate** statement at the **[edit protocols oam ethernet link-fault-management action-profile *profile-name* event]** hierarchy level:

```
link-event-rate {
  frame-error count;
  frame-period count;
  frame-period-summary count;
  symbol-period count;
}
```

- Related Documentation**
- [link-event-rate](#)
 - [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
 - [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
 - [Enabling IEEE 802.3ah OAM Support on page 27](#)
 - [Configuring Link Discovery on page 37](#)
 - [Configuring the OAM PDU Interval on page 28](#)
 - [Configuring the OAM PDU Threshold on page 29](#)
 - [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
 - [Disabling the Sending of Link Event TLVs on page 39](#)
 - [Detecting Remote Faults on page 40](#)
 - [Configuring an OAM Action Profile on page 30](#)
 - [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
 - [Monitoring the Loss of Link Adjacency on page 34](#)
 - [Monitoring Protocol Status on page 35](#)
 - [Applying an Action Profile on page 32](#)
 - [Setting a Remote Interface into Loopback Mode on page 33](#)
 - [Enabling Remote Loopback Support on the Local Interface on page 36](#)
 - [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Applying an Action Profile

You can apply an action profile to one or more interfaces.

To apply an action profile to an interface, include the **apply-action-profile** statement at the **[edit protocols oam ethernet link-fault-management action-profile interface *interface-name*] hierarchy level**:

```
[edit protocol oam ethernet link-fault-management interface interface-name]  
  apply-action-profile profile-name;
```

- Related Documentation**
- [apply-action-profile on page 1303](#)
 - [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
 - [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
 - [Enabling IEEE 802.3ah OAM Support on page 27](#)
 - [Configuring Link Discovery on page 37](#)
 - [Configuring the OAM PDU Interval on page 28](#)

- [Configuring the OAM PDU Threshold on page 29](#)
- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Detecting Remote Faults on page 40](#)
- [Configuring an OAM Action Profile on page 30](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Monitoring Protocol Status on page 35](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Setting a Remote Interface into Loopback Mode

You can configure the software to set the remote DTE into loopback mode on the following interfaces:

- IQ2 and IQ2-E Gigabit Ethernet interfaces
- Ethernet interfaces on the MX Series routers or EX Series switches

Junos OS can place a remote DTE into loopback mode (if remote-loopback mode is supported by the remote DTE). When you place a remote DTE into loopback mode, the interface receives the remote-loopback request and puts the interface into remote-loopback mode. When the interface is in remote-loopback mode, all frames except OAM PDUs are looped back without any changes made to the frames. OAM PDUs continue to be sent to the management plane and processed.

To configure remote loopback, include the **remote-loopback** statement at the **[edit protocol oam ethernet link-fault-management interface *interface-name*]** hierarchy level:

```
[edit protocol oam ethernet link-fault-management interface interface-name]  
remote-loopback;
```

To take the remote DTE out of loopback mode, remove the **remote-loopback** statement from the configuration.

Related Documentation

- [remote-loopback](#)
- [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
- [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
- [Enabling IEEE 802.3ah OAM Support on page 27](#)

- [Configuring Link Discovery on page 37](#)
- [Configuring the OAM PDU Interval on page 28](#)
- [Configuring the OAM PDU Threshold on page 29](#)
- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Detecting Remote Faults on page 40](#)
- [Configuring an OAM Action Profile on page 30](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Monitoring Protocol Status on page 35](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Monitoring the Loss of Link Adjacency

You can specify actions be taken when link adjacency is lost. When link adjacency is lost, the system takes the action defined in the **action** statement of the action profile.

To configure the system to take action when link adjacency is lost, include the **link-adjacency-loss** statement at the **[edit protocols oam ethernet link-fault-management action-profile *profile-name* event]** hierarchy level:

```
[edit protocol oam ethernet link-fault-management action-profile profile-name]  
link-adjacency-loss;
```

Related Documentation

- [link-adjacency-loss](#)
- [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
- [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
- [Enabling IEEE 802.3ah OAM Support on page 27](#)
- [Configuring Link Discovery on page 37](#)
- [Configuring the OAM PDU Interval on page 28](#)
- [Configuring the OAM PDU Threshold on page 29](#)
- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Detecting Remote Faults on page 40](#)

- [Configuring an OAM Action Profile on page 30](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
- [Monitoring Protocol Status on page 35](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Monitoring Protocol Status

The CCC-DOWN flag is associated with a circuit cross-connect (CCC) connection, Layer 2 circuit, and Layer 2 VPN, which send the CCC-DOWN status to the kernel. The CCC-DOWN flag indicates that the CCC is down. The CCC-DOWN status is sent to the kernel when the CCC connection, Layer 2 circuit, or Layer 2 VPN is down. This in turn, brings down the CE-facing PE interface associated with the CCC connection, Layer 2 circuit, or Layer 2 VPN.

When the CCC-DOWN flag is signaled to the IEEE 802.3ah protocol, the system takes the action defined in the **action** statement of the action profile. For additional information about Layer 2 circuits, see the Junos OS Layer 2 Circuits Feature Guide, Junos OS VPNs Configuration Guide.

To monitor the IEEE 802.3ah protocol, on the CE-facing PE interface, include the **protocol-down** statement at the **[edit protocols oam ethernet link-fault-management action-profile *profile-name* event]** hierarchy level:

1. In configuration mode, go to the **[edit protocols oam ethernet link-fault-management action-profile *profile-name* event]** hierarchy level.

```
[edit]
user@host# edit protocols oam ethernet link-fault-management action-profile
profile-name event
```

2. Include the **protocol-down** statement.

```
[edit protocols oam ethernet link-fault-management action-profile profile-name event]
user@host# set protocol-down
```



NOTE: If multiple events are specified in the action profile, all the events must occur before the specified action is taken.

**Related
Documentation**

- [protocol-down on page 1345](#)
- [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
- [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
- [Enabling IEEE 802.3ah OAM Support on page 27](#)
- [Configuring Link Discovery on page 37](#)
- [Configuring the OAM PDU Interval on page 28](#)
- [Configuring the OAM PDU Threshold on page 29](#)
- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Detecting Remote Faults on page 40](#)
- [Configuring an OAM Action Profile on page 30](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Enabling Remote Loopback Support on the Local Interface

You can allow a remote DTE to set a local interface into remote loopback mode on IQ2 and IQ2-E Gigabit Ethernet interfaces and all Ethernet interfaces on the MX Series routers and EX Series switches. When a remote-loopback request is sent by a remote DTE, the Junos OS places the local interface into loopback mode. When an interface is in loopback mode, all frames except OAM PDUs are looped back without any changes to the frames. OAM PDUs continue to be sent to the management plane and processed. By default, the remote loopback feature is not enabled.

To enable remote loopback, include the **allow-remote-loopback** statement at the **[edit protocol oam ethernet link-fault-management interface *interface-name* negotiation-options]** hierarchy level:

```
[edit protocol oam ethernet link-fault-management interface interface-name
 negotiation-options]
allow-remote-loopback;
```



NOTE: Activation of OAM remote loopback may result in data frame loss.

- Related Documentation**
- [allow-remote-loopback](#)
 - [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
 - [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
 - [Enabling IEEE 802.3ah OAM Support on page 27](#)
 - [Configuring Link Discovery on page 37](#)
 - [Configuring the OAM PDU Interval on page 28](#)
 - [Configuring the OAM PDU Threshold on page 29](#)
 - [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
 - [Disabling the Sending of Link Event TLVs on page 39](#)
 - [Detecting Remote Faults on page 40](#)
 - [Configuring an OAM Action Profile on page 30](#)
 - [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
 - [Monitoring the Loss of Link Adjacency on page 34](#)
 - [Monitoring Protocol Status on page 35](#)
 - [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
 - [Applying an Action Profile on page 32](#)
 - [Setting a Remote Interface into Loopback Mode on page 33](#)
 - [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Configuring Link Discovery

When the IEEE 802.3ah OAM protocol is enabled on a physical interface, the discovery process is automatically triggered. The discovery process permits Ethernet interfaces to discover and monitor the peer on the link if it also supports the IEEE 802.3ah standard.

You can specify the discovery mode used for IEEE 802.3ah OAM support. The discovery process is triggered automatically when OAM IEEE 802.3ah functionality is enabled on a port. Link monitoring is done when the interface sends periodic OAM PDUs.

To configure the discovery mode, include the **link-discovery** statement at the **[edit protocol oam ethernet link-fault-management interface *interface-name*]** hierarchy level:

```
[edit protocol oam ethernet link-fault-management interface interface-name]  
link-discovery (active | passive);
```

In active mode, the interface discovers and monitors the peer on the link if the peer also supports IEEE 802.3ah OAM functionality. In passive mode, the peer initiates the discovery process. After the discovery process has been initiated, both sides participate in discovery.

- Related Documentation**
- [link-discovery](#)
 - [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
 - [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
 - [Enabling IEEE 802.3ah OAM Support on page 27](#)
 - [Configuring the OAM PDU Interval on page 28](#)
 - [Configuring the OAM PDU Threshold on page 29](#)
 - [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
 - [Disabling the Sending of Link Event TLVs on page 39](#)
 - [Detecting Remote Faults on page 40](#)
 - [Configuring an OAM Action Profile on page 30](#)
 - [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
 - [Monitoring the Loss of Link Adjacency on page 34](#)
 - [Monitoring Protocol Status on page 35](#)
 - [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
 - [Applying an Action Profile on page 32](#)
 - [Setting a Remote Interface into Loopback Mode on page 33](#)
 - [Enabling Remote Loopback Support on the Local Interface on page 36](#)
 - [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Configuring Threshold Values for Local Fault Events on an Interface

You can configure threshold values on an interface for the local errors that trigger the sending of link event TLVs.

To set the error threshold values for sending event TLVs, include the **frame-error**, **frame-period**, **frame-period-summary**, and **symbol-period** statements at the **[edit protocols oam ethernet link-fault-management interface *interface-name* event-thresholds]** hierarchy level:

```
[edit protocol oam ethernet link-fault-management interface interface-name]  
event-thresholds {  
    frame-error count;  
    frame-period count;  
    frame-period-summary count;  
    symbol-period count;  
}
```

- Related Documentation**
- [event-thresholds on page 1320](#)
 - [frame-error](#)

- [frame-period on page 1324](#)
- [frame-period-summary on page 1326](#)
- [symbol-period](#)
- [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
- [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
- [Enabling IEEE 802.3ah OAM Support on page 27](#)
- [Configuring Link Discovery on page 37](#)
- [Configuring the OAM PDU Interval on page 28](#)
- [Configuring the OAM PDU Threshold on page 29](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Detecting Remote Faults on page 40](#)
- [Configuring an OAM Action Profile on page 30](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Monitoring Protocol Status on page 35](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Disabling the Sending of Link Event TLVs

You can disable the sending of link event TLVs.

To disable the monitoring and sending of PDUs containing link event TLVs in periodic PDUs, include the **no-allow-link-events** statement at the **[edit protocols oam ethernet link-fault-management interface *interface-name* negotiation-options]** hierarchy level:

```
[edit protocol oam ethernet link-fault-management interface interface-name
 negotiation-options]
no-allow-link-events;
```

Related Documentation

- [no-allow-link-events](#)
- [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
- [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
- [Enabling IEEE 802.3ah OAM Support on page 27](#)

- [Configuring Link Discovery on page 37](#)
- [Configuring the OAM PDU Interval on page 28](#)
- [Configuring the OAM PDU Threshold on page 29](#)
- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Detecting Remote Faults on page 40](#)
- [Configuring an OAM Action Profile on page 30](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Monitoring Protocol Status on page 35](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Detecting Remote Faults

Fault detection is either based on flags or fault event type, length, and values (TLVs) received in OAM protocol data units (PDUs). Flags that trigger a link fault are:

- Critical Event
- Dying Gasp
- Link Fault

The link event TLVs are sent by the remote DTE by means of event notification PDUs. Link event TLVs are:

- Errored Symbol Period Event
- Errored Frame Event
- Errored Frame Period Event
- Errored Frame Seconds Summary Event

Related Documentation

- [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
- [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
- [Enabling IEEE 802.3ah OAM Support on page 27](#)
- [Configuring Link Discovery on page 37](#)
- [Configuring the OAM PDU Interval on page 28](#)

- [Configuring the OAM PDU Threshold on page 29](#)
- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Configuring an OAM Action Profile on page 30](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Monitoring Protocol Status on page 35](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Specifying the Actions to Be Taken for Link-Fault Management Events

You can specify the action to be taken by the system when the configured link-fault event occurs. Multiple action profiles can be applied to a single interface. For each action-profile, at least one event and one action must be specified. The actions are taken only when all of the events in the action profile are true. If more than one action is specified, all the actions are executed.

You might want to set a lower threshold for a specific action such as logging the error and set a higher threshold for another action such as sending a critical event TLV.

To specify the action, include the **action** statement at the **[edit protocols oam ethernet link-fault-management action-profile *profile-name*]** hierarchy level:

```
[edit protocol oam ethernet link-fault-management action-profile profile-name]
event {
    link-adjacency-loss;
    protocol-down;
}
action {
    syslog;
    link-down;
    send-critical-event;
}
```

To create a system log entry when the link-fault event occurs, include the **syslog** statement.

To administratively disable the link when the link-fault event occurs, include the **link-down** statement.

To send IEEE 802.3ah link event TLVs in the OAM PDU when a link-fault event occurs, include the **send-critical-event** statement.



NOTE: If multiple actions are specified in the action profile, all of the actions are executed in no particular order.

**Related
Documentation**

- [action on page 1299](#)
- [syslog on page 1350](#)
- [link-down](#)
- [send-critical-event on page 1347](#)
- [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
- [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
- [Enabling IEEE 802.3ah OAM Support on page 27](#)
- [Configuring Link Discovery on page 37](#)
- [Configuring the OAM PDU Interval on page 28](#)
- [Configuring the OAM PDU Threshold on page 29](#)
- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Detecting Remote Faults on page 40](#)
- [Configuring an OAM Action Profile on page 30](#)
- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Monitoring Protocol Status on page 35](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)
- [Example: Configuring IEEE 802.3ah OAM Support on an Interface on page 42](#)

Example: Configuring IEEE 802.3ah OAM Support on an Interface

Configure 802.3ah OAM support on a 10-Gigabit Ethernet interface:

```
[edit]
protocols {
  oam {
    ethernet {
      link-fault-management {
```



```

interface xe-0/0/0 {
  link-discovery active;
  pdu-interval 800;
  pdu-threshold 4;
  remote-loopback;
  negotiation-options {
    allow-remote-loopback;
  }
  event-thresholds {
    frame-error 30;
    frame-period 50;
    frame-period summary 40;
    symbol-period 20;
  }
}
}
}
}
}
}

```

Related Documentation

- [link-fault-management](#)
- [IEEE 802.3ah OAM Link-Fault Management Overview on page 25](#)
- [Configuring IEEE 802.3ah OAM Link-Fault Management on page 26](#)
- [Enabling IEEE 802.3ah OAM Support on page 27](#)
- [Configuring Link Discovery on page 37](#)
- [Configuring the OAM PDU Interval on page 28](#)
- [Configuring the OAM PDU Threshold on page 29](#)
- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)
- [Disabling the Sending of Link Event TLVs on page 39](#)
- [Detecting Remote Faults on page 40](#)
- [Configuring an OAM Action Profile on page 30](#)
- [Specifying the Actions to Be Taken for Link-Fault Management Events on page 41](#)
- [Monitoring the Loss of Link Adjacency on page 34](#)
- [Monitoring Protocol Status on page 35](#)
- [Configuring Threshold Values for Fault Events in an Action Profile on page 31](#)
- [Applying an Action Profile on page 32](#)
- [Setting a Remote Interface into Loopback Mode on page 33](#)
- [Enabling Remote Loopback Support on the Local Interface on page 36](#)

Example: Configuring Ethernet OAM Connectivity Fault Management on EX Series Switches

Ethernet interfaces on EX Series switches and Junos OS for EX Series switches support the IEEE 802.1ag standard for Operation, Administration, and Management (OAM). The IEEE 802.1ag specification provides for Ethernet connectivity fault management (CFM).

This example describes how to enable and configure OAM CFM on a Gigabit Ethernet interface:

- [Requirements on page 44](#)
- [Overview and Topology on page 44](#)
- [Configuring Ethernet OAM Connectivity Fault Management on Switch 1 on page 44](#)
- [Configuring Ethernet OAM Connectivity Fault Management on Switch 2 on page 45](#)
- [Verification on page 47](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 10.2 or later for EX Series switches
- Two EX Series switches connected by a point-to-point Gigabit Ethernet link

Overview and Topology

CFM can be used to monitor the physical link between two switches. In the following example, two switches are connected by a point-to-point Gigabit Ethernet link. The link between these two switches is monitored using CFM.

Configuring Ethernet OAM Connectivity Fault Management on Switch 1

CLI Quick Configuration To quickly configure Ethernet OAM CFM, copy the following commands and paste them into the switch terminal window:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain]
set name-format character-string
set maintenance-domain private level 0
set maintenance-association private-ma
set continuity-check hold-interval 1s
```

Step-by-Step Procedure To enable and configure OAM CFM on switch 1:

1. Specify the maintenance domain name format:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain]
user@switch1# set name-format character-string
```

2. Specify the maintenance domain name and the maintenance domain level:

```
[edit protocols oam ethernet connectivity-fault-management]
```

```
user@switch1# set maintenance-domain private level 0
```

3. Create a maintenance association:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain private]
```

```
user@switch1# set maintenance-association private-ma
```

4. Enable the continuity check protocol and specify the continuity check hold interval:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain private maintenance-association private-ma]
```

```
user@switch1# set continuity-check hold-interval 1s
```

5. Configure the maintenance association end point (MEP):

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain private maintenance-association private-ma]
```

```
user@switch1# set mep 100 interface ge-1/0/1 auto-discovery direction down
```

Results

Check the results of the configuration.

```
[edit]
```

```
user@switch1 > show
```

```
protocols {
  oam {
    ethernet {
      connectivity-fault-management {
        maintenance-domain private {
          level 0;
          maintenance-association private-ma {
            continuity-check {
              interval 1s;
            }
            mep 100 {
              interface ge-1/0/1;
              auto-discovery;
              direction down;
            }
          }
        }
      }
    }
  }
}
```

Configuring Ethernet OAM Connectivity Fault Management on Switch 2

CLI Quick Configuration

To quickly configure Ethernet OAM CFM, copy the following commands and paste them into the switch terminal window:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain]
```

```
set name-format character-string
set maintenance-domain private level 0
set maintenance-association private-ma
set continuity-check hold-interval 1s
```

Step-by-Step Procedure

The configuration on switch 2 mirrors that on switch 2.

1. Specify the maintenance domain name format:

```
[edit protocols oam ethernet connectivity-fault-management]
user@switch2# set name-format character-string
```

2. Specify the maintenance domain name and the maintenance domain level:

```
[edit protocols oam ethernet connectivity-fault-management]
user@switch2# set maintenance-domain private level 0
```

3. Create a maintenance association:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
private]
user@switch2# set maintenance-association private-ma
```

4. Enable the continuity check protocol and specify the continuity check hold interval:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
private maintenance-association private-ma]
user@switch2# set continuity-check hold-interval 1s
```

5. Configure the maintenance association end point (MEP)

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
private maintenance-association private-ma]
user@switch2# set mep 200 interface ge-0/2/5 auto-discovery direction down
```

Results

Check the results of the configuration.

```
[edit]
user@switch2 > show
```

```
protocols {
  oam {
    ethernet {
      connectivity-fault-management {
        maintenance-domain private {
          level 0;
          maintenance-association private-ma {
            continuity-check {
              interval 1s;
            }
            mep 200 {
```

```

        interface ge-0/2/5;
        auto-discovery;
        direction down;
    }
}
}
}
}

```

Verification

To confirm that the configuration is working properly, perform these tasks:

- [Verifying That OAM CFM Has Been Configured Properly on page 47](#)

Verifying That OAM CFM Has Been Configured Properly

Purpose Verify that OAM CFM has been configured properly.

Action Use the `show oam ethernet connectivity-fault-management interfaces detail` command:

```
user@switch1# show oam ethernet connectivity-fault-management interfaces detail
```

Sample Output

```

Interface name: ge-1/0/1.0, Interface status: Active, Link status: Up
Maintenance domain name: private, Format: string, Level: 0
Maintenance association name: private-ma, Format: string
Continuity-check status: enabled, Interval: 1ms, Loss-threshold: 3 frames
MEP identifier: 100, Direction: down, MAC address: 00:90:69:0b:4b:94
MEP status: running
Defects:
  Remote MEP not receiving CCM                : no
  Erroneous CCM received                      : yes
  Cross-connect CCM received                  : no
  RDI sent by some MEP                       : yes
Statistics:
  CCMs sent                                  : 76
  CCMs received out of sequence              : 0
  LBMs sent                                  : 0
  Valid in-order LBRs received               : 0
  Valid out-of-order LBRs received           : 0
  LBRs received with corrupted data          : 0
  LBRs sent                                  : 0
  LTMs sent                                  : 0
  LTMs received                             : 0
  LTRs sent                                  : 0
  LTRs received                             : 0
  Sequence number of next LTM request        : 0
Remote MEP count: 2
Identifier  MAC address      State  Interface
2001       00:90:69:0b:7f:71  ok    ge-0/2/5.0

```

Meaning When the output displays that continuity-check status is **enabled** and displays details of the remote MEP, it means that connectivity fault management (CFM) has been configured properly.

Related Documentation

- [Understanding Ethernet OAM Connectivity Fault Management for Switches on page 51](#)
- [Junos OS Network Interfaces Configuration Guide](#)

Configuring Ethernet OAM Link Fault Management

Ethernet OAM link fault management (LFM) can be used for physical link-level fault detection and management. The IEEE 802.3ah LFM works across point-to-point Ethernet links either directly or through repeaters.

To configure Ethernet OAM LFM using the CLI:

1. Enable IEEE 802.3ah OAM support on an interface:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name
```



NOTE: You can configure Ethernet OAM LFM on aggregated interfaces.



NOTE: The remaining steps are optional. You can choose which of these features to configure for Ethernet OAM LFM on your switch.

2. Specify whether the interface or the peer initiates the discovery process by configuring the link discovery mode to **active** or **passive** (**active** = interface initiates; **passive** = peer initiates):

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name link-discovery active
```

3. Configure a periodic OAM PDU-sending interval (in milliseconds) for fault detection:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface pdu-interval interval
```

4. Specify the number of OAM PDUs that an interface can miss before the link between peers is considered down:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name pdu-threshold threshold-value
```

5. Configure event threshold values on an interface for the local errors that trigger the sending of link event TLVs:

- Set the threshold value (in seconds) for sending frame-error events or taking the action specified in the action profile:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name event-thresholds frame-error count
```

- Set the threshold value (in seconds) for sending frame-period events or taking the action specified in the action profile:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name event-thresholds frame-period count
```

- Set the threshold value (in seconds) for sending frame-period-summary events or taking the action specified in the action profile:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name event-thresholds frame-period-summary count
```

- Set the threshold value (in seconds) for sending symbol-period events or taking the action specified in the action profile:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name event-thresholds symbol-period count
```



NOTE: You can disable the sending of link event TLVs.

To disable the sending of link event TLVs:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name negotiation-options no-allow-link-events
```

6. Create an action profile to define event fault flags and thresholds to be taken when the link fault event occurs. Then apply the action profile to one or more interfaces. (You can also apply multiple action profiles to a single interface.)

- a. Name the action profile:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set action-profile profile-name
```

- b. Specify actions to be taken by the system when the link fault event occurs:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set action-profile profile-name action syslog

user@switch# set action-profile profile-name action link-down
```

- c. Specify events for the action profile:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set action-profile profile-name event link-adjacency-loss
```



NOTE: For each action profile, you must specify at least one link event and one action. The actions are taken only when all of the events in the action profile are true. If more than one action is specified, all actions are executed. You can set a low threshold for a specific action such as logging the error and set a high threshold for another action such as system logging.

7. Set a remote interface into loopback mode so that all frames except OAM PDUs are looped back without any changes made to the frames. Set the remote DTE in loopback mode (the remote DTE must support remote-loopback mode) and then enable remote loopback support for the local interface.

```
[edit protocols oam ethernet link-fault-management]  
user@switch# set interface interface-name remote-loopback
```

```
user@switch# set interface interface-name negotiation-options allow-remote-loopback
```


CHAPTER 4

Ethernet OAM Connectivity Fault Management

- [Understanding Ethernet OAM Connectivity Fault Management for Switches on page 51](#)
- [Example: Configuring Ethernet OAM Connectivity Fault Management on EX Series Switches on page 53](#)
- [Configuring Ethernet OAM Connectivity Fault Management \(CLI Procedure\) on page 57](#)

Understanding Ethernet OAM Connectivity Fault Management for Switches

Ethernet interfaces on Juniper Networks Switches and Juniper Networks Junos operating system (Junos OS) for switches support the IEEE 802.1ag standard for Operation, Administration, and Management (OAM). The IEEE 802.1ag specification provides for Ethernet connectivity fault management (CFM). CFM monitors Ethernet networks that might comprise one or more service instances for network-compromising connectivity faults.

The major features of CFM are:

- Fault monitoring using the continuity check protocol. This is a neighbor discovery and health check protocol that discovers and maintains adjacencies at the VLAN level.
- Path discovery and fault verification using the linktrace protocol.
- Fault isolation using the loopback protocol.

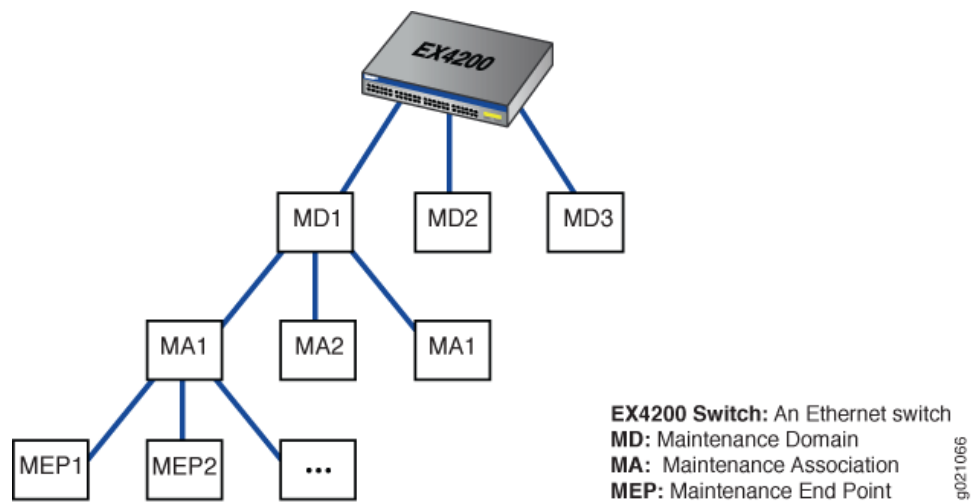
CFM partitions the service network into various administrative domains. For example, operators, providers, and customers might be part of different administrative domains. Each administrative domain is mapped into one maintenance domain providing enough information to perform its own management, thus avoiding security breaches and making end-to-end monitoring possible.

In a CFM maintenance domain, each service instance is called a maintenance association. A maintenance association can be thought of as a full mesh of maintenance association endpoints (MEPs) having similar characteristics. MEPs are active CFM entities generating and responding to CFM protocol messages. There is also a maintenance intermediate point (MIP), which is a CFM entity similar to the MEP, but more passive (MIPs only respond to CFM messages).

Each maintenance domain is associated with a maintenance domain level from 0 through 7. Level allocation is based on the network hierarchy, where outer domains are assigned a higher level than the inner domains. Configure customer end points to have the highest maintenance domain level. The maintenance domain level is a mandatory parameter that indicates the nesting relationships between various maintenance domains. The level is embedded in each CFM frame. CFM messages within a given level are processed by MEPs at that same level.

To enable CFM on an Ethernet interface, you must configure maintenance domains, maintenance associations, and maintenance association end points (MEPs). [Figure 1 on page 52](#) shows the relationships among maintenance domains, maintenance association end points (MEPs), and maintenance intermediate points (MIPs) configured on a switch.

Figure 1: Relationship Among MEPs, MIPs, and Maintenance Domain Levels



CFM Limitations on EX4600 Switches

Starting in Junos OS Release 18.3R1, Junos OS provides CFM support on EX4600. CFM support on EX4600 has the following limitations:

- CFM support is provided via software using filters. This can impact scaling.
- Inline Packet Forwarding Engine (PFE) mode is not supported. In Inline PFE mode, you can delegate periodic packet management (PPM) processing to the Packet Forwarding Engine (PFE) which results in faster packet handling and the CCM interval supported is 10 milliseconds.
- Performance monitoring (ITU-T Y.1731 Ethernet Service OAM) is not supported.
- CCM interval of less than 1 second is not supported.
- CFM is not supported on Routed Interfaces and aggregated Ethernet (lag) interfaces.
- MIP half function, to divide the MIP functionality into two unidirectional segments to improve network coverage, is not supported.

- Up MEP is not supported.
- Total number of CFM sessions supported is 20.

CFM Limitations on QFX5200 Switches and QFX5210 Switches

Starting in Junos OS Release 18.4R1, Junos OS provides CFM support on QFX5200 switches and QFX5210 switches. CFM support on QFX5200 switches and QFX5210 switches has the following limitations:

- CFM support is provided via software using filters. This can impact scaling.
- Inline Packet Forwarding Engine (PFE) mode is not supported. In Inline PFE mode, you can delegate periodic packet management (PPM) processing to the Packet Forwarding Engine (PFE) which results in faster packet handling and the CCM interval supported is 10 milliseconds.
- Performance monitoring (ITU-T Y.1731 Ethernet Service OAM) is not supported.
- CCM interval of less than 1 second is not supported.
- CFM is not supported on Routed Interfaces and aggregated Ethernet (lag) interfaces.
- MIP half function, to divide the MIP functionality into two unidirectional segments to improve network coverage, is not supported.
- Up MEP is not supported.
- Total number of CFM sessions supported is 20.

Related Documentation

- [Configuring Ethernet OAM Connectivity Fault Management \(CLI Procedure\) on page 57](#)
- [Junos OS Network Interfaces Configuration Guide](#)

Example: Configuring Ethernet OAM Connectivity Fault Management on EX Series Switches

Ethernet interfaces on EX Series switches and Junos OS for EX Series switches support the IEEE 802.1ag standard for Operation, Administration, and Management (OAM). The IEEE 802.1ag specification provides for Ethernet connectivity fault management (CFM).

This example describes how to enable and configure OAM CFM on a Gigabit Ethernet interface:

- [Requirements on page 54](#)
- [Overview and Topology on page 54](#)
- [Configuring Ethernet OAM Connectivity Fault Management on Switch 1 on page 54](#)
- [Configuring Ethernet OAM Connectivity Fault Management on Switch 2 on page 55](#)
- [Verification on page 56](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 10.2 or later for EX Series switches
- Two EX Series switches connected by a point-to-point Gigabit Ethernet link

Overview and Topology

CFM can be used to monitor the physical link between two switches. In the following example, two switches are connected by a point-to-point Gigabit Ethernet link. The link between these two switches is monitored using CFM.

Configuring Ethernet OAM Connectivity Fault Management on Switch 1

CLI Quick Configuration To quickly configure Ethernet OAM CFM, copy the following commands and paste them into the switch terminal window:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain]
set name-format character-string
set maintenance-domain private level 0
set maintenance-association private-ma
set continuity-check hold-interval 1s
```

Step-by-Step Procedure To enable and configure OAM CFM on switch 1:

1. Specify the maintenance domain name format:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain]
user@switch1# set name-format character-string
```

2. Specify the maintenance domain name and the maintenance domain level:

```
[edit protocols oam ethernet connectivity-fault-management]
user@switch1# set maintenance-domain private level 0
```

3. Create a maintenance association:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
private]
user@switch1# set maintenance-association private-ma
```

4. Enable the continuity check protocol and specify the continuity check hold interval:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
private maintenance-association private-ma]
user@switch1# set continuity-check hold-interval 1s
```

5. Configure the maintenance association end point (MEP):

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
private maintenance-association private-ma]
user@switch1# set mep 100 interface ge-1/0/1 auto-discovery direction down
```

Results

Check the results of the configuration.

```
[edit]
user@switch1 > show
```

```
protocols {
  oam {
    ethernet {
      connectivity-fault-management {
        maintenance-domain private {
          level 0;
          maintenance-association private-ma {
            continuity-check {
              interval 1s;
            }
            mep 100 {
              interface ge-1/0/1;
              auto-discovery;
              direction down;
            }
          }
        }
      }
    }
  }
}
```

Configuring Ethernet OAM Connectivity Fault Management on Switch 2

CLI Quick Configuration To quickly configure Ethernet OAM CFM, copy the following commands and paste them into the switch terminal window:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain]
set name-format character-string
set maintenance-domain private level 0
set maintenance-association private-ma
set continuity-check hold-interval 1s
```

Step-by-Step Procedure The configuration on switch 2 mirrors that on switch 2.

1. Specify the maintenance domain name format:

```
[edit protocols oam ethernet connectivity-fault-management]
user@switch2# set name-format character-string
```

2. Specify the maintenance domain name and the maintenance domain level:

```
[edit protocols oam ethernet connectivity-fault-management]
user@switch2# set maintenance-domain private level 0
```

3. Create a maintenance association:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
private]
user@switch2# set maintenance-association private-ma
```

4. Enable the continuity check protocol and specify the continuity check hold interval:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
private maintenance-association private-ma]
user@switch2# set continuity-check hold-interval 1s
```

5. Configure the maintenance association end point (MEP)

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
private maintenance-association private-ma]
user@switch2# set mep 200 interface ge-0/2/5 auto-discovery direction down
```

Results

Check the results of the configuration.

```
[edit]
user@switch2 > show
```

```
protocols {
  oam {
    ethernet {
      connectivity-fault-management {
        maintenance-domain private {
          level 0;
          maintenance-association private-ma {
            continuity-check {
              interval 1s;
            }
            mep 200 {
              interface ge-0/2/5;
              auto-discovery;
              direction down;
            }
          }
        }
      }
    }
  }
}
```

Verification

To confirm that the configuration is working properly, perform these tasks:

- [Verifying That OAM CFM Has Been Configured Properly on page 56](#)

Verifying That OAM CFM Has Been Configured Properly

Purpose Verify that OAM CFM has been configured properly.

Action Use the `show oam ethernet connectivity-fault-management interfaces detail` command:

```
user@switch1# show oam ethernet connectivity-fault-management interfaces detail
```

Sample Output

```
Interface name: ge-1/0/1.0, Interface status: Active, Link status: Up
Maintenance domain name: private, Format: string, Level: 0
Maintenance association name: private-ma, Format: string
Continuity-check status: enabled, Interval: 1ms, Loss-threshold: 3 frames
MEP identifier: 100, Direction: down, MAC address: 00:90:69:0b:4b:94
MEP status: running
Defects:
  Remote MEP not receiving CCM                : no
  Erroneous CCM received                      : yes
  Cross-connect CCM received                  : no
  RDI sent by some MEP                       : yes
Statistics:
  CCMs sent                                  : 76
  CCMs received out of sequence              : 0
  LBMs sent                                  : 0
  Valid in-order LBRs received               : 0
  Valid out-of-order LBRs received           : 0
  LBRs received with corrupted data          : 0
  LBRs sent                                  : 0
  LTMs sent                                  : 0
  LTMs received                             : 0
  LTRs sent                                  : 0
  LTRs received                             : 0
  Sequence number of next LTM request        : 0
Remote MEP count: 2
Identifier  MAC address      State  Interface
  2001      00:90:69:0b:7f:71  ok     ge-0/2/5.0
```

Meaning When the output displays that continuity-check status is **enabled** and displays details of the remote MEP, it means that connectivity fault management (CFM) has been configured properly.

Related Documentation

- [Understanding Ethernet OAM Connectivity Fault Management for Switches on page 51](#)
- [Junos OS Network Interfaces Configuration Guide](#)

Configuring Ethernet OAM Connectivity Fault Management (CLI Procedure)

Ethernet interfaces on Juniper Networks EX Series Ethernet Switches and Juniper Networks Junos OS for EX Series switches support the IEEE 802.1ag standard for Operation, Administration, and Management (OAM). The IEEE 802.1ag specification provides for Ethernet connectivity fault management (CFM).



NOTE: This feature is not supported on EX4300 switches.

This topic describes these tasks:

1. [Creating the Maintenance Domain on page 58](#)
2. [Configuring the Maintenance Domain MIP Half Function on page 59](#)
3. [Creating a Maintenance Association on page 59](#)
4. [Configuring the Continuity Check Protocol on page 59](#)
5. [Configuring a Maintenance Association End Point on page 60](#)
6. [Configuring a Connectivity Fault Management Action Profile on page 61](#)
7. [Configuring the Linktrace Protocol on page 61](#)

Creating the Maintenance Domain

A maintenance domain comprises network entities such as operators, providers, and customers. To enable connectivity fault management (CFM) on an Ethernet interface, you must create a maintenance domains, maintenance associations, and MEPS.

To create a maintenance domain:

1. Specify a name for the maintenance domain:

```
[edit protocols oam ethernet connectivity-fault-management]
user@switch# set maintenance-domain domain-name
```

2. Specify a format for the maintenance domain name. If you specify **none**, no name is configured:

- A plain ASCII character string
- A domain name service (DNS) format
- A media access control (MAC) address plus a two-octet identifier in the range 0 through 65,535
- **none**

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
domain-name]
user@switch# set name-format format
```

For example, to specify the name format as MAC address plus a two-octet identifier:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
domain-name]
user@switch# set name-format mac+2oct
```

3. Configure the maintenance domain level, which is used to indicate the nesting relationship between this domain and other domains. Use a value from 0 through 7:


```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
domain-name]
user@switch# set level level
```

Configuring the Maintenance Domain MIP Half Function



NOTE: MIP Half Function (MHF) is not supported on EX4600, QFX5200, and QFX5210 switches.

MIP Half Function (MHF) divides the maintenance association intermediate point (MIP) functionality into two unidirectional segments, improves visibility with minimal configuration, and improves network coverage by increasing the number of points that can be monitored. MHF extends monitoring capability by responding to loop-back and link-trace messages to help isolate faults. Whenever a MIP is configured, the MIP half function value for all maintenance domains and maintenance associations must be the same.

To configure the MIP half function:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
domain-name]
user@switch# set mip-half-function (none | default | explicit)
```

Creating a Maintenance Association

In a CFM maintenance domain, each service instance is called a maintenance association.

To create a maintenance association:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
domain-name]
user@switch# set maintenance-association ma-name
```

Configuring the Continuity Check Protocol

The continuity check protocol is used for fault detection by a maintenance association end point (MEP) within a maintenance association. The MEP periodically sends continuity check multicast messages. The receiving MEPs use the continuity check messages (CCMs) to build a MEP database of all MEPs in the maintenance association.

To configure the continuity check protocol:

1. Enable the continuity check protocol:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
domain-name maintenance-association ma-name]
user@switch# set continuity-check
```

2. Specify the continuity check hold interval. The hold interval is the number of minutes to wait before flushing the MEP database if no updates occur. The default value is 10 minutes.

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
domain-name maintenance-association ma-name continuity-check]
user@switch# set hold-interval number
```

3. Specify the CCM interval. The interval is the time between the transmission of CCMs. You can specify 10 minutes (10m), 1 minute (1m), 10 seconds (10s), 1 second (1s), 100 milliseconds (100ms), or 10 milliseconds (10ms).



NOTE: On EX4600, QFX5200, and QFX5210 switches, CCM interval of less than 1 second is not supported.

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
domain-name maintenance-association ma-name continuity-check]
user@switch# set interval number
```

4. Specify the number of CCMs (that is, protocol data units) that can be lost before the MEP is marked as down. The default number of protocol data units (PDUs) is 3.

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
domain-name maintenance-association ma-name continuity-check]
user@switch# set loss-threshold number
```

Configuring a Maintenance Association End Point

To configure a maintenance association end point:

1. Specify an ID for the MEP. The value can be from 1 through 8191.

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
domain-name maintenance-association ma-name]
user@switch# set mep mep-id]
```

2. Enable maintenance endpoint automatic discovery if you want to have the MEP accept continuity check messages (CCMs) from all remote MEPs of the same maintenance association:

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
domain-name maintenance-association ma-name mep mep-id]
user@switch# set auto-discovery
```

3. You can specify that CFM packets (CCMs) be transmitted only in one direction for the MEP, that is, the direction be set as **down** so that CCMs are transmitted only out of (not into) the interface configured on this MEP.

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
domain-name maintenance-association ma-name mep mep-id]
user@switch# set direction down
```

4. Specify the logical interface to which the MEP is attached. It can be either an access interface or a trunk interface. If you specify a trunk interface, the VLAN associated with that interface must have a VLAN ID.



NOTE: You cannot associate an access interface that belongs to multiple VLANs with the MEP.

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
domain-name maintenance-association ma-name mep mep-id]
user@switch# set interface interface-name
```

5. You can configure a remote MEP from which CCMs are expected. If autodiscovery is not enabled, the remote MEP must be configured under the **mep** statement. If the remote MEP is not configured under the **mep** statement, the CCMs from the remote MEP are treated as errors.

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain
domain-name maintenance-association ma-name mep mep-id]
user@switch# set remote-mep mep-id
```

Configuring a Connectivity Fault Management Action Profile

You can configure an action profile and specify the action to be taken when any of the configured events occur. Alternatively, you can configure an action profile and specify default actions when connectivity to a remote MEP fails.

To configure an action profile:

1. Specify a name for an action profile:

```
[edit protocols oam ethernet connectivity-fault-management]
user@switch# set action-profile profile-name
```

2. Configure the action of the action profile:

```
[edit protocols oam ethernet connectivity-fault-management action-profile
profile-name]
user@switch# set action interface-down
```

3. Configure one or more events under the action profile, the occurrence of which will trigger the corresponding action to be taken:

```
[edit protocols oam ethernet connectivity-fault-management action-profile
profile-name]
user@switch# set event event
```

See *Junos OS Network Interfaces Configuration Guide*

Configuring the Linktrace Protocol

The linktrace protocol is used for path discovery between a pair of maintenance points. Linktrace messages are triggered by an administrator using the **traceroute** command to verify the path between a pair of MEPs under the same maintenance association. Linktrace messages can also be used to verify the path between a MEP and a MIP under the same maintenance domain.

To configure the linktrace protocol:

1. Configure the linktrace path age timer. If no response to a linktrace request is received, the request and response entries are deleted after the age timer expires:

```
[edit protocols oam ethernet connectivity-fault-management]  
user@switch# set linktrace age time
```

2. Configure the number of linktrace reply entries to be stored per linktrace request:

```
[edit protocols oam ethernet connectivity-fault-management]  
user@switch# set linktrace path-database-size path-database-size
```

**Related
Documentation**

- [Example: Configuring Ethernet OAM Connectivity Fault Management on EX Series Switches on page 44](#)
- [Understanding Ethernet OAM Connectivity Fault Management for Switches on page 51](#)
- [Junos OS Network Interfaces Configuration Guide](#)

PART 3

Uplink Failure Detection

- [Uplink Failure Detection Overview on page 65](#)
- [Configuring Uplink Failure Detection on page 69](#)

CHAPTER 5

Uplink Failure Detection Overview

- [Understanding Uplink Failure Detection on page 65](#)

Understanding Uplink Failure Detection

Uplink failure detection allows Juniper Networks EX Series Ethernet Switches to detect link failure on uplink interfaces and to propagate the failure to the downlink interfaces so that servers connected to those downlink interfaces can switch over to secondary interfaces.

Uplink failure detection supports network adapter teaming and provides network redundancy. In network adapter teaming, all the network interface cards (NICs) on a server are configured in a primary or secondary relationship and share the same IP address. When the primary link goes down, the server transparently shifts the connection to the secondary link. With uplink failure detection, the switch monitors uplink interfaces for link failures. When it detects a failure, it disables the downlink interfaces. When the server detects disabled downlink interfaces, it switches over to the secondary link to help ensure balanced traffic flow on switches.

This topic describes:

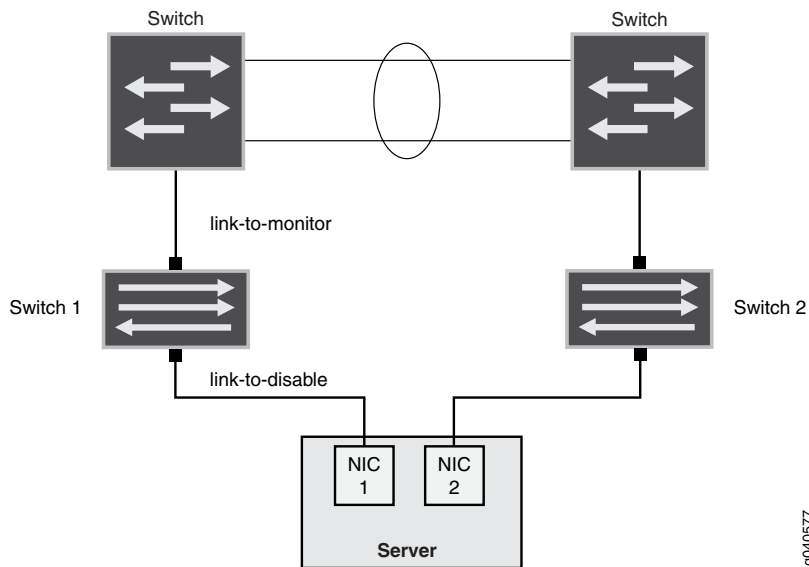
- [Uplink Failure Detection Overview on page 65](#)
- [Failure Detection Pair on page 66](#)

Uplink Failure Detection Overview

Uplink failure detection allows switches to monitor uplink interfaces to spot link failures. When a switch detects a link failure, it automatically disables the downlink interfaces in that group. The server that is connected to the disabled downlink interfaces triggers a network-adapter failover to a secondary link to avoid any information drop.

[Figure 2 on page 66](#) illustrates a typical setup for uplink failure detection.

Figure 2: Uplink Failure Detection Configuration on Switches



For uplink failure detection, you specify a group of uplink interfaces to be monitored and downlink interfaces to be brought down when an uplink fails. The downlink interfaces are bound to the uplink interfaces within the group. If all uplink interfaces in a group go down, then the switch brings down all downlink interfaces within that group. If any uplink interface returns to service, then the switch brings all downlink interfaces in that group back to service.



NOTE: Routed VLAN interfaces (RVIs) cannot be configured as uplink interfaces to be monitored.

The switch can monitor both physical-interface links and logical-interface links for uplink failures, but you must put the two types of interfaces in separate groups.



NOTE: To detect failure of logical interfaces, the server must run some high level protocol such as keepalives between the switch and the server.

Failure Detection Pair

Uplink failure detection requires that you create groups that contain uplink interfaces and downlink interfaces. Each group includes one of each of the following:

- A link-to-monitor interface—The link-to-monitor interfaces specify the uplink interfaces the switch monitors. You can configure a maximum of 48 uplink interfaces as link-to-monitor in a group.

- A link-to-disable interface—The link-to-disable interfaces specify the downlink interfaces the switch disables when the switch detects an uplink failure. You can configure a maximum of 48 downlink interfaces as link-to-disable in a group.

The link-to-disable interfaces are bound to the link-to-monitor interfaces within the group. When a link-to-monitor interface returns to service, the switch automatically enables all link-to-disable interfaces in the group.

**Related
Documentation**

- [Configuring Interfaces for Uplink Failure Detection \(CLI Procedure\) on page 69](#)

CHAPTER 6

Configuring Uplink Failure Detection

- [Configuring Interfaces for Uplink Failure Detection \(CLI Procedure\) on page 69](#)
- [Verifying That Uplink Failure Detection Is Working Correctly on page 70](#)

Configuring Interfaces for Uplink Failure Detection (CLI Procedure)

You can configure uplink failure detection on EX Series switches to help ensure balanced traffic flow. Using this feature, switches can monitor and detect link failure on uplink interfaces and can propagate the failure to downlink interfaces so that servers connected to those downlink interfaces can switch over to secondary interfaces.

Follow these configuration guidelines:

- You can configure a maximum of 48 groups for each switch.
- You can configure a maximum of 48 uplink interfaces and 48 downlink interfaces in each group.
- You can configure physical links and logical links in separate groups.
- Ensure that all the interfaces in the group are up. If the interfaces are down, uplink failure detection does not work.



NOTE: Routed VLAN interfaces (RVIs) cannot be configured as uplink interfaces to be monitored.

To configure uplink failure detection on a switch:

1. Specify a name for the group:

```
[edit protocols]
user@switch# set uplink-failure-detection group group-name
```

2. Add an uplink interface to the group:

```
[edit protocols]
user@switch# set uplink-failure-detection group group-name link-to-monitor interface-name
```

3. Repeat Step 2 for adding each uplink interface to the group.



NOTE: An interface can be configured as link-to-monitor in multiple groups.

4. Add a downlink interface to the group:

```
[edit protocols]  
user@switch# set uplink-failure-detection group group-name link-to-disable interface-name
```

5. Repeat Step 4 for adding each downlink interface to the group.



NOTE: After you have configured a group, use the **show uplink-failure-detection group *group-name*** command to verify that all interfaces in the group are up.

**Related
Documentation**

- [Verifying That Uplink Failure Detection Is Working Correctly on page 70](#)
- [Understanding Uplink Failure Detection on page 65](#)

Verifying That Uplink Failure Detection Is Working Correctly

Purpose Verify that the switch disables the downlink interface when it detects an uplink failure.

- Action** 1. View the current uplink-failure-detection status:

```
user@switch> show uplink-failure-detection
```

```
Group           : group1
Uplink          : ge-0/0/0*
Downlink       : ge-0/0/1*
Failure Action  : Inactive
```



NOTE: The asterisk (*) indicates that the link is up.

2. Disable the uplink interface:

```
[edit]
```

```
user@switch# set interface ge-0/0/0 disable
```

3. Save the configuration on the switch.

4. View the current uplink-failure-detection status:

```
user@switch> show uplink-failure-detection
```

```
Group           : group1
Uplink          : ge-0/0/0
Downlink       : ge-0/0/1
Failure Action  : Active
```

Meaning The output in Step 1 shows that the uplink interface is up, and hence that the downlink interface is also up, and that the status of **Failure Action** is **Inactive**.

The output in Step 4 shows that both the uplink and downlink interfaces are down and that the status of **Failure Action** is changed to **Active**. This output shows that uplink failure detection is working.

- Related Documentation**
- [Configuring Interfaces for Uplink Failure Detection \(CLI Procedure\) on page 69](#)
 - [Understanding Uplink Failure Detection on page 65](#)

PART 4

Network Monitoring Using SNMP

- [SNMP Overview on page 75](#)
- [SNMP MIBs and Traps Supported by Junos OS on page 115](#)
- [Configuring Basic SNMP on page 187](#)
- [Configuring SNMPv3 on page 281](#)
- [Configuring SNMP for Routing Instances on page 325](#)
- [Configuring SNMP Remote Operations on page 343](#)
- [Tracing SNMP Activity on page 363](#)

CHAPTER 7

SNMP Overview

- [Understanding SNMP Implementation in Junos OS on page 75](#)
- [SNMPv3 Overview on page 78](#)
- [SNMPv3 Overview \(QFX in Standalone Mode\) on page 79](#)
- [Loading MIB Files to a Network Management System on page 80](#)
- [Show SNMP on page 82](#)
- [Junos OS SNMP FAQ Overview on page 84](#)
- [Junos OS SNMP FAQs on page 84](#)
- [Managing Traps and Informs on page 111](#)

Understanding SNMP Implementation in Junos OS

A network management systems (NMS) is a combination of hardware and software that is used to monitor and administer a network. The software running on the NMS includes the SNMP manager, which collects information about network connectivity, activity, and events by polling the managed devices, which send unsolicited messages called traps.

The following subsections describe SNMP implementations in general and the Junos OS implementation in more detail:

- [A Typical SNMP Implementation on page 75](#)
- [The Junos OS SNMP Implementation on page 76](#)

A Typical SNMP Implementation

SNMP data is stored in a highly structured, hierarchical format known as a management information base (MIB). The MIB structure is based on a tree structure and defines a grouping of objects into related sets. Each object in the MIB is associated with an object identifier (OID), which names the object. The “leaf” in the tree structure is the actual managed object instance, which represents a resource, event, or activity that occurs in your network device.

A typical SNMP implementation includes three components:

- Network management system (NMS)
- Managed device

- **SNMP agent**

A managed device (also called a network element) is any device on a network that is managed by the NMS. Routers and switches are common examples of managed devices.

The SNMP agent is the SNMP process that resides on the managed device and communicates with the NMS. The SNMP agent exchanges network management information with the SNMP manager software running on an NMS, or host. The agent responds to requests for information and actions from the manager. The agent also controls access to the agent's MIB, the collection of objects that can be viewed or changed by the SNMP manager.

SNMP uses a very basic form of authentication called community strings to control access between a manager and remote agents. Community strings are administrative names used to group collections of devices (and the agents running on them) into common management domains. If a manager and an agent share the same community, they can talk to one another. Many people associate SNMP community strings with passwords and keys because the jobs they do are similar. As a result, SNMP communities are traditionally referred to as strings.

Communication between the agent and the manager occurs in one of the following forms:

- **Get, GetBulk, and GetNext** requests—The manager requests information from the agent. The agent returns the information in a **Get** response message.
- **Set** requests—The manager changes the value of a MIB object controlled by the agent. The agent indicates status in a **Set** response message.
- **Traps** notification—The agent sends traps to notify the manager of significant events that occur on the network device.

The Junos OS SNMP Implementation

The SNMP implementation in Junos OS uses both standard (developed by IETF and documented in RFCs) and Juniper Networks enterprise-specific MIBs.



NOTE: By default, SNMP is not enabled on devices running Junos OS.

In Junos OS, the processes that maintain the SNMP management data include the following:

- A master SNMP agent (known as the SNMP process, or `snmpd`), which resides on the managed device and is managed by the NMS, or host.
- Various subagents that reside on different modules of Junos OS, such as the Routing Engine, and are managed by the master SNMP agent.
- Junos OS processes that share data with the subagents when polled for SNMP data (for example, interface-related MIBs).

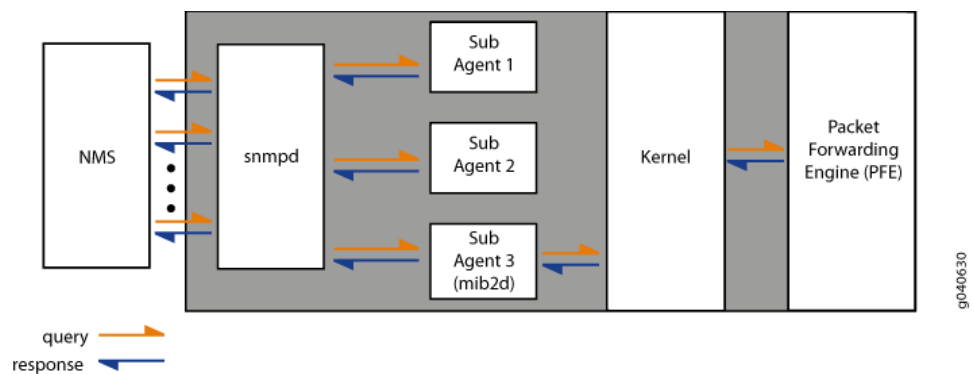
The community string is the first level of management authentication implemented by the SNMP agent in Junos OS.

You might also want to configure remote logging on your device. Junos OS uses a system log (syslog) mechanism similar to many Unix devices to forward log messages to a specified log host address. This allows each of your devices to forward their messages to one central host, making it easier to monitor the network as a whole. Syslog is a very flexible and rich way of logging messages and is used by many device vendors to supplement the information provided by SNMP traps.

When a NMS polls the master agent for data, the master agent immediately shares the data with the NMS if the requested data is available from the master agent or one of the subagents. However, if the requested data does not belong to those categories that are maintained by the master agent or the subagents, the subagent polls the Junos OS kernel or the process that maintains that data. On receiving the required data, the subagent passes the response back to the master agent, which in turn passes it to the NMS.

Figure 3 on page 77 shows the communication flow among the NMS, SNMP master agent (snmpd), SNMP subagents, Junos OS kernel, and the Packet Forwarding Engine.

Figure 3: SNMP Communication Flow



When a significant event, most often an error or a failure, occurs on a network device, the SNMP agent sends notifications to the SNMP manager. The SNMP implementation in Junos OS supports two types of notifications: traps and informs. *Traps* are unconfirmed notifications, whereas *informs* are confirmed notifications. Informs are supported only on devices that support SNMP version 3 (SNMPv3) configuration.

Junos OS supports trap queuing to ensure that traps are not lost because of temporary unavailability of routes. Two types of queues, *destination queues* and a *throttle queue*, are formed to ensure delivery of traps and to control the trap traffic.



NOTE: You cannot configure trap queueing in Junos OS. You cannot view information about trap queues except for what is provided in the system logs.

Junos OS forms a destination queue when a trap to a particular destination is returned because the host is not reachable, and adds the subsequent traps to the same destination

to the queue. Junos OS checks for availability of routes every 30 seconds and sends the traps from the destination queue in a round-robin fashion.

If the trap delivery fails, the trap is added back to the queue, and the delivery attempt counter and the next delivery attempt timer for the queue are reset. Subsequent attempts occur at progressive intervals of 1 minute, 2 minutes, 4 minutes, and 8 minutes. The maximum delay between the attempts is 8 minutes, and the maximum number of attempts is 10. After 10 unsuccessful attempts, the destination queue and all the traps in the queue are deleted.

Junos OS also has a throttle mechanism to control the number of traps (throttle threshold; default value of 500 traps) sent during a particular time period (throttle interval; default of 5 seconds) and to ensure consistency in trap traffic, especially when large number of traps are generated because of interface status changes. The throttle interval period begins when the first trap arrives at the throttle. All traps within the trap threshold are processed, and the traps beyond the threshold limit are queued.

The maximum size of trap queues—that is, throttle queue and destination queue put together—is 40,000. However, on EX Series Ethernet Switches, the maximum size of the trap queue is 1,000. The maximum size of any one queue is 20,000 for devices other than EX Series Switches. On EX Series Switches, the maximum size of one queue is 500. When a trap is added to the throttle queue, or if the throttle queue has exceeded the maximum size, the trap is added back on top of the destination queue, and all subsequent attempts from the destination queue are stopped for a 30-second period, after which the destination queue restarts sending the traps.

**Related
Documentation**

- [Best Practices for Configuring SNMP on page 199](#)
- [Monitoring SNMP Activity and Tracking Problems That Affect SNMP Performance on a Device Running Junos OS on page 363](#)
- [Optimizing the Network Management System Configuration for the Best Results on page 196](#)
- [Configuring Options on Managed Devices for Better SNMP Response Time on page 197](#)
- [Managing Traps and Informs on page 111](#)
- [Using the Enterprise-Specific Utility MIB to Enhance SNMP Coverage on page 265](#)

SNMPv3 Overview

In contrast to SNMP version 1 (SNMPv1) and SNMP version 2 (SNMPv2), SNMP version 3 (SNMPv3) supports authentication and encryption. SNMPv3 uses the user-based security model (USM) for message security and the view-based access control model (VACM) for access control. USM specifies authentication and encryption. VACM specifies access-control rules.

USM uses the concept of a user for which security parameters (levels of security, authentication, privacy protocols, and keys) are configured for both the agent and the manager. Messages sent using USM are better protected than messages sent with community strings, where passwords are sent in the clear. With USM, messages

exchanged between the manager and the agent can have data integrity checking and data origin authentication. USM protects against message delays and message replays by using time indicators and request IDs. Encryption is also available.

To complement the USM, SNMPv3 uses the VACM, a highly granular access-control model for SNMPv3 applications. Based on the concept of applying security policies to the name of the groups querying the agent, the agent decides whether the group is allowed to view or change specific MIB objects. VACM defines collections of data (called views), groups of data users, and access statements that define which views a particular group of users can use for reading, writing, or receiving traps.

Trap entries in SNMPv3 are created by configuring the notify, notify filter, target address, and target parameters. The **notify** statement specifies the type of notification (trap) and contains a single tag. The tag defines a set of target addresses to receive a trap. The notify filter defines access to a collection of trap object identifiers (OIDs). The target address defines a management application's address and other attributes to be used in sending notifications. Target parameters define the message processing and security parameters to be used in sending notifications to a particular management target.

To configure SNMPv3, perform the following tasks:

- [Creating SNMPv3 Users on page 286](#)
- [Configuring MIB Views on page 241](#)
- [Defining Access Privileges for an SNMP Group on page 291](#)
- [Configuring SNMPv3 Traps on a Device Running Junos OS on page 299](#)
- [Configuring SNMP Informs on page 309](#)

Related Documentation

- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

SNMPv3 Overview (QFX in Standalone Mode)

The QFX3500 switch supports SNMP version 3 (SNMPv3). SNMPv3 enhances the functionality of SNMPv1 and SNMPv2c by supporting user authentication and data encryption. SNMPv3 uses the user-based security model (USM) to provide security for SNMP messages, and the view-based access control model (VACM) for user access control.

SNMPv3 features include:

- With USM, the SNMP messages between the SNMP manager and the agent can have the message source authenticated and the data integrity checked. USM reduces messaging delays and message replays by enforcing timeout limits and by checking for duplicate message request IDs.
- VACM complements USM by providing user access control for SNMP queries to the agent. You define access privileges that you wish to extend to a group of one or more users. Access privileges are determined by the security model parameters (**usm**, **v1**, or

v2) and security level parameters (**authentication**, **privacy**, or **none**). For each security level, you must associate one MIB view for the group. Associating a MIB view with a group grants the read, write, or notify permission to a set of MIB objects for the group.

- You configure security parameters for each user, including the username, authentication type and authentication password, and privacy type and privacy password. The username given to each user is in a format that is dependent on the security model configured for that user.
- To ensure messaging security, another type of username, called the security name, is included in the messaging data that is sent between the local SNMP server and the destination SNMP server. Each user name is mapped to a security name, but the security name is in a format that is independent of the security model.
- Trap entries in SNMPv3 are created by configuring the notify, notify filter, target address, and target parameters. The **notify** statement specifies the type of notification (trap) and contains a single tag that defines a set of target addresses to receive a trap. The notify filter defines access to a collection of trap object identifiers (OIDs). The target address defines the address of an SNMP management application and other attributes used in sending notifications. Target parameters define the message processing and security parameters used in sending notifications to a particular target.

Related Documentation

- *Assigning a Security Name to a Group*
- *Configuring Access Privileges for a Group*
- [Configuring SNMP Informs on page 309](#)
- [Creating SNMPv3 Users on page 286](#)

Loading MIB Files to a Network Management System

For your network management system (NMS) to identify and understand the MIB objects used by the Junos OS, you must first load the MIB files to your NMS using a MIB compiler. A MIB compiler is a utility that parses the MIB information such as the MIB object name, IDs, and data type for the NMS.

You can download the Junos MIB package from the Junos OS Enterprise MIBs index at https://www.juniper.net/documentation/en_US/release-independent/junos/mibs/mibs.html. The Junos MIB package is available in **.zip** and **.tar** packages. You can download the appropriate format based on your requirements.

The Junos MIB package contains two folders: **StandardMibs** and **JuniperMibs**. The **StandardMibs** folder contains the standard MIBs and RFCs that are supported on devices running the Junos OS, whereas the **JuniperMibs** folder contains the Juniper Networks enterprise-specific MIBs.

To load MIB files that are required for managing and monitoring devices running the Junos OS:

1. Go to the SNMP MIB Explorer Download page for Juniper Networks SNMP MIB packages (<https://apps.juniper.net/mib-explorer/download.jsp#product=Junos%20OS>).
2. Click the **TAR** or **ZIP** link under the appropriate release heading to download the Junos MIB package for that release.
3. Decompress the file (**.tar** or **.zip**) using an appropriate utility.
4. Load the standard MIB files (from the **StandardMibs** folder) in the following order:



NOTE: Some of the MIB compilers that are commonly used have the standard MIBs preloaded on them. If the standard MIBs are already loaded on the MIB compiler that you are using, skip this step and proceed to Step 7.

- a. **mib-SNMPv2-SMI.txt**
 - b. **mib-SNMPv2-TC.txt**
 - c. **mib-IANAifType-MIB.txt**
 - d. **mib-IANA-RTPROTO-MIB.txt**
 - e. **mib-rfc1907.txt**
 - f. **mib-rfc2011a.txt**
 - g. **mib-rfc2012a.txt**
 - h. **mib-rfc2013a.txt**
 - i. **mib-rfc2863a.txt**
5. Load the remaining standard MIB files.



NOTE: You must follow the order specified in this procedure, and ensure that all standard MIBs are loaded before you load the enterprise-specific MIBs. There might be dependencies that require a particular MIB to be present on the compiler before loading some other MIB. You can find such dependencies listed in the **IMPORT** section of the MIB file.

6. Load the Juniper Networks enterprise-specific SMI MIB, **mib-jnx-smi.txt**, and the following optional SMI MIBs based on your requirements:
 - **mib-jnx-js-smi.txt**—(Optional) For Juniper Security MIB tree objects
 - **mib-jnx-ex-smi.txt**—(Optional) For EX Series Ethernet Switches

- **mib-jnx-exp.txt**—(Recommended) For Juniper Networks experimental MIB objects
7. Load the remaining enterprise-specific MIBs from the **JuniperMibs** folder.



TIP: While loading a MIB file, if the compiler returns an error message saying that any of the objects is undefined, open the MIB file using a text editor and ensure that all the MIB files listed in the **IMPORT** section are loaded on the compiler. If any of the MIB files listed in the **IMPORT** section is not loaded on the compiler, load that MIB file, and then try to load the MIB file that failed to load.

For example, the enterprise-specific PING MIB, **mib-jnx-ping.txt**, has dependencies on RFC 2925, DiSMAN-PING-MIB, **mib-rfc2925a.txt**. If you try to load **mib-jnx-ping.txt** before loading **mib-rfc2925a.txt**, the compiler returns an error message saying that certain objects in **mib-jnx-ping.txt** are undefined. Load **mib-rfc2925a.txt**, and then try to load **mib-jnx-ping.txt**. The enterprise-specific PING MIB, **mib-jnx-ping.txt**, then loads without any issue.

Related Documentation

- [Standard SNMP MIBs Supported by Junos OS on page 126](#)
- [Enterprise-Specific SNMP MIBs Supported by Junos OS on page 115](#)

Show SNMP

There are several commands that you can access in Junos OS operational mode to monitor SNMP information. Some of the commands are:

- **show snmp health-monitor**, which displays the health monitor log and alarm information.
- **show snmp mib**, which displays information from the MIBs, such as device and system information.
- **show snmp statistics**, which displays SNMP statistics such as the number of packets, silent drops, and invalid output values.
- **show snmp rmon**, which displays the RMON alarm, event, history, and log information

The following example provides sample output from the **show snmp health-monitor** command:

```
user@switch> show snmp health-monitor
```

Alarm			
Index	Variable description	Value	State
32768	Health Monitor: root file system utilization jnxHrStoragePercentUsed.1	58	active
32769	Health Monitor: /config file system utilization jnxHrStoragePercentUsed.2	0	active


```

32770 Health Monitor: RE 0 CPU utilization
      jnxOperatingCPU.9.1.0.0                0 active

32773 Health Monitor: RE 0 Memory utilization
      jnxOperatingBuffer.9.1.0.0            35 active

32775 Health Monitor: jkernel daemon CPU utilization
      Init daemon                          0 active
      Chassis daemon                      50 active
      Firewall daemon                     0 active
      Interface daemon                    5 active
      SNMP daemon                         11 active
      MIB2 daemon                        42 active
      ...

```

The following example provides sample output from the **show snmp mib** command:

```
user@switch> show snmp mib walk system
```

```

sysDescr.0    = Juniper Networks, Inc. qfx3500s internet router, kernel
JUNOS 11.1-20100926.0 #0: 2010-09-26 06:17:38 UTC builder@abc.example.net:
/volume/build/junos/11.1/production/20100926.0/obj-xlr/bsd/sys/compile/JUNIPER-xxxxx

Build date: 2010-09-26 06:00:10 U
sysObjectID.0 = jnxProductQFX3500
sysUpTime.0   = 24444184
sysContact.0  = J Smith
sysName.0     = Lab QFX3500
sysLocation.0 = Lab
sysServices.0 = 4

```

The following example provides sample output from the **show snmp statistics** command:

```
user@switch> show snmp statistics
```

```

SNMP statistics:
Input:
  Packets: 0, Bad versions: 0, Bad community names: 0,
  Bad community uses: 0, ASN parse errors: 0,
  Too big: 0, No such names: 0, Bad values: 0,
  Read only: 0, General errors: 0,
  Total request varbinds: 0, Total set varbinds: 0,
  Get requests: 0, Get nexts: 0, Set requests: 0,
  Get responses: 0, Traps: 0,
  Silent drops: 0, Proxy drops: 0, Commit pending drops: 0,
  Throttle drops: 0, Duplicate request drops: 0
Output:
  Packets: 0, Too big: 0, No such names: 0,
  Bad values: 0, General errors: 0,
  Get requests: 0, Get nexts: 0, Set requests: 0,
  Get responses: 0, Traps: 0

```

Related Documentation

- [health-monitor on page 1573](#)
- [show snmp mib on page 2013](#)

- [show snmp statistics on page 2026](#)

Junos OS SNMP FAQ Overview

This document presents the most frequently asked questions about the features and technologies used to implement SNMP services on Juniper Networks devices using the Junos operating system.

SNMP enables users to monitor network devices from a central location. Many network management systems (NMS) are based on SNMP, and support for this protocol is a key feature of most network devices.

Juniper Networks provides many different platforms that support SNMP on the Junos OS. The Junos OS includes an onboard SNMP agent that provides remote management applications with access to detailed information about the devices on the network.

A typical SNMP implementation contains three components:

- Managed devices – Such as routers and switches.
- SNMP agent – Process that resides on a managed device and communicates with the NMS.
- NMS – A combination of hardware and software used to monitor and administer the network; network device that runs SNMP manager software. Also referred to as an SNMP manager.

The SNMP agent exchanges network management information with the SNMP manager (NMS). The agent responds to requests for information and actions from the manager. The SNMP manager collects information about network connectivity, activity, and events by polling managed devices.

SNMP implementation in the Junos OS uses a master SNMP agent (known as an SNMP process or `snmpd`) that resides on the managed device. Various subagents reside on different modules of the Junos OS as well (such as the Routing Engine), and these subagents are managed by the `snmpd`.

Related Documentation

- [Junos OS SNMP FAQs on page 84](#)

Junos OS SNMP FAQs

This Frequently Asked Questions technology overview covers these SNMP-related areas:

- [Junos OS SNMP Support FAQs on page 85](#)
- [Junos OS MIBs FAQs on page 86](#)
- [Junos OS SNMP Configuration FAQs on page 93](#)
- [SNMPv3 FAQs on page 98](#)
- [SNMP Interaction with Juniper Networks Devices FAQs on page 99](#)

- [SNMP Traps and Informs FAQs on page 101](#)
- [Junos OS Dual Routing Engine Configuration FAQs on page 108](#)
- [SNMP Support for Routing Instances FAQs on page 108](#)
- [SNMP Counters FAQs on page 110](#)

Junos OS SNMP Support FAQs

This section presents frequently asked questions and answers related to SNMP support on Junos OS.

Which SNMP versions does Junos OS support?

Junos OS supports SNMP version 1 (SNMPv1), version 2 (SNMPv2c), and version 3 (SNMPv3). By default, SNMP is disabled on a Juniper Networks device.

Which ports (sockets) does SNMP use?

The default port for SNMP queries is port 161. The default port for SNMP traps and informs is port 162. The port used for SNMP traps and informs is configurable, and you can configure your system to use ports other than the default port 162. However, the SNMP listening port will remain the same; this is established on the RFC.

Is SNMP support different among the Junos OS platforms?

No, SNMP support is not different among the Junos OS platforms. SNMP configuration, interaction, and behavior are the same on any Junos OS device. The only difference that might occur across platforms is MIB support.

See also [SNMP MIB Explorer](#) for a list of MIBs that are supported across the Junos OS platforms.

Does Junos OS support the user-based security model (USM)?

Yes, Junos OS supports USM as part of its support for SNMPv3. SNMPv3 contains more security measures than previous versions of SNMP, including providing a defined USM. SNMPv3 USM provides message security through data integrity, data origin authentication, message replay protection, and protection against disclosure of the message payload.

Does Junos OS support the view-based access control model (VACM)?

Yes, Junos OS supports VACM as part of its support for SNMPv3. SNMPv3 contains more security measures than previous versions of SNMP, including providing a defined VACM. SNMPv3 VACM determines whether a specific type of access (read or write) to the management information is allowed.

Does Junos OS support SNMP informs?

Yes, Junos OS supports SNMP informs as part of its support for SNMPv3. SNMP informs are confirmed notifications sent from SNMP agents to SNMP managers when significant events occur on a network device. When an SNMP manager receives an inform, it sends a response to the sender to verify receipt of the inform.

Can I provision or configure a device using SNMP on Junos OS?

No, provisioning or configuring a device using SNMP is not allowed on Junos OS.

Related Documentation

Junos OS MIBs FAQs

This section presents frequently asked questions and answers related to Junos OS MIBs.

What is a MIB?

A management information base (MIB) is a table of definitions for managed objects in a network device. MIBs are used by SNMP to maintain standard definitions of all of the components and their operating conditions within a network device. Each object in the MIB has an identifying code called an object identifier (OID).

MIBs are either standard or enterprise-specific. Standard MIBs are created by the Internet Engineering Task Force (IETF) and documented in various RFCs. Enterprise-specific MIBs are developed and supported by a specific equipment manufacturer.

For a list of supported standard MIBs, see [“Standard SNMP MIBs Supported by Junos OS” on page 126](#).

For a list of Juniper Networks enterprise-specific MIBs, see [“Enterprise-Specific SNMP MIBs Supported by Junos OS” on page 115](#).

Do MIB files reside on the Junos OS devices?

No, MIB files do not reside on the Junos OS devices. You must download the MIB files from the Juniper Networks Technical Publications page for the required Junos OS release: https://www.juniper.net/documentation/en_US/release-independent/junos/mibs/mibs.html.

How do I compile and load the Junos OS MIBs onto an SNMP manager or NMS?

For your network management systems (NMSs) to identify and understand the MIB objects used by Junos OS, you must first load the MIB files to your NMS using a MIB compiler. A MIB compiler is a utility that parses the MIB information, such as the MIB object names, IDs, and data types for the NMS.

You can download the Junos OS MIB package from the Enterprise-Specific MIBs and Traps section at https://www.juniper.net/documentation/en_US/release-independent/junos/mibs/mibs.html or <https://www.juniper.net/documentation/software/junos/index.html>.

The Junos OS MIB package has two folders: **StandardMibs**, containing standard MIBs supported on Juniper Networks devices, and **JuniperMibs**, containing Juniper Networks enterprise-specific MIBs. You *must* have the required standard MIBs downloaded and decompressed before downloading any enterprise-specific MIBs. There might be

dependencies that require a particular standard MIB to be present on the compiler before loading a particular enterprise-specific MIB.

The Junos OS MIB package is available in **.zip** and **.tar** formats. Download the format appropriate for your requirements.

Use the following steps to load MIB files for devices running Junos OS:

1. Navigate to the appropriate Juniper Networks software download page and locate the **Enterprise MIBs** link under the **Enterprise-Specific MIBs and Traps** section.



NOTE: Although the link is titled **Enterprise MIBs**, both standard MIBs and enterprise-specific MIBs are available for download from this location.

2. Click the **TAR** or **ZIP** link to download the Junos OS MIB package.
3. Decompress the file (**.tar** or **.zip**) using an appropriate utility.



NOTE: Some commonly used MIB compilers are preloaded with standard MIBs. You can skip Step 4 and Step 5 and proceed to Step 6 if you already have the standard MIBs loaded on your system.

4. Load the standard MIB files from the **StandardMibs** folder.

Load the files in the following order:

- a. mib-SNMPv2-SMI.txt
 - b. mib-SNMPv2-TC.txt
 - c. mib-IANAifType-MIB.txt
 - d. mib-IANA-RTPROTO-MIB.txt
 - e. mib-rfc1907.txt
 - f. mib-rfc2011a.txt
 - g. mib-rfc2012a.txt
 - h. mib-rfc2013a.txt
 - i. mib-rfc2863a.txt
5. Load any remaining standard MIB files.



NOTE: You must follow the order specified in this procedure, and ensure that all standard MIBs are loaded before you load the enterprise-specific MIBs. There might be dependencies that require a particular standard MIB to be present on the compiler before loading a particular enterprise-specific MIB. Dependencies are listed in the **IMPORT** section of the MIB file.

6. After loading the standard MIBs, load the Juniper Networks enterprise-specific SMI MIB, **mib-jnx-smi.txt**, and the following optional SMI MIBs based on your requirements:
 - **mib-jnx-exp.txt**—(Recommended) for Juniper Networks experimental MIB objects
 - **mib-jnx-js-smi.txt**—(Optional) for Juniper Security MIB tree objects
 - **mib-jnx-ex-smi.txt**—(Optional) for EX Series Ethernet Switches
7. Load any remaining desired enterprise-specific MIBs from the **JuniperMibs** folder.



TIP: While loading a MIB file, if the compiler returns an error message indicating that any of the objects are undefined, open the MIB file using a text editor and ensure that all the MIB files listed in the **IMPORT** section are loaded on the compiler. If any of the MIB files listed in the **IMPORT** section are not loaded on the compiler, load the missing file or files first, then try to load the MIB file that failed.

The system might return an error if files are not loaded in a particular order.

What is SMI?

Structure of Management Information Version (SMI) is a subset of Abstract Syntax Notation One (ASN.1), which describes the structure of objects. SMI is the notation syntax, or “grammar”, that is the standard for writing MIBs.

Which versions of SMI does Junos OS support?

The Junos OS supports SMIv1 for SNMPv1 MIBs, and SMIv2 for SNMPv2c and enterprise MIBs.

Does Junos OS support MIB II?

Yes, Junos OS supports MIB II, the second version of the MIB standard.

The features of MIB II include:

- Additions that reflect new operational requirements.
- Backward compatibility with the original MIBs and SNMP.
- Improved support for multiprotocol entities.
- Improved readability.

Refer to the relevant release documentation for a list of MIBs that are supported. Go to <https://www.juniper.net/documentation/software/junos/index.html>.

Are the same MIBs supported across all Juniper Networks devices?

There are some common MIBs supported by all the Junos OS devices, such as the Interface MIB (ifTable), System MIB, and Chassis MIB. Some MIBs are supported only by functionalities on specific platforms. For example, the Bridge MIB is supported on the EX Series Ethernet Switches and the SRX Series Services Gateways for the branch.

What is the system object identifier (SYSOID) of a device? How do I determine the SYSOID of my device?

The jnx-chas-defines (Chassis Definitions for Router Model) MIB has a **jnxProductName** branch for every Junos OS device. The system object ID of a device is identical to the object ID of the **jnxProductName** for the platform. For example, for an M7i Multiservice Edge Router, the jnxProductNameM7i is .1.3.6.1.4.1.2636.1.1.1.2.10 in the jnxProductName branch, which is identical to the SYSOID of the M7i (.1.3.6.1.4.1.2636.1.1.1.2.10).

How can I determine if a MIB is supported on a platform? How can I determine which MIBs are supported by a device?

MIBs device and platform support is listed on the Junos OS Technical Documentation. See “Enterprise-Specific SNMP MIBs Supported by Junos OS” on page 115 and “Standard SNMP MIBs Supported by Junos OS” on page 126 documents to view the list of MIBs and supported Junos OS devices.

What can I do if the MIB OID query is not responding?

There can be various reasons why the MIB OID query stops responding. One reason could be that the MIB itself is unresponsive. To verify that the MIB responds, use the **show snmp mib walk | get MIB name | MIB OID** command:

- If the MIB responds, the communication issue exists between the SNMP master and SNMP agent. Possible reasons for this issue include network issues, an incorrect community configuration, an incorrect SNMP configuration, and so on.
- If the MIB does not respond, enable SNMP **traceoptions** to log PDUs and errors. All incoming and outgoing SNMP PDUs are logged. Check the **traceoptions** output to see if there are any errors.

If you continue to have problems with the MIB OID query, technical product support is available through the Juniper Networks Technical Assistance Center (JTAC).

What is the enterprise branch number for Junos OS?

The enterprise branch number for Junos OS is 2636. Enterprise branch numbers are used in SNMP MIB configurations, and they are also known as SMI network management private enterprise codes.

Which MIB displays the hardware and chassis details on a Juniper Networks device?

The Chassis MIB (jnxchassis.mib) displays the hardware and chassis details for each Juniper Networks device. It provides information about the router and its components. The Chassis MIB objects represent each component and its status.

Which MIB objects can I query to determine the CPU and memory utilization of the Routing Engine, Flexible PIC Concentrator (FPC), and PIC components on a device?

Query the Chassis MIB objects **jnxOperatingMemory**, **jnxOperatingBuffer**, and **jnxOperatingCPU** to find out the CPU and memory utilization of the hardware components of a device.

Is the interface index (ifIndex) persistent?

The ifIndex is persistent when reboots occur if the Junos OS version remains the same, meaning the values assigned to the interfaces in the ifIndex do not change.

When there is a software upgrade, the device tries to keep the ifIndex persistent on a best effort basis. For Junos OS Release 10.0 and earlier, the ifIndex is not persistent when there is a software upgrade to Junos OS Release 10.1 and later.

Is it possible to set the ifAdminStatus?

SNMP is not allowed to set the ifAdminStatus.

Which MIB objects support SNMP set operations?

The Junos OS SNMP set operations are supported in the following MIB tables and variables:

- snmpCommunityTable
- eventTable
- alarmTable
- snmpTargetAddrExtTable
- jnxPingCtlTable
- pingCtlTable
- traceRouteCtlTable
- jnxTraceRouteCtlTable
- sysContact.O
- sysName.O
- sysLocation.O
- pingMaxConcurrentRequests.O
- traceRouteMaxConcurrentRequests.O
- usmUserSpinLock
- usmUserOwnAuthKeyChange

- `usmUserPublic`
- `vacmSecurityToGroupTable` (`vacmGroupName`, `vacmSecurityToGroupStorageType`, and `vacmSecurityToGroupStatus`)
- `vacmAccessTable` (`vacmAccessContextMatch`, `vacmAccessReadViewName`, `vacmAccessWriteViewName`, `vacmAccessNotifyViewName`, `vacmAccessStorageType`, and `vacmAccessStatus`)
- `vacmViewSpinLock`
- `vacmViewTreeFamilyTable` (`vacmViewTreeFamilyMask`, `vacmViewTreeFamilyType`, `vacmViewTreeFamilyStorageType`, and `vacmViewTreeFamilyStatus`)

Does Junos OS support remote monitoring (RMON)?

Yes, Junos OS supports RMON as defined in RFC 2819, *Remote Network Monitoring Management Information Base*. However, remote monitoring version 2 (RMON 2) is not supported.

Can I use SNMP to determine the health of the processes running on the Routing Engine?

Yes, you can use SNMP to determine the health of the Routing Engine processes by configuring the health monitoring feature. On Juniper Networks devices, RMON alarms and events provide much of the infrastructure needed to reduce the polling overhead from the NMS. However, you must set up the NMS to configure specific MIB objects into RMON alarms. This often requires device-specific expertise and customizing the monitoring application. Additionally, some MIB object instances that need monitoring are set only at initialization, or they change at runtime and cannot be configured in advance.

To address these issues, the health monitor extends the RMON alarm infrastructure to provide predefined monitoring for a selected set of object instances, such as file system usage, CPU usage, and memory usage, and includes support for unknown or dynamic object instances, such as Junos OS software processes.

To display the health monitoring configuration, use the **`show snmp health-monitor`** command:

```
user@host> show snmp health-monitor
interval 300;
rising-threshold 90;
falling-threshold 80;
```

When you configure the health monitor, monitoring information for certain object instances is available, as shown in [Table 7 on page 92](#).

Table 7: Monitored Object Instances

Object	Description
jnxHrStoragePercentUsed.1	Monitors the following file system on the router or switch: /dev/ad0s1a: This is the root file system mounted on /.
jnxHrStoragePercentUsed.2	Monitors the following file system on the router or switch: /dev/ad0s1e: This is the configuration file system mounted on /config.
jnxOperatingCPU (RE0)	Monitor CPU usage for Routing Engines RE0 and RE1. The index values assigned to the Routing Engines depend on whether the Chassis MIB uses a zero-based or a ones-based indexing scheme. Because the indexing scheme is configurable, the correct index is determined whenever the router is initialized and when there is a configuration change. If the router or switch has only one Routing Engine, the alarm entry monitoring RE1 is removed after five failed attempts to obtain the CPU value.
jnxOperatingCPU (RE1)	
jnxOperatingBuffer (RE0)	Monitor the amount of memory available on Routing Engines RE0 and RE1. Because the indexing of this object is identical to that used for jnxOperatingCPU, index values are adjusted depending on the indexing scheme used in the Chassis MIB. As with jnxOperatingCPU, the alarm entry monitoring RE1 is removed if the router or switch has only one Routing Engine.
jnxOperatingBuffer (RE1)	
sysApplElmtRunCPU	Monitors the CPU usage for each Junos OS software process. Multiple instances of the same process are monitored and indexed separately.
sysApplElmtRunMemory	Monitors the memory usage for each Junos OS software process. Multiple instances of the same process are monitored and indexed separately.

The system log entries generated for any health monitor events, such as thresholds crossed and errors, have a corresponding **HEALTHMONITOR** tag rather than a generic **SNMPD_RMON_EVENTLOG** tag. However, the health monitor sends generic **RMON risingThreshold** and **fallingThreshold** traps.

Are the Ping MIBs returned in decimal notation and ASCII?

Yes, both decimal notation and ASCII are supported, which is the standard implementation in SNMP. All strings are ASCII encoded.

The following example displays the Ping MIB in hexadecimal notation:

```
pingCtlTargetAddress.2.69.72.9.116.99.112.115.97.109.112.108.101 = 0a fa 01 02
```

This translates to ASCII:

```
pingCtlTargetAddress."EH"."tcpsample" = 0a fa 01 02
2=length of the string
69=E
72=H
9=length of second string
116=t
```

```

99 =c
112=p
115=s
97=a
109=m
112 =p
108 =l
101 =e

```

As of Junos OS Release 9.6 and later, the Junos OS CLI returns ASCII values using the command **show snmp mib get | get-next | walk ascii**.

The following example shows the output with the ASCII option:

```

user@host> show snmp mib walk pingCtlTargetAddress ascii

pingCtlTargetAddress."EH"."httpgetsampl" = http://www.yahoo.com
pingCtlTargetAddress."p1"."t2" = 74 c5 b3 06
pingCtlTargetAddress."p1"."t3" = 74 c5 b2 0c

```

The following example shows the output without the ASCII option:

```

user@host> show snmp mib walk pingCtlTargetAddress

pingCtlTargetAddress.2.69.72.13.104.116.116.112.103.101.116.115.97.109.112.108.101
= http://www.yahoo.com
pingCtlTargetAddress.2.112.49.2.116.50 = 74 c5 b3 06
pingCtlTargetAddress.2.112.49.2.116.51 = 74 c5 b2 0c

```

You can convert decimal and ASCII values using a decimal ASCII chart like the one at <http://www.asciichart.com>.

Is IPv6 supported by the Ping MIB for remote operations?

No, IPv6 is not supported.

Is there an SNMP MIB to show Address Resolution Protocol (ARP) table information? Are both IP and MAC addresses displayed in the same table?

Yes, the Junos OS supports the standard MIB **ipNetToMediaTable**, which is described in RFC 2111, *SNMPv2 Management Information Base for the Internet Protocol using SMIPv2*. This table is used for mapping IP addresses to their corresponding MAC addresses.

Related Documentation

Junos OS SNMP Configuration FAQs

This section presents frequently asked questions and answers related to Junos OS SNMP configuration.

Can the Junos OS be configured for SNMPv1 and SNMPv3 simultaneously?

Yes, SNMP has backward compatibility, meaning that all three versions can be enabled simultaneously.

Can I filter specific SNMP queries on a device?

Yes, you can filter specific SNMP queries on a device using **exclude** and **include** statements.

The following example shows a configuration that blocks read-write operation on all OIDs under .1.3.6.1.2.1.1 for the community **test**:

```
user@host# show snmp
view system-exclude {
  oid .1.3.6.1.2.1.1 exclude;
  oid .1 include;
}
community test {
  view system-exclude;
  authorization read-write;
}
```

Can I change the SNMP agent engine ID?

Yes, the SNMP agent engine ID can be changed to the MAC address of the device, the IP address of the device, or any other desired value. Several examples are included here.

The following example shows how to use the MAC address of a device as the SNMP agent engine ID:

```
user@host# show snmp
engine-id {
  use-mac-address;
}
```

The following example shows how to use the IP address of a device as the SNMP agent engine ID:

```
user@host# show snmp
engine-id {
  use-default-ip-address;
}
```

The following example shows the use of a selected value, **AA** in this case, as the SNMP agent engine ID of a device:

```
user@host# show snmp
engine-id {
  local AA;
}
```

How can I configure a device with dual Routing Engines or a chassis cluster (SRX Series Services Gateways) for continued communication during a switchover?

When configuring for continued communication, the SNMP configuration should be identical between the Routing Engines. However, it is best to have separate Routing Engine IDs configured for each Routing Engine, especially when using SNMPv3.

The following example shows the configuration of the Routing Engines in a dual Routing Engine device. Notice that the Routing Engine IDs are set to the MAC addresses for each Routing Engine:

```
user@host# show groups
re0 {
  system {
    host-name PE3-re0;
  }
  interfaces {
    fxp0 {
      unit 0 {
        family inet {
          address 116.197.178.14/27;
          address 116.197.178.29/27 {
            master-only;
          }
        }
      }
    }
  }
  snmp {
    engine-id {
      use-mac-address;
    }
  }
}
re1 {
  system {
    host-name PE3-re1;
  }
  interfaces {
    fxp0 {
      unit 0 {
        family inet {
          address 116.197.178.11/27;
          address 116.197.178.29/27 {
            master-only;
          }
        }
      }
    }
  }
  snmp {
    engine-id {
      use-mac-address;
    }
  }
}
```

The following is an example of an SNMPv3 configuration on a dual Routing Engine device:

```
user@host> show snmp name host1
v3 {
  vacm {
    security-to-group {
      security-model usm {
        security-name test123 {
          group test1;
        }
        security-name juniper {
          group test1;
        }
      }
    }
  }
  access {
    group test1 {
      default-context-prefix {
        security-model any {
          security-level authentication {
            read-view all;
          }
        }
      }
    }
    context-prefix MGMT_10 {
      security-model any {
        security-level authentication {
          read-view all;
        }
      }
    }
  }
}
target-address server1 {
  address 116.197.178.20;
  tag-list router1;
  routing-instance MGMT_10;
  target-parameters test;
}
target-parameters test {
  parameters {
    message-processing-model v3;
    security-model usm;
    security-level authentication;
    security-name juniper;
  }
  notify-filter filter1;
}
notify server {
  type trap;
  tag router1;
}
notify-filter filter1 {
  oid .1 include;
```

```

}
view all {
  oid .1 include;
}
community public {
  view all;
}
community comm1;
community comm2;
community comm3 {
  view all;
  authorization read-only;
  logical-system LDP-VPLS {
    routing-instance vpls-server1;
  }
}
trap-group server1 {
  targets {
    116.197.179.22;
  }
}
routing-instance-access;
traceoptions {
  flag all;
}
}

```

How can I track SNMP activities?

SNMP trace operations track activity of SNMP agents and record the information in log files.

A sample **traceoptions** configuration might look like this:

```

[edit snmp]
user@host# set traceoptions flag all

```

When the **traceoptions flag all** statement is included at the **[edit snmp]** hierarchy level, the following log files are created:

- snmpd
- mib2d
- rmopd

Related Documentation

- [Junos OS SNMP Support FAQs on page 85](#)
- [Junos OS MIBs FAQs on page 86](#)
- [SNMPv3 FAQs on page 98](#)
- [SNMP Interaction with Juniper Networks Devices FAQs on page 99](#)
- [SNMP Traps and Informs FAQs on page 101](#)

- [SNMP Support for Routing Instances FAQs on page 108](#)
- [SNMP Counters FAQs on page 110](#)

SNMPv3 FAQs

This section presents frequently asked questions and answers related to SNMPv3.

Why is SNMPv3 important?

SNMP v3 provides enhanced security compared to the other versions of SNMP. It provides authentication and encryption of data. Enhanced security is important for managing devices at remote sites from the management stations.

In my system, the MIB object `snmpEngineBoots` is not in sync between two Routing Engines in a dual Routing Engine device. Is this normal behavior?

Yes, this is the expected behavior. Each Routing Engine runs its own SNMP process (`snmpd`), allowing each Routing Engine to maintain its own engine boots. However, if both routing engines have the same engine ID and the routing engine with lesser `snmpEngineBoots` value is selected as the master routing engine during the switchover process, the `snmpEngineBoots` value of the master routing engine is synchronized with the `snmpEngineBoots` value of the other routing engine.

Do I need the SNMP manager engine object identifier (OID) for informs?

Yes, the engine OID of the SNMP manager is required for authentication, and informs do not work without it.

I see the configuration of informs under the `[edit snmp v3]` hierarchy. Does this mean I cannot use informs with SNMPv2c?

Informs can be used with SNMPv2c. The following example shows the basic configuration for SNMPv3 informs on a device (note that the authentication and privacy is set to none):

```
[edit snmp]
v3 {
  usm {
    remote-engine 00000063000100a2c0a845b3 {
      user RU2_v3_sha_none {
        authentication-none;
        privacy-none;
      }
    }
  }
  vacm {
    security-to-group {
      security-model usm {
        security-name RU2_v3_sha_none {
          group g1_usm_auth;
        }
      }
    }
  }
}
```



```

access {
  group g1_usm_auth {
    default-context-prefix {
      security-model usm {
        security-level authentication {
          read-view all;
          write-view all;
          notify-view all;
        }
      }
    }
  }
}
target-address TA2_v3_sha_none {
  address 192.168.69.179;
  tag-list tl1;
  address-mask 255.255.252.0;
  target-parameters TP2_v3_sha_none;
}
target-parameters TP2_v3_sha_none {
  parameters {
    message-processing-model v3;
    security-model usm;
    security-level none;
    security-name RU2_v3_sha_none;
  }
  notify-filter nf1;
}
notify N1_all_tl1_informs {
  type inform; # Replace "inform" with "trap" to convert informs to traps.
  tag tl1;
}
notify-filter nf1 {
  oid .1 include;
}
view all {
  oid .1 include;
}
}

```

You can convert the SNMPv3 informs to traps by setting the value of the **type** statement at the **[edit snmp v3 notify N1_all_tl1_informs]** hierarchy level to **trap** as shown in the following example:

```
user@host# set snmp v3 notify N1_all_tl1_informs type trap
```

Related Documentation

SNMP Interaction with Juniper Networks Devices FAQs

This section presents frequently asked questions and answers related to how SNMP interacts with Juniper Networks devices.

How frequently should a device be polled? What is a good polling rate?

It is difficult to give an absolute number for the rate of SNMP polls per second since the rate depends on the following two factors:

- The number of variable bindings in a protocol data unit (PDU)
- The response time for an interface from the Packet Forwarding Engine

In a normal scenario where no delay is being introduced by the Packet Forwarding Engine and there is one variable per PDU (a Get request), the response time is 130+ responses per second. However, with multiple variables in an SNMP request PDU (30 to 40 for GetBulk requests), the number of responses per second is much less. Because the Packet Forwarding Engine load can vary for each system, there is greater variation in how frequently a device should be polled.

Frequent polling of a large number of counters, especially statistics, can impact the device. We recommend the following optimization on the SNMP managers:

- Use the row-by-row polling method, not the column-by-column method.
- Reduce the number of variable bindings per PDU.
- Increase timeout values in polling and discovery intervals.
- Reduce the incoming packet rate at the SNMP process (snmpd).

For better SNMP response on the device, the Junos OS does the following:

- Filters out duplicate SNMP requests.
- Excludes interfaces that are slow in response from SNMP queries.

One way to determine a rate limit is to note an increase in the **Currently Active** count from the **show snmp statistics extensive** command.

The following is a sample output of the **show snmp statistics extensive** command:

```
user@host> show snmp statistics extensive
```

```
SNMP statistics:
Input:
  Packets: 226656, Bad versions: 0, Bad community names: 0,
  Bad community uses: 0, ASN parse errors: 0,
  Too big: 0, No such names: 0, Bad values: 0,
  Read only: 0, General errors: 0,
  Total request varbinds: 1967606, Total set varbinds: 0,
  Get requests: 18478, Get nexts: 75794, Set requests: 0,
  Get responses: 0, Traps: 0,
  Silent drops: 0, Proxy drops: 0, Commit pending drops: 0,
  Throttle drops: 27084, Duplicate request drops: 0
V3 Input:
  Unknown security models: 0, Invalid messages: 0
  Unknown pdu handlers: 0, Unavailable contexts: 0
  Unknown contexts: 0, Unsupported security levels: 0
  Not in time windows: 0, Unknown user names: 0
  Unknown engine ids: 0, Wrong digests: 0, Decryption errors: 0
Output:
```

```

Packets: 226537, Too big: 0, No such names: 0,
Bad values: 0, General errors: 0,
Get requests: 0, Get nexts: 0, Set requests: 0,
Get responses: 226155, Traps: 382
SA Control Blocks:
  Total: 222984, Currently Active: 501, Max Active: 501,
  Not found: 0, Timed Out: 0, Max Latency: 25
SA Registration:
  Registers: 0, Deregisters: 0, Removes: 0
Trap Queue Stats:
  Current queued: 0, Total queued: 0, Discards: 0, Overflows: 0
Trap Throttle Stats:
  Current throttled: 0, Throttles needed: 0
Snmp Set Stats:
  Commit pending failures: 0, Config lock failures: 0
  Rpc failures: 0, Journal write failures: 0
  Mgd connect failures: 0, General commit failures: 0

```

Does SNMP open dynamic UDP ports? Why?

The SNMP process opens two additional ports (sockets): one for IPv4 and one for IPv6. This enables the SNMP process to send traps.

I am unable to perform a MIB walk on the ifIndex. Why is this?

Any variable bindings or values with an access level of **not-accessible** cannot be queried directly because they are part of other variable bindings in the SNMP MIB table. The ifIndex has an access level of **not-accessible**. Therefore, it cannot be accessed directly because it is part of the variable bindings. However, the ifIndex can be accessed indirectly through the variable bindings.

I see SNMP_IPC_READ_ERROR messages when the SNMP process restarts on my system and also during Routing Engine switchover. Is this acceptable?

Yes, it is acceptable to see **SNMP_IPC_READ_ERROR** messages when the SNMP process is restarted, the system reboots, or during a Routing Engine switchover. If all the processes come up successfully and the SNMP operations are working properly, then these messages can be ignored.

What is the source IP address used in the response PDUs for SNMP requests? Can this be configured?

The source IP address used in the response PDUs for SNMP requests is the IP address of the outgoing interface to reach the destination. The source IP address cannot be configured for responses. It can only be configured for traps.

Related Documentation

SNMP Traps and Informs FAQs

This section presents frequently asked questions and answers related to SNMP traps and informs.

Does the Junos OS impose any rate limiting on SNMP trap generation?

The Junos OS implements a trap-queuing mechanism to limit the number of traps that are generated and sent.

If a trap delivery fails, the trap is added back to the queue, and the delivery attempt counter and the next delivery attempt timer for the queue are reset. Subsequent attempts occur at progressive intervals of 1, 2, 4, and 8 minutes. The maximum delay between the attempts is 8 minutes, and the maximum number of attempts is 10. After 10 unsuccessful attempts, the destination queue and all traps in the queue are deleted.

Junos OS also has a throttle threshold mechanism to control the number of traps sent (default 500 traps) during a particular throttle interval (default 5 seconds). This helps ensure consistency in trap traffic, especially when a large number of traps are generated due to interface status changes.

The throttle interval begins when the first trap arrives at the throttle. All traps within the throttle threshold value are processed, and traps exceeding the threshold value are queued. The maximum size of all trap queues (the throttle queue and the destination queue) is 40,000 traps. The maximum size of any one queue is 20,000 traps. When a trap is added to the throttle queue, or if the throttle queue has exceeded the maximum size, the trap is moved to the top of the destination queue. Further attempts to send the trap from the destination queue are stopped for a 30-second period, after which the destination queue restarts sending the traps.



NOTE: For the Juniper Networks EX Series Ethernet Switch, the maximum size of all trap queues (the throttle queue and the destination queue) is 1,000 traps. The maximum size for any one queue on the EX Series is 500 traps.

I did not see a trap when I had a syslog entry with a critical severity. Is this normal? Can it be changed?

Not every syslog entry with critical severity is a trap. However, you can convert any syslog entry to a trap using the **event-options** statement.

The following example shows how to configure a **jnxSyslogTrap** whenever an **rpd_ldp_nbrdown** syslog entry message error occurs.

```
user@host> show event-options
policy snmptrap {
  events rpd_ldp_nbrdown;
  then {
    raise-trap;
  }
}
```

Are SNMP traps compliant with the Alarm Reporting Function (X.733) on the Junos OS?

No, SNMP traps on the Junos OS are not X.733 compliant.

Can I set up filters for traps or informs?

Traps and informs can be filtered based on the trap category and the object identifier. You can specify categories of traps to receive per host by using the **categories** statement at the **[edit snmp trap-group *trap-group*]** hierarchy level. Use this option when you want to monitor only specific modules of the Junos OS.

The following example shows a sample configuration for receiving only **link**, **vrrp-events**, **services**, and **otn-alarms** traps:

```
[edit snmp]
trap-group jnpr {
  categories {
    link;
    vrrp-events;
    services;
    otn-alarms;
  }
  targets {
    192.168.69.179;
  }
}
```

The Junos OS also has a more advanced filter option (**notify-filter**) for filtering specific traps or a group of traps based on their object identifiers.

The SNMPv3 configuration also supports filtering of SNMPv1 and SNMPv2 traps and excluding Juniper Networks enterprise-specific configuration management traps, as shown in the following configuration example:

```
[edit snmp]
v3 {
  vacm {
    security-to-group {
      security-model v2c {
        security-name sn_v2c_trap {
          group gr_v2c_trap;
        }
      }
    }
  }
  access {
    group gr_v2c_trap {
      default-context-prefix {
        security-model v2c {
          security-level none {
            read-view all;
            notify-view all;
          }
        }
      }
    }
  }
}
target-address TA_v2c_trap {
```

```

address 10.209.196.166;
port 9001;
tag-list tg1;
target-parameters TP_v2c_trap;
}
target-parameters TP_v2c_trap {
  parameters {
    message-processing-model v2c;
    security-model v2c;
    security-level none;
    security-name sn_v2c_trap;
  }
  notify-filter nf1;
}
notify v2c_notify {
  type trap;
  tag tg1;
}
notify-filter nf1 {
  oid .1.3.6.1.4.1.2636.4.5 exclude;
  oid .1 include;
}
snmp-community index1 {
  community-name "$9$tDLi01h7Nbw2axN"; ## SECRET-DATA
  security-name sn_v2c_trap;
  tag tg1;
}
view all {
  oid .1 include;
}
}

```

Can I simulate traps on a device?

Yes, you can use the **request snmp spoof-trap *trap name*** command for simulating a trap to the NMS that normally receives your device's traps. You can also add required values using the **variable-bindings** parameter.

The following example shows how to simulate a trap to the local NMS using variable bindings:

```

user@host> request snmp spoof-trap linkDown variable-bindings "ifIndex[116]=116,
ifAdminStatus[116]=1 ,ifOperStatus[116]=2 , ifName[116]=ge-1/0/1"

```

How do I generate a warm start SNMPv1 trap?

When the SNMP process is restarted under normal conditions, a warm start trap is generated if the system up time is more than 5 minutes. If the system up time is less than 5 minutes, a cold start trap is generated.

The NMS sees only the MIB OIDs and numbers, but not the names of the SNMP traps. Why?

Before the NMS can recognize the SNMP trap details, such as the names of the traps, it must first compile and understand the MIBs and then parse the MIB OIDs.

In the Junos OS, how can I determine to which category a trap belongs?

For a list of common traps and their categories, see [“Enterprise-Specific SNMP Traps Supported by Junos OS” on page 154](#).

Can I configure a trap to include the source IP address?

Yes, you can configure the **source-address**, **routing-instance**, or **logical-instance** name for the source IP address using the **trap-options** command:

```
user@host> show snmp trap-options
source-address 10.1.1.1;
```

Can I create a custom trap?

Yes, you can use the **jnxEventTrap** event script to create customized traps as needed.

In the following example, a Junos OS operations (op) script is triggered when a **UI_COMMIT_NOT_CONFIRMED** event is received. The Junos OS op script matches the complete message of the event and generates an SNMP trap.

Example: Junos OS Op Script

```
version 1.0;

ns junos = "http://xml.juniper.net/junos/*/junos";
ns xnm = "http://xml.juniper.net/xnm/1.1/xnm";
ns jcs = "http://xml.juniper.net/junos/commit-scripts/1.0";

param $event;
param $message;

match / {
    /*
     * trapm utility wants the following characters in the value to be escaped
     * '[', ']', ' ', '=', and ', '
     */
    var $event-escaped = {
        call escape-string($text = $event, $vec = '[] =,');
    }

    var $message-escaped = {
        call escape-string($text = $message, $vec = '[] =,');
    }

    <op-script-results> {
    var $rpc = <request-snmp-spoof-trap> {
        <trap> "jnxEventTrap";
        <variable-bindings> "jnxEventTrapDescr[0]='Event-Trap' , "
        _ "jnxEventAvAttribute[1]='event' , "
        _ "jnxEventAvValue[1]='" _ $event-escaped _ "' , "
        _ "jnxEventAvAttribute[2]='message' , "
        _ "jnxEventAvValue[1]='" _ $message-escaped _ "'";
```

```

}

var $res = jcs:invoke($rpc);
}
}

template escape-string ($text, $vec) {

    if (jcs:empty($vec)) {
        expr $text;
    } else {
        var $index = 1;
        var $from = substring($vec, $index, 1);
        var $changed-value = {
            call replace-string($text, $from) {
                with $to = {
                    expr "\\\";
                    expr $from;
                }
            }
        }

        call escape-string($text = $changed-value, $vec = substring($vec, $index
+ 1));
    }
}

template replace-string ($text, $from, $to) {

    if (contains($text, $from)) {
        var $before = substring-before($text, $from);
        var $after = substring-after($text, $from);
        var $prefix = $before _ $to;

        expr $before;
        expr $to;
        call replace-string($text = $after, $from, $to);
    } else {
        expr $text;
    }
}

```

After creating your customized trap, you must configure a policy on your device to tell the device what actions to take after it receives the trap.

Here is an example of a configured policy under the **[edit event-options]** hierarchy:

```

[edit event-options]
user@host> show
policy trap-on-event {
    events UI_COMMIT_NOT_CONFIRMED;
    attributes-match {
        UI_COMMIT_NOT_CONFIRMED.message matches complete;
    }
}

```



```

    }
    then {
        event-script ev-syslog-trap.junos-op {
            arguments {
                event UI_COMMIT_NOT_CONFIRMED;
                message "${$.message}";
            }
        }
    }
}

```

Can I disable link up and link down traps on interfaces?

Yes, link up and link down traps can be disabled in the interface configuration. To disable the traps, use the **no-traps** statement at the **[edit interfaces *interface-name* unit *logical-unit-number*]** and **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]** hierarchies for physical and logical interfaces.

```
(traps | no-traps);
```

I see the link up traps on logical interfaces, but I do not see the link down traps. Is this normal behavior?

For Ethernet and ATM types of interfaces, Junos OS does not send link down traps for a logical interface if the physical interface is down to prevent flooding alarms for the same root cause. However, when the physical interface and logical interfaces come back up, traps are sent indicating link up. This is because the physical interface coming up does not necessarily mean the logical interfaces are also coming up.

For SONET types of interfaces with PPP encapsulation, Junos OS does send link down traps for a logical interface if the physical interface is down. When the physical interface and logical interfaces come back up, traps are sent for both the physical and logical interfaces indicating link up.

For SONET types of interfaces with HDLC encapsulation, Junos OS does not send link down traps for a logical interface if the physical interface is down. When the physical interface and logical interfaces come back up, traps are sent for both the physical and logical interfaces indicating link up.

For channelize interfaces with PPP encapsulation, Junos OS does send link down traps for a logical interface if the physical interface is down. When the physical interface and logical interfaces come back up, traps are sent for both the physical and logical interfaces indicating link up.

For channelize interfaces with HDLC encapsulation, Junos OS does not send link down traps for a logical interface if the physical interface is down. When the physical interface and logical interfaces come back up, traps are sent for both the physical and logical interfaces indicating link up.

**Related
Documentation**

Junos OS Dual Routing Engine Configuration FAQs

This section presents frequently asked questions and answers related to the configuration of dual Routing Engines.

The SNMP configuration should be identical between the Routing Engines when configuring for continued communication. However, we recommend having separate Routing Engine IDs configured for each Routing Engine, when using SNMPv3.

In my system, the MIB object `snmpEngineBoots` is not in sync between two Routing Engines in a dual Routing Engine device. Is this normal behavior?

Yes. This is the normal behavior. Each Routing Engine runs its own SNMP process (`snmpd`) agent, allowing each Routing Engine to maintain its own engine boots.

Is there a way to identify that an address belongs to RE0, RE1, or the master Routing Engine management interface (`fxp0`) by looking at an SNMP walk?

No. When you do an SNMP walk on the device, it only displays the master Routing Engine management interface address.

What is the best way to tell if the current IP address belongs to `fxp0` or a Routing Engine, from a CLI session?

Routing Engines are mapped with the `fxp0` interface. This means that when you query RE0, the `ifTable` reports the `fxp0` interface address of RE0 only. Similarly, if you query RE1, the `ifTable` reports the `fxp0` interface address of RE1 only.

When there is a failover, the master hostname is changed since the hostname belongs to the Routing Engine. Is this correct?

Yes. You can configure the same hostname or different hostnames. Either would work.

If only the master IP address is configured (for example, 192.168.2.5), and the `sysDescr.0` object has the same string configured on both of the Routing Engines, then even after a switchover, the `sysDescr.0` object returns the same value. The following sample shows the results you get by using the `snmpget` command:

```
bng-junos-pool02: /c/svivek/PR_BRANCH/src> snmpget -c jnpr -v2c 192.168.2.5
sysDescr.0 system.sysDescr.0 = foo
```

SNMP Support for Routing Instances FAQs

This section presents frequently asked questions and answers related to how SNMP supports routing instances.

Can the SNMP manager access data for routing instances?

Yes, the Junos OS enables SNMP managers for all routing instances to request and manage SNMP data related to the corresponding routing instances and logical system networks.

Two different routing instance behaviors can occur, depending on where the clients originate:

- Clients from routing instances other than the default can access MIB objects and perform SNMP operations only on the logical system networks to which they belong.
- Clients from the default routing instance can access information related to all routing instances and logical system networks.

Routing instances are identified by either the context field in SNMPv3 requests or encoded in the community string in SNMPv1 or SNMPv2c requests.

When encoded in a community string, the routing instance name appears first and is separated from the actual community string by the @ character.

To avoid conflicts with valid community strings that contain the @ character, the community is parsed only if typical community string processing fails. For example, if a routing instance named **RI** is configured, an SNMP request with **RI@public** is processed within the context of the **RI** routing instance. Access control (including views, source address restrictions, and access privileges) is applied according to the actual community string (the set of data after the @ character—in this case **public**). However, if the community string **RI@public** is configured, the PDU is processed according to that community, and the embedded routing instance name is ignored.

Logical systems perform a subset of the actions of a physical router and have their own unique routing tables, interfaces, policies, and routing instances. When a routing instance is defined within a logical system, the logical system name must be encoded along with the routing instance using a slash (/) to separate the two. For example, if the routing instance **RI** is configured within the logical system **LS**, that routing instance must be encoded within a community string as **LS/RI@public**. When a routing instance is configured outside a logical system (within the default logical system), no logical system name, or / character, is needed.

Additionally, when a logical system is created, a default routing instance named **default** is always created within the logical system. This name should be used when querying data for that routing instance, for example **LS/default@public**. For SNMPv3 requests, the name **logical system/routing instance** should be identified directly in the context field.

Can I access a list of all routing instances on a device?

Yes, you can access a list of all the routing instances on a device using the `vacmContextName` object in the `SNMP-VIEW-BASED-ACM` MIB. In SNMP, each routing instance becomes a VACM context; this is why the routing instances appear in the `vacmContextName` object.

Can I access a default routing instance from a client in another logical router or routing instance?

No, the SNMP agent can only access data of the logical router to which it is connected.

**Related
Documentation**

SNMP Counters FAQs

This section presents frequently asked questions and answers related to SNMP counters.

Which MIB should I use for interface counters?

Interface management over SNMP is based on two tables: the **ifTable** and its extension the **ifXTable**. Both are described in RFC 1213, *Management Information Base for Network Management of TCP/IP-based internets: MIB-II* and RFC 2233, *The Interfaces Group MIB using SMIv2*.

Interfaces can have several layers, depending on the media, and each sublayer is represented by a separate row in the table. The relationship between the higher layer and lower layers is described in the **ifStackTable**.

The **ifTable** defines 32-bit counters for inbound and outbound octets (ifInOctets/ifOutOctets), packets (ifInUcastPkts/ifOutUcastPkts, ifInNUcastPkts/ifOutNUcastPkts), errors, and discards.

The **ifXTable** provides similar 64-bit counters, also called high capacity (HC) counters, for inbound and outbound octets (ifHCInOctets/ifHCOctets) and inbound packets (ifHCInUcastPkts).

When should 64-bit counters be used?

It is always good to use 64-bit counters because they contain statistics for both low and high capacity components.

Are the SNMP counters ifInOctets and ifOutOctets the same as the command reference show interfaces statistics in and out counters?

Yes, these are the same, but only if SNMP is enabled when the router boots up. If you power on a Juniper Networks device and then enable SNMP, the SNMP counters start from 0. SNMP counters do not automatically receive their statistics from the **show** command output. Similarly, using the **clear statistics** command does not clear the statistics that the SNMP counters collected, which can cause a discrepancy in the data that is seen by both processes.

Do the SNMP counters ifInOctets and ifOutOctets include the framing overhead for Point-to-Point Protocol (PPP) and High-Level Data Link Control (HDLC)?

Yes.

**Related
Documentation**

Managing Traps and Informs

The following sections contain a few tips on managing SNMP notifications:

- [Generating Traps Based on SysLog Events on page 111](#)
- [Filtering Traps Based on the Trap Category on page 111](#)
- [Filtering Traps Based on the Object Identifier on page 112](#)

Generating Traps Based on SysLog Events

Event policies can include an action that raises traps for events based on system log messages. This feature enables notification of an SNMP trap-based application when an important system log message occurs. You can convert any system log message, for which there is no corresponding trap, into a trap. If you are using network management system traps rather than system log messages to monitor your network, you can use this feature to ensure that you are notified of all the major events.

To configure a policy that raises a trap on receipt of an event, include the following statements at the **[edit event-options policy *policy-name*]** hierarchy level:

```
[edit event-options policy policy-name]
events [ events ];
then {
    raise-trap;
}
```

The following example shows the sample configuration for raising a trap for the event **ui_mgd_terminate**:

Generating Traps Based on SysLog Events

```
[edit event-options policy p1]
events ui_mgd_terminate;
then {
    raise-trap;
}
```

Filtering Traps Based on the Trap Category

SNMP traps are categorized into many categories. The Junos OS provides a configuration option, **categories** at the **[edit snmp trap-group *trap-group*]** hierarchy level, that enables you to specify categories of traps that you want to receive on a particular host. You can use this option when you want to monitor only specific modules of the Junos OS.

The following example shows a sample configuration for receiving only **link**, **vrrp-events**, **services**, and **otn-alarms** traps:

```
[edit snmp]
trap-group jnpr {
    categories {
        link;
```

```
vrp-events;  
services;  
otn-alarms;  
}  
targets {  
  192.168.69.179;  
}  
}
```

Filtering Traps Based on the Object Identifier

The Junos OS also provides a more advanced filter option that enables you to filter out specific traps based on their object identifiers. You can use the **notify-filter** option to filter out a specific trap or a group of traps.

The following example shows the sample configuration for excluding Juniper Networks enterprise-specific configuration management traps (note that the SNMPv3 configuration also supports filtering of SNMPv1 and SNMPv2 traps as is shown in the following example):

```
[edit snmp]  
v3 {  
  vacm {  
    security-to-group {  
      security-model v2c {  
        security-name sn_v2c_trap {  
          group gr_v2c_trap;  
        }  
      }  
    }  
  }  
  access {  
    group gr_v2c_trap {  
      default-context-prefix {  
        security-model v2c {  
          security-level none {  
            read-view all;  
            notify-view all;  
          }  
        }  
      }  
    }  
  }  
}  
target-address TA_v2c_trap {  
  address 10.209.196.166;  
  port 9001;  
  tag-list tg1;  
  target-parameters TP_v2c_trap;  
}  
target-parameters TP_v2c_trap {  
  parameters {  
    message-processing-model v2c;  
    security-model v2c;  
    security-level none;  
    security-name sn_v2c_trap;  
  }  
}
```

```
    }
    notify-filter nf1;
  }
  notify v2c_notify {
    type trap;
    tag tg1;
  }
  notify-filter nf1 {
    oid .1.3.6.1.4.1.2636.4.5 exclude;
    oid .1 include;
  }
  snmp-community index1 {
    community-name "$9$tDLl01h7Nbw2axN"; ## SECRET-DATA
    security-name sn_v2c_trap;
    tag tg1;
  }
  view all {
    oid .1 include;
  }
}
```

**Related
Documentation**

- [Understanding SNMP Implementation in Junos OS on page 75](#)
- [Best Practices for Configuring SNMP on page 199](#)
- [Monitoring SNMP Activity and Tracking Problems That Affect SNMP Performance on a Device Running Junos OS on page 363](#)
- [Optimizing the Network Management System Configuration for the Best Results on page 196](#)
- [Configuring Options on Managed Devices for Better SNMP Response Time on page 197](#)
- [Using the Enterprise-Specific Utility MIB to Enhance SNMP Coverage on page 265](#)

CHAPTER 8

SNMP MIBs and Traps Supported by Junos OS

- [Enterprise-Specific SNMP MIBs Supported by Junos OS on page 115](#)
- [Standard SNMP MIBs Supported by Junos OS on page 126](#)
- [Standard SNMP Traps Supported by Junos OS on page 146](#)
- [Enterprise-Specific SNMP Traps Supported by Junos OS on page 154](#)
- [Customized SNMP MIBs for Syslog Traps on page 168](#)
- [Example Custom Syslog Trap on page 181](#)

Enterprise-Specific SNMP MIBs Supported by Junos OS

Junos OS supports the enterprise-specific MIBs listed in [Table 8 on page 115](#). For information about enterprise-specific SNMP MIB objects, see the [SNMP MIB Explorer](#).

Table 8: Enterprise-specific MIBs supported by Junos OS

Enterprise-Specific MIB	Description	Platforms
AAA Objects MIB	Provides support for monitoring user authentication, authorization, and accounting through the RADIUS, LDAP, SecurID, and local authentication servers.	SRX Series and vSRX
Access Authentication Objects MIB	Provides support for monitoring firewall authentication, including data about the users trying to access firewall-protected resources and the firewall authentication service itself.	SRX Series and vSRX
Alarm MIB	Provides information about alarms from the router chassis.	All platforms

Table 8: Enterprise-specific MIBs supported by Junos OS (continued)

Enterprise-Specific MIB	Description	Platforms
Analyzer MIB	Provides information about analyzer and remote analyzer related to port mirroring on the EX Series Ethernet Switches. Port mirroring is a method used on enterprise switches to monitor and analyze traffic on the network. When port mirroring is enabled, copies of all (or a sample set of) packets are forwarded from one port of the switch to another port on the same switch (analyzer) or on another switch (remote analyzer) where the packet can be analyzed and studied.	EX Series, QFabric system, and QFX Series
Antivirus Objects MIB	Provides information about the antivirus engine, antivirus scans, and antivirus scan-related traps.	SRX Series and vSRX
ATM Class-of-Service MIB	Provides support for ATM interfaces and virtual connections.	ACX Series, M Series, and T Series
ATM MIB	Provides support for monitoring Asynchronous Transfer Mode, version 2 (ATM2) virtual circuit (VC) class-of-service (CoS) configurations. It also provides CoS queue statistics for all VCs that have CoS configured.	M Series, SRX Series, T Series and vSRX
BGP4 V2 MIB	Provides support for monitoring BGP peer-received prefix counters. It is based upon similar objects in the MIB documented in Internet draft draft-ietf-idr-bgp4-mibv2-03.txt, <i>Definitions of Managed Objects for the Fourth Version of BGP (BGP-4), Second Version</i> .	All platforms
Bidirectional Forwarding Detection MIB	Provides support for monitoring Bidirectional Forwarding Detection (BFD) sessions.	All platforms
Chassis Cluster MIB	Provides information about objects that are used whenever the state of the control link interfaces or fabric link interfaces changes (up to down or down to up) in a chassis cluster deployment.	SRX Series and vSRX
Chassis Definitions for Router Model MIB	Contains the object identifiers (OIDs) that are used by the Chassis MIB to identify platform and chassis components. The Chassis MIB provides information that changes often, whereas the Chassis Definitions for Router Model MIB provides information that changes less often.	ACX Series, M Series, MX Series, PTX Series, QFX Series, SRX550, SRX1500, and T Series

Table 8: Enterprise-specific MIBs supported by Junos OS (continued)

Enterprise-Specific MIB	Description	Platforms
Chassis MIBs	Provides support for environmental monitoring (power supply state, board voltages, fans, temperatures, and air flow) and inventory support for the chassis, System Control Board (SCB), System and Switch Board (SSB), Switching and Forwarding Module (SFM), Switch Fabric Board (SFB), Flexible PIC Concentrators (FPCs), and PICs.	All platforms
Class-of-Service MIB	Provides support for monitoring interface output queue statistics per interface and per forwarding class.	ACX Series, EX Series, M Series, MX Series, PTX Series, QFabric system, QFX Series, SRX Series, T Series, and vSRX
Configuration Management MIB	Provides notification for configuration changes as SNMP traps. Each trap contains the time at which the configuration change was committed, the name of the user who made the change, and the method by which the change was made. A history of the last 32 configuration changes is kept in <code>jnxCmChgEventTable</code> .	All platforms
Destination Class Usage MIB	Provides support for monitoring packet counts based on the ingress and egress points for traffic transiting your networks. Ingress points are identified by the input interface. Egress points are identified by destination prefixes grouped into one or more sets, known as destination classes. One counter is managed per interface per destination class, up to a maximum of 16 counters per interface.	EX Series, M Series, SRX Series, T Series, and vSRX
DHCP MIB	Provides SNMP support (get and trap) for DHCP local server and relay configurations. It also provides support for bindings and leases tables, and for statistics.	M Series, MX Series, and T Series
DHCPv6 MIB	Provides SNMP support (get and trap) for DHCPv6 local server and relay configurations. It also provides support for bindings and leases tables, and for statistics.	M Series, MX Series, and T Series
Digital Optical Monitoring MIB	Provides support for the SNMP Get request for statistics and SNMP Trap notifications for alarms.	EX Series, M Series, MX Series, PTX Series, and T Series

Table 8: Enterprise-specific MIBs supported by Junos OS (continued)

Enterprise-Specific MIB	Description	Platforms
DNS Objects MIB	Provides support for monitoring DNS proxy queries, requests, responses, and failures.	SRX Series and vSRX
Dynamic Flow Capture MIB	Provides support for monitoring the operational status of dynamic flow capture (DFC) PICs.	M Series and T Series
Ethernet MAC MIB	Monitors media access control (MAC) statistics on Gigabit Ethernet intelligent queuing (IQ) interfaces. It collects MAC statistics; for example, inocetets , inframes , outocetets , and outframes on each source MAC address and virtual LAN (VLAN) ID for each Ethernet port.	EX Series, M Series, MX Series, QFX Series, SRX300, SRX320, SRX340, SRX550, SRX1500 and T Series
Event MIB	Defines a generic trap that can be generated using an op script or event policy. This MIB provides the ability to specify a system log string and raise a trap if that system log string is found.	ACX Series, EX Series, M Series, MX Series, PTX Series, QFabric system, QFX Series, SRX1500, SRX300, SRX320, SRX340, SRX550, and T Series
Experimental MIB	Contains object identifiers for experimental MIBs.	ACX Series, M series, MX Series, and T series
EX Series MAC Notification MIB	Contains Juniper Networks' implementation of enterprise-specific MIB for Ethernet Mac Stats for EX Series.	EX Series
EX Series SMI MIB	Contains the Structure of Management Information for Juniper Networks EX Series platforms.	EX Series
Firewall MIB	Provides support for monitoring firewall filter counters. Routers must have the Internet Processor II ASIC to perform firewall monitoring.	ACX Series, EX Series, M Series, MX Series, PTX Series, QFabric system, QFX Series, SRX300, SRX320, SRX340, SRX550, SRX1500 and T Series
Flow Collection Services MIB	Provides statistics on files, records, memory, FTP, and error states of a monitoring services interface. It also provides SNMP traps for unavailable destinations, unsuccessful file transfers, flow overloading, and memory overloading.	M Series and T Series
GRE Keepalive Monitoring MIB	Provides support for monitoring generic routing encapsulation (GRE) keepalive status. This MIB also provides an SNMP trap when GRE keepalive status changes.	SRX Series and vSRX instances

Table 8: Enterprise-specific MIBs supported by Junos OS (continued)

Enterprise-Specific MIB	Description	Platforms
Host Resources MIB	Extends the hrStorageTable object, providing a measure of the usage of each file system on the router in percentage format. Previously, the objects in the hrStorageTable measured the usage in allocation units— hrStorageUsed and hrStorageAllocationUnits —only. Using the percentage measurement, you can more easily monitor and apply thresholds on usage.	ACX Series, EX Series, M Series, MX Series, QFX Series, SRX300, SRX320, SRX340, SRX550, SRX1500 and T Series
Interface Accounting Forwarding Class MIB	Extends the Juniper Enterprise Interface MIB and provides support for monitoring statistics data for interface accounting and IETF standardization.	M Series, MX Series, SRX Series, and vSRX
Interface MIB	Extends the standard ifTable (RFC 2863) with additional statistics and Juniper Networks enterprise-specific chassis information.	ACX Series, EX Series, M Series, MX Series, PTX Series, QFabric system, QFX Series, SRX300, SRX320, SRX340, SRX550, SRX1500 and T Series
IP Forward MIB	Extends the standard IP Forwarding Table MIB (RFC 4292) to include CIDR forwarding information.	All platforms
IPsec Generic Flow Monitoring Object MIB	Based on jnx-ipsec-monitor-mib , this MIB provides support for monitoring IPsec and IPsec VPN management objects.	SRX Series and vSRX
IPsec Monitoring MIB	Provides operational and statistical information related to the IPsec and IKE tunnels on Juniper Networks routers.	M Series, SRX Series, and T Series
IPsec VPN Objects MIB	Provides support for monitoring IPsec and IPsec VPN management objects for Juniper security product lines. This MIB is an extension of jnx-ipsec-flow-mon.mib .	SRX Series
IPv4 MIB	Provides additional Internet Protocol version 4 (IPv4) address information, supporting the assignment of identical IPv4 addresses to separate interfaces.	All platforms
IPv6 and ICMPv6 MIB	Provides IPv6 and Internet Control Message Protocol version 6 (ICMPv6) statistics.	M series, MX Series, PTX Series, SRX Series, T Series, and vSRX

Table 8: Enterprise-specific MIBs supported by Junos OS (continued)

Enterprise-Specific MIB	Description	Platforms
L2ALD MIB	<p>Contains information about the Layer 2 Address Learning Daemon (L2ALD) and related traps, such as the routing instance MAC limit trap and the interface MAC limit trap. This MIB also provides VLAN information in the jnxL2aldVlanTable table for Enhanced Layer 2 Software (ELS) EX Series and QFX Series switches.</p> <p>NOTE: Non-ELS EX Series switches support the VLAN MIB (jnxExVlanTable table) for VLAN information instead of this MIB. See the SNMP MIB Explorer.</p>	EX Series, MX Series, QFX Series, and T Series
L2CP MIB	<p>Provides information about Layer 2 Control Protocols (L2CP) based features. Currently, Junos OS supports only the jnxDot1dStpPortRootProtectEnabled, jnxDot1dStpPortRootProtectState, and jnxPortRootProtectStateChangeTrap objects.</p>	MX Series
L2TP MIB	Provides information about Layer 2 Transport Protocol (L2TP) tunnels and sessions.	M Series, MX Series, and T Series
LDP MIB	Provides LDP statistics and defines LDP label-switched path (LSP) notifications. LDP traps support only IPv4 standards.	ACX Series, M Series, PTX Series, SRX Series, and T Series
License MIB	Extends SNMP support to licensing information, and introduces SNMP traps that alert users when the licenses are about to expire, expire, or when the total number of users exceeds the number specified in the license.	M Series, MX Series, SRX Series, and T Series
Logical Systems MIB	Extend SNMP support to logical systems security profile through various MIBs defined under jnxLsysSecurityProfile .	SRX Series
LTE MIB	Extend SNMP support to monitor the 4G LTE Mini-Physical Interface Module (Mini-PIM) status using SNMP remote network management.	SRX300, SRX320, SRX340, SRX345, and SRX550M.
MIMSTP MIB	Provides information about MSTP instances (that is, routing instances of type Virtual Switch/Layer 2 control, also known as virtual contexts), MSTIs within the MSTP instance, and VLANs associated with the MSTI.	MX Series and T Series

Table 8: Enterprise-specific MIBs supported by Junos OS (continued)

Enterprise-Specific MIB	Description	Platforms
MPLS LDP MIB	<p>Contains object definitions as described in RFC 3815, <i>Definitions of Managed Objects for the Multiprotocol Label Switching (MPLS), Label Distribution Protocol (LDP)</i>.</p> <p>NOTE: Objects in the MPLS LDP MIB were supported in earlier releases of Junos OS as a proprietary LDP MIB (mib-ldpmib.txt). Because the branch used by the proprietary LDP (mib-ldpmib.txt) conflicts with RFC 3812, the proprietary LDP MIB (mib-ldpmib.txt) has been deprecated and replaced by the enterprise-specific MPLS LDP MIB (mib-jnx-mpls-ldp.txt).</p>	ACX Series, EX Series, M Series, MX Series, PTX Series, QFX Series, and T Series
MPLS MIB	<p>Provides MPLS information and defines MPLS notifications.</p> <p>NOTE: To collect information about MPLS statistics on transit routers, use the enterprise-specific RSVP MIB (mib-jnx-rsvp.txt) instead of the enterprise-specific MPLS MIB (mib-jnx-mpls.txt).</p>	ACX Series, EX Series, M Series, MX Series, PTX Series, QFX Series, SRX Series, and T Series
MVPN MIB	<p>Contains objects that enable SNMP manager to monitor MVPN connections on the provider edge routers. The enterprise-specific MVPN MIB is the Juniper Networks extension of the IETF standard MIBs defined in Internet draft draft-ietf-l3vpn-mvpn-mib-03.txt, <i>MPLS/BGP Layer 3 VPN Multicast Management Information Base</i>.</p>	All platforms
NAT Objects MIB	<p>Provides support for monitoring network address translation (NAT).</p>	EX Series and SRX Series
NAT Resources-Monitoring MIB	<p>Provides support for monitoring NAT pools usage and NAT rules. Notifications of usage of NAT resources are also provided by this MIB. This MIB is currently supported on the Multiservices PIC and Multiservices DPC on M Series and MX Series routers only.</p>	M Series and MX Series
OTN Interface Management MIB	<p>Defines objects for managing Optical Transport Network (OTN) interfaces on devices running Junos OS.</p>	M Series, MX series, PTX Series, and T Series
Packet Forwarding Engine MIB	<p>Provides notification statistics for Packet Forwarding Engines.</p>	ACX Series, EX Series, M Series, PTX Series, SRX Series, and T Series

Table 8: Enterprise-specific MIBs supported by Junos OS (continued)

Enterprise-Specific MIB	Description	Platforms
Packet Mirror MIB	Enables you to capture and view packet mirroring-related information. This MIB is currently supported by Junos OS for MX Series routers only. Packet mirroring traps are an extension of the standard SNMP implementation and are only available to SNMPv3 users.	MX Series
PAE Extension MIB	Extends the standard IEEE802.1x PAE Extension MIB, and contains information for Static MAC Authentication.	EX Series
Passive Monitoring MIB	Performs traffic flow monitoring and lawful interception of packets transiting between two routers.	M Series and T Series
Ping MIB	Extends the standard Ping MIB control table (RFC 2925). Items in this MIB are created when entries are created in pingCtlTable of the Ping MIB. Each item is indexed exactly as it is in the Ping MIB.	ACX Series, EX Series, M Series, MX Series, QFX Series, SRX Series, and T Series
Policy Objects MIB	Provides support for monitoring the security policies that control the flow of traffic from one zone to another.	SRX Series
Power Supply Unit MIB	Enables monitoring and managing of the power supply on a device running Junos OS.	EX Series and QFabric system
PPP MIB	Provides SNMP support for PPP-related information such as the type of authentication used, interface characteristics, status, and statistics. This MIB is supported on Common Edge PPP process, jpppd.	M Series and MX Series
PPPoE MIB	Provides SNMP support for PPPoE-related information such as the type of authentication used, interface characteristics, status, and statistics. This MIB is supported on Common Edge PPPoE process, jpppoed.	M Series and MX Series
Pseudowire ATM MIB	Extends the standard Pseudowire MIB, and defines objects used for managing the ATM pseudowires in Juniper products. The enterprise-specific Pseudowire ATM MIB is the Juniper Networks implementation of RFC 5605, <i>Managed Objects for ATM over Packet Switched Networks (PSNs)</i> .	M Series and MX Series

Table 8: Enterprise-specific MIBs supported by Junos OS (continued)

Enterprise-Specific MIB	Description	Platforms
Pseudowire TDM MIB	Extends the standard Pseudowire MIB, and contains information about configuration and statistics for specific pseudowire types. The enterprise-specific Pseudowire TDM MIB is the Juniper Networks implementation of the standard Managed Objects for TDM over Packet Switched Network MIB (draft-ietf-pwe3-tdm-mib-08.txt).	ACX Series, M Series, and T Series
PTP MIB	Monitors the operation of PTP clocks within the network.	MX Series
Real-Time Performance Monitoring MIB	Provides real-time performance-related data and enables you to access jitter measurements and calculations using SNMP.	EX Series, M Series, MX Series, SRX Series, and T Series
Reverse-Path-Forwarding MIB	Monitors statistics for traffic that is rejected because of reverse-path-forwarding (RPF) processing.	All platforms
RMON Events and Alarms MIB	Supports the Junos OS extensions to the standard Remote Monitoring (RMON) Events and Alarms MIB (RFC 2819). The extension augments alarmTable with additional information about each alarm. Two new traps are also defined to indicate when problems are encountered with an alarm.	All platforms
RSVP MIB	Provides information about RSVP-traffic engineering sessions that correspond to MPLS LSPs on transit routers in the service provider core network. NOTE: To collect information about MPLS statistics on transit routers, use the enterprise-specific RSVP MIB (mib-jnx-rsvp.txt) instead of the enterprise-specific MPLS MIB (mib-jnx-mpls.txt).	ACX Series, M Series, MX Series, PTX Series, and T Series
Security Interface Extension Objects MIB	Provides support for the security management of interfaces.	EX Series, SRX Series, and vSRX
Security Screening Objects MIB	Defines the MIB for the Juniper Networks Enterprise Firewall screen functionality.	SRX Series and vSRX
Services PIC MIB	Provides statistics for Adaptive Services (AS) PICs and defines notifications for AS PICs.	M Series and T Series

Table 8: Enterprise-specific MIBs supported by Junos OS (continued)

Enterprise-Specific MIB	Description	Platforms
SNMP IDP MIB	Contains Juniper Networks' implementation of enterprise specific MIB for IDP.	SRX Series and vSRX
SONET APS MIB	Monitors any SONET interface that participates in Automatic Protection Switching (APS).	M Series and T Series
SONET/SDH Interface Management MIB	Monitors the current alarm for each SONET/SDH interface.	M Series and T Series
Source Class Usage MIB	Counts packets sent to customers by performing a lookup on the IP source address and the IP destination address. The Source Class Usage (SCU) MIB makes it possible to track traffic originating from specific prefixes on the provider core and destined for specific prefixes on the customer edge.	M Series, T Series, and SRX Series
SPU Monitoring MIB	Provides support for monitoring SPUs on SRX5600 and SRX5800 devices.	SRX Series and vSRX
Structure of Management Information MIB	Explains how the Juniper Networks enterprise-specific MIBs are structured.	ACX Series, EX Series, M Series, MX series, QFX Series, SRX Series, T Series and vSRX
Structure of Management Information MIB for EX Series Ethernet Switches	Defines a MIB branch for switching-related MIB definitions for the EX Series Ethernet Switches.	EX Series
Structure of Management Information MIB for SRX Series	Contains object identifiers (OIDs) for the security branch of the MIBs used in Junos OS for SRX Series devices, services, and traps.	SRX Series and vSRX
Subscriber MIB	Provides SNMP support for subscriber-related information.	ACX Series, MX Series, and T Series
System Log MIB	Enables notification of an SNMP trap-based application when an important system log message occurs.	EX Series, M Series, MX Series, PTX Series, QFX Series, SRX Series, and T Series
Traceroute MIB	Supports the Junos OS extensions of traceroute and remote operations. Items in this MIB are created when entries are created in the <code>traceRouteCtlTable</code> of the Traceroute MIB. Each item is indexed exactly the same way as it is in the Traceroute MIB.	EX Series, M Series, MX Series, SRX Series, T Series, and vSRX

Table 8: Enterprise-specific MIBs supported by Junos OS (continued)

Enterprise-Specific MIB	Description	Platforms
Tunnel Stats MIB	Supports monitoring of tunnel statistics for IPV4 over IPV6 tunnels. This MIB currently displays three counters: tunnel count in rpd, tunnel count in Kernel, and tunnel count in the Packet Forwarding Engine.	all platforms
Utility MIB	Provides SNMP support for exposing the Junos OS data and has tables that contain information about each type of data, such as integer and string.	EX Series, M Series, MX Series, QFabric system, QFX Series, SRX Series, T Series, and vSRX
Virtual Chassis MIB	Contains information about the virtual chassis on the EX Series Ethernet Switches and the MX Series.	EX Series and MX Series
VLAN MIB	<p>Contains information about prestandard IEEE 802.10 VLANs and their association with LAN emulation clients.</p> <p>NOTE: For ELS EX Series switches and QFX Series switches, VLAN information is provided in the L2ALD MIB in the <code>jnxL2aldVlanTable</code> table instead of in this MIB. See the SNMP MIB Explorer for details.</p> <p>Non-ELS EX Series Ethernet switches use the <code>jnxExVlanTable</code> table in this MIB to provide VLAN configuration information, and the <code>jnxVlanTable</code> table in this MIB has been deprecated and is no longer used.</p>	EX Series and QFX Series
VPLS MIBs	<p>Provides information about generic, BGP-based, and LDP-based VPLS, and pseudowires associated with the VPLS networks. The enterprise-specific VPLS MIBs are Juniper Networks extensions of the following IETF standard MIBs defined in Internet draft <code>draft-ietf-l2vpn-vpls-mib-05.txt</code>, and are implemented as part of the <code>jnxExperiment</code> branch:</p> <ul style="list-style-type: none"> • VPLS-Generic-Draft-01-MIB implemented as <code>mib-jnx-vpls-generic.txt</code> • VPLS-BGP-Draft-01-MIB implemented as <code>mib-jnx-vpls-bgp.txt</code> • VPLS-LDP-Draft-01-MIB implemented as <code>mib-jnx-vpls-ldp.txt</code> 	M Series, MX Series, and T Series

Table 8: Enterprise-specific MIBs supported by Junos OS (continued)

Enterprise-Specific MIB	Description	Platforms
VPN Certificate Objects MIB	Provides support for monitoring the local and CA certificates loaded on the router.	EX Series, SRX Series, and vSRX
VPN MIB	Provides monitoring for Layer 3 VPNs, Layer 2 VPNs, and virtual private LAN service (VPLS) (read access only).	ACX Series, EX Series, M Series, MX Series, and T Series

Starting in Junos OS Release 18.4R1, you can monitor 4G LTE Mini-PIM status by using SNMP remote network management.

You can use the following commands to monitor the 4G LTE Mini-PIM status:

```
show snmp mib walk ascii jnxWirelessWANNetworkInfoTable
```

```
show snmp mib walk ascii jnxWirelessWANFirmwareInfoTable
```

In previous releases, the **show modem wireless network interface *interface-name*** and **show modem wireless firmware interface *interface-name*** commands are used to check the 4G LTE Mini-PIM status.

For information about enterprise-specific SNMP MIB objects, see the [SNMP MIB Explorer](#).

Related Documentation

- *Network Management and Monitoring Guide*
- [Standard SNMP MIBs Supported by Junos OS on page 126](#)
- [Enterprise-Specific SNMP Traps Supported by Junos OS on page 154](#)

Standard SNMP MIBs Supported by Junos OS

Junos OS supports the Standard MIBs listed in [Table 9 on page 126](#).



NOTE: For details on SNMP MIB support on EX4600 switches, QFX Series switches, and QFabric systems, see [“SNMP MIBs Support” on page 245](#).

Table 9: Standard MIBs supported by Junos OS

Standard MIB	Exceptions	Platforms
IEEE 802.1ab section 12.1, <i>Link Layer Discovery Protocol (LLDP) MIB</i>	EX Series implementation of LLDP MIB supports both IPv4 and IPv6 configuration.	EX Series and MX Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
IEEE, 802.3ad, <i>Aggregation of Multiple Link Segments</i>	<p>Supported tables and objects:</p> <ul style="list-style-type: none"> • dot3adAggPortTable, dot3adAggPortListTable, dot3adAggTable, and dot3adAggPortStatsTable <p>NOTE: EX Series switches do not support the dot3adAggPortTable and dot3adAggPortStatsTable.</p> <ul style="list-style-type: none"> • dot3adAggPortDebugTable (only dot3adAggPortDebugRxState, dot3adAggPortDebugMuxState, dot3adAggPortDebugActorSyncTransitionCount, dot3adAggPortDebugPartnerSyncTransitionCount, dot3adAggPortDebugActorChangeCount, and dot3adAggPortDebugPartnerChangeCount) <p>NOTE: EX Series switches do not support the dot3adAggPortDebugTable.</p> <ul style="list-style-type: none"> • dot3adTablesLastChanged 	EX Series, M Series, MX Series, PTX Series, SRX Series, T Series, and vSRX
IEEE, 802.1ag, <i>Connectivity Fault Management</i>	<p>Supported tables and objects:</p> <ul style="list-style-type: none"> • dot1agCfmMdTableNextIndex • dot1agCfmMdTable (except dot1agCfmMdMhFldPermission) • dot1agCfmMaNetTable • dot1agCfmMaMepListTable • dot1agCfmDefaultMdDefLevel • dot1agCfmDefaultMdDefMhfCreation • dot1agCfmMepTable (except dot1agCfmMepLbrBadMsdu, dot1agCfmMepTransmitLbmVlanPriority, dot1agCfmMepTransmitLbmVlanDropEnable, dot1agCfmMepTransmitLtmFlags, dot1agCfmMepPbbTeCanReportPbbTePresence, dot1agCfmMepPbbTeTrafficMismatchDefect, dot1agCfmMepPbbTransmitLbmLtmReverseVid, dot1agCfmMepPbbTeMismatchAlarm, dot1agCfmMepPbbTeLocalMismatchDefect, and dot1agCfmMepPbbTeMismatchSinceReset) • dot1agCfmLtrTable (except dot1agCfmLtrChassisIdSubtype, dot1agCfmLtrChassisId, dot1agCfmLtrManAddressDomain, dot1agCfmLtrManAddress, dot1agCfmLtrIngressPortIdSubtype, dot1agCfmLtrIngressPortId, dot1agCfmLtrEgressPortIdSubtype, dot1agCfmLtrEgressPortId, and dot1agCfmLtrOrganizationSpecificTlv) • dot1agCfmMepDbTable (except dot1agCfmMebDbChassisIdSubtype, dot1agCfmMebDbChassisId, dot1agCfmMebDbManAddressDomain, and dot1agCfmMebDbManAddress) 	EX Series, MX Series, and QFX Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
IEEE, 802.1ap, <i>Management Information Base (MIB) definitions for VLAN Bridges</i>	Supported tables and objects: <ul style="list-style-type: none"> • <code>ieee8021CfmStackTable</code> • <code>ieee8021CfmVlanTable</code> • <code>ieee8021CfmDefaultMdTable</code> (except <code>ieee8021CfmDefaultMdIdPermission</code>) • <code>ieee8021CfmMaCompTable</code> (except <code>ieee8021CfmMaCompldPermission</code>) 	MX Series
RFC 1155, <i>Structure and Identification of Management Information for TCP/IP-based Internets</i>	No exceptions	All platforms
RFC 1157, <i>A Simple Network Management Protocol (SNMP)</i>	No exceptions	All platforms
RFC 1195, <i>Use of OSI IS-IS for Routing in TCP/IP and Dual Environments</i>	Supported tables and objects: <ul style="list-style-type: none"> • <code>isisSystem</code> • <code>isisMANAreaAddr</code> • <code>isisAreaAddr</code> • <code>isisSysProtSupp</code> • <code>isisSummAddr</code> • <code>isisCirc</code> • <code>isisCircLevel</code> • <code>isisPacketCount</code> • <code>isisISAdj</code> • <code>isisISAdjAreaAddr</code> • <code>isisAdjIPAddr</code> • <code>isisISAdjProtSupp</code> • <code>isisRa</code> • <code>isisIPRA</code> 	All platforms
RFC 1212, <i>Concise MIB Definitions</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 1213, <i>Management Information Base for Network Management of TCP/IP-Based Internets: MIB-II</i>	<p>Junos OS supports the following areas:</p> <ul style="list-style-type: none"> MIB II and its SNMP version 2 derivatives, including: <ul style="list-style-type: none"> Statistics counters IP, except for ipRouteTable, which has been replaced by ipCidrRouteTable (RFC 2096, <i>IP Forwarding Table MIB</i>) SNMP management Interface management SNMPv1 Get, GetNext requests, and version 2 GetBulk request Junos OS-specific secured access list Master configuration keywords Reconfigurations upon SIGHUP 	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 1215, <i>A Convention for Defining Traps for use with the SNMP</i>	Junos OS supports only MIB II SNMP version 1 traps and version 2 notifications.	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 1406, <i>Definitions of Managed Objects for the DS1 and E1 Interface Types</i>	Junos OS supports T1 MIB.	ACX Series, M Series, SRX Series, and T Series
RFC 1407, <i>Definitions of Managed Objects for the DS3/E3 Interface Type</i>	Junos OS supports T3 MIB.	M Series and T Series
RFC 1471, <i>Definitions of Managed Objects for the Link Control Protocol of the Point-to-Point Protocol</i>	<p>Supported tables and objects:</p> <ul style="list-style-type: none"> pppLcp 1 object pppLinkStatustable table pppLinkConfigTable table 	M Series, MX Series, and PTX Series
RFC 1657, <i>Definitions of Managed Objects for the Fourth Version of the Border Gateway Protocol (BGP-4) using SMIv2</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, and T Series
RFC 1695, <i>Definitions of Managed Objects for ATM Management Version 8.0 Using SMIv2</i>	No exceptions	ACX Series, M Series, PTX Series, and T Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 1850, <i>OSPF Version 2 Management Information Base</i>	Unsupported tables, objects, and traps: <ul style="list-style-type: none"> • ospfOriginateNewLsas object • ospfRxNewLsas object • The host table • ospfOriginateLSA trap • ospfLsdbOverflow trap • ospfLsdbApproachingOverflow trap 	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 1901, <i>Introduction to Community-based SNMPv2</i>	No exceptions	All platforms
RFC 2011, <i>SNMPv2 Management Information Base for the Internet Protocol Using SMIv2</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, and T Series
RFC 2012, <i>SNMPv2 Management Information Base for the Transmission Control Protocol Using SMIv2</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2013, <i>SNMPv2 Management Information Base for the User Datagram Protocol Using SMIv2</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2024, <i>Definitions of Managed Objects for Data Link Switching Using SMIv2</i>	Unsupported tables, objects, and traps with read-only access: <ul style="list-style-type: none"> • dlswInterface object group • dlswSdlc object group • dlswDirLocateMacTable table • dlswDirNBTable table • dlswDirLocateNBTable table • dlswCircuitDiscReasonLocal tabular object • dlswCircuitDiscReasonRemote tabular object • dlswDirMacCacheNextIndex scalar object • dlswDirNBCacheNextIndex scalar object 	M Series, MX Series, and T Series
RFC 2096, <i>IP Forwarding Table MIB</i> NOTE: RFC 2096 has been replaced by RFC 4292. However, Junos OS currently supports both RFC 2096 and RFC 4292.	The IpCidrRouteTable has been extended to include the tunnel name when the next hop is through an RSVP-signaled LSP.	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 2115, <i>Management Information Base for Frame Relay DTEs Using SMIv2</i>	Unsupported table and objects: <ul style="list-style-type: none"> • frCircuitTable • frErrTable 	M Series, MX Series, SRX Series, and T Series
RFC 2233, <i>The Interfaces Group MIB Using SMIv2</i> NOTE: RFC 2233 has been replaced by RFC 2863, IF MIB. However, Junos OS supports both RFC 2233 and RFC 2863.	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2287, <i>Definitions of System-Level Managed Objects for Applications</i>	Supported tables and objects: <ul style="list-style-type: none"> • sysApplInstallIPkgTable • sysApplInstallElmtTable • sysApplElmtRunTable • sysApplMapTable 	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2465, <i>Management Information Base for IP Version 6: Textual Conventions and General Group</i> (except for IPv6 interface statistics)	Junos OS does not support IPv6 interface statistics.	ACX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2495, <i>Definitions of Managed Objects for the DS1, E1, DS2, and E2 Interface Types</i>	Unsupported tables, objects, and traps: <ul style="list-style-type: none"> • dsx1FarEndConfigTable • dsx1FarEndCurrentTable • dsx1FarEndIntervalTable • dsx1FarEndTotalTable • dsx1FracTable 	ACX Series, M Series, SRX Series, and T Series
RFC 2515, <i>Definitions of Managed Objects for ATM Management</i>	Unsupported table and objects: <ul style="list-style-type: none"> • atmVpCrossConnectTable • atmVcCrossConnectTable • aal5VccTable 	ACX Series, M Series, and T Series
RFC 2570, <i>Introduction to Version 3 of the Internet-standard Network Management Framework</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 2571, <i>An Architecture for Describing SNMP Management Frameworks</i> (read-only access) NOTE: RFC 2571 has been replaced by RFC 3411. However, Junos OS supports both RFC 2571 and RFC 3411.	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2572, <i>Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)</i> (read-only access) NOTE: RFC 2572 has been replaced by RFC 3412. However, Junos OS supports both RFC 2572 and RFC 3412.	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2576, <i>Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework</i> NOTE: RFC 2576 has been replaced by RFC 3584. However, Junos OS supports both RFC 2576 and RFC 3584.	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2578, <i>Structure of Management Information Version 2 (SMIv2)</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2579, <i>Textual Conventions for SMIv2</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2580, <i>Conformance Statements for SMIv2</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2662, <i>Definitions of Managed Objects for ADSL Lines</i>	No exceptions	M Series, MX Series, SRX Series, and T Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 2665, <i>Definitions of Managed Objects for the Ethernet-like Interface Types</i> NOTE: The list of managed objects specified in RFC 2665 has been updated by RFC 3635 by including information useful for the management of 10-Gigabit per second Ethernet interfaces.	For M Series, T Series, and MX Series, the SNMP counters do not count the Ethernet header and frame check sequence (FCS). Therefore, the Ethernet header bytes and the FCS bytes are not included in the following four tables: <ul style="list-style-type: none"> • ifInOctets • ifOutOctets • ifHCInOctets • ifHCOctets However, the EX switches adhere to RFC 2665.	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2787, <i>Definitions of Managed Objects for the Virtual Router Redundancy Protocol</i>	Unsupported table and objects: <ul style="list-style-type: none"> • vrrpStatsPacketLengthErrors NOTE: Junos OS does not support this standard for row creation and the Set operation.	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2790, <i>Host Resources MIB</i>	Supported tables and objects: <ul style="list-style-type: none"> • hrStorageTable NOTE: The file systems / , /config , /var , and /tmp always return the same index number. When SNMP restarts, the index numbers for the remaining file systems might change. <ul style="list-style-type: none"> • hrSystem group • hrSWInstalled group • hrProcessorTable 	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2819, <i>Remote Network Monitoring Management Information Base</i>	Supported tables and objects: <ul style="list-style-type: none"> • etherStatsTable (for Ethernet interfaces only), alarmTable, eventTable, and logTable are supported on all devices running Junos OS. • historyControlTable and etherHistoryTable (except etherHistoryUtilization object) are supported only on EX Series switches. 	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2863, <i>The Interfaces Group MIB</i> NOTE: RFC 2863 replaces RFC 2233. However, Junos OS supports both RFC 2233 and RFC 2863.	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2864, <i>The Inverted Stack Table Extension to the Interfaces Group MIB</i>	No exceptions	M Series, MX Series, PTX Series, SRX Series, and T Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 2922, <i>The Physical Topology (PTOPO) MIB</i>	Supported objects: <ul style="list-style-type: none"> • <code>ptopoConnDiscAlgorithm</code> • <code>ptopoConnAgentNetAddrType</code> • <code>ptopoConnAgentNetAddr</code> • <code>ptopoConnMultiMacSASeen</code> • <code>ptopoConnMultiNetSASeen</code> • <code>ptopoConnsStatic</code> • <code>ptopoConnLastVerifyTime</code> • <code>ptopoConnRowStatus</code> 	EX Series and SRX Series
RFC 2925, <i>Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations</i>	Supported tables and objects: <ul style="list-style-type: none"> • <code>pingCtlTable</code> • <code>pingResultsTable</code> • <code>pingProbeHistoryTable</code> • <code>pingMaxConcurrentRequests</code> • <code>traceRouteCtlTable</code> • <code>traceRouteResultsTable</code> • <code>traceRouteProbeHistoryTable</code> • <code>traceRouteHopsTable</code> 	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2932, <i>IPv4 Multicast Routing MIB</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2934, <i>Protocol Independent Multicast MIB for IPv4</i> NOTE: In Junos OS, RFC 2934 is implemented based on a draft version, <i>pimmib.mib</i> , of the now standard RFC.	Support for the <code>pimNeighborLoss</code> trap was added in Release 11.4.	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 2981, <i>Event MIB</i>	No exceptions	ACX Series, M Series, MX Series, PTX Series, and T Series
RFC 3014, <i>Notification Log MIB</i>	No exceptions	ACX Series, M Series, MX Series, PTX Series, and T Series
RFC 3019, <i>IP Version 6 Management Information Base for The Multicast Listener Discovery Protocol</i>	No exceptions	M Series, MX Series, PTX Series, SRX Series, and T Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 3410, <i>Introduction and Applicability Statements for Internet-Standard Management Framework</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 3411, <i>An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks</i> NOTE: RFC 3411 replaces RFC 2571. However, Junos OS supports both RFC 3411 and RFC 2571.	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 3412, <i>Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)</i> NOTE: RFC 3412 replaces RFC 2572. However, Junos OS supports both RFC 3412 and RFC 2572.	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 3413, <i>Simple Network Management Protocol (SNMP) Applications</i>	Unsupported tables and objects: <ul style="list-style-type: none">• Proxy MIB	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 3414, <i>User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 3415, <i>View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 3416, <i>Version 2 of the Protocol Operations for the Simple Network Management Protocol (SNMP)</i> NOTE: RFC 3416 replaces RFC 1905, which was supported in earlier versions of Junos OS.	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 3417, <i>Transport Mappings for the Simple Network Management Protocol (SNMP)</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 3418, <i>Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)</i> NOTE: RFC 3418 replaces RFC 1907, which was supported in earlier versions of Junos OS.	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 3498, <i>Definitions of Managed Objects for Synchronous Optical Network (SONET) Linear Automatic Protection Switching (APS) Architectures</i> (implemented under the Juniper Networks enterprise branch [jnxExperiment])	No exceptions	M Series and T Series
RFC 3584, <i>Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 3591 <i>Managed Objects for the Optical Interface Type</i>	Supported tables and objects: <ul style="list-style-type: none"> • optIfOTMnTable (except optIfOTMnOpticalReach, optIfOTMnInterfaceType, and optIfOTMnOrder) • optIfOChConfigTable (except optIfOChDirectionality and optIfOChCurrentStatus) • optIfOTUkConfigTable (except optIfOTUkTraceIdentifierAccepted, optIfOTUkTIMDetMode, optIfOTUkTIMActEnabled, optIfOTUkTraceIdentifierTransmitted, optIfOTUkDEGThr, optIfOTUkDEGM, optIfOTUkSinkAdaptActive, and optIfOTUkSourceAdaptActive) • optIfODUkConfigTable (except optIfODUkPositionSeqCurrentSize and optIfODUkTtpPresent) 	M Series, MX Series, PTX Series, and T Series
RFC 3592, <i>Definitions of Managed Objects for the Synchronous Optical Network/Synchronous Digital Hierarchy (SONET/SDH) Interface Type</i>	No exceptions	M Series, MX Series, and T Series
RFC 3621, <i>Power Ethernet MIB</i>	No exceptions	EX Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 3635, <i>Definitions of Managed Objects for the Ethernet-like Interface Types</i>	<p>Unsupported tables and objects:</p> <ul style="list-style-type: none"> • dot3StatsRateControlAbility • dot3StatsRateControlStatus in dot3StatsEntry table <p>NOTE: The values of the following objects in dot3HCStatsEntry table will be always zero for both 32-bit counters and 64-bit counters:</p> <ul style="list-style-type: none"> • dot3HCStatsSymbolErrors • dotHCStatsInternalMacTransmitErrors 	MX Series
RFC 3637, <i>Definitions of Managed Objects for the Ethernet WAN Interface Sublayer</i>	<p>Unsupported tables and objects:</p> <ul style="list-style-type: none"> • etherWisDeviceTable, • etherWisSectionCurrentTable • etherWisFarEndPathCurrentTable 	M Series, MX Series, PTX Series, and T Series
RFC 3811, <i>Definitions of Textual Conventions (TCs) for Multiprotocol Label Switching (MPLS) Management</i>	No exceptions	ACX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 3812, <i>Multiprotocol Label Switching (MPLS) Traffic Engineering (TE) Management Information Base (MIB) (read-only access)</i>	<p>MPLS tunnels as interfaces are not supported.</p> <p>mplsTunnelCHopTable is supported on ingress routers only.</p> <p>NOTE: The branch used by the proprietary LDP MIB (ldpmib.mib) conflicts with RFC 3812. ldpmib.mib has been deprecated and replaced by jnx-mpls-ldp.mib.</p> <p>Unsupported tables and objects:</p> <ul style="list-style-type: none"> • mplsTunnelResourceMeanRate in TunnelResource table • mplsTunnelResourceMaxBurstSize in TunnelResource table • mplsTunnelResourceMeanBurstSize in TunnelResource table • mplsTunnelResourceExBurstSize in TunnelResource table • mplsTunnelResourceWeight in TunnelResource table • mplsTunnelPerfTable • mplsTunnelCRLDPResTable 	ACX Series, M Series, MX Series, PTX Series, and T Series
RFC 3813, <i>Multiprotocol Label Switching (MPLS) Label Switching Router (LSR) Management Information Base (MIB)</i>	<p>Unsupported tables and objects (read-only access):</p> <ul style="list-style-type: none"> • mplsInterfacePerfTable • mplsInSegmentPerfTable • mplsOutSegmentPerfTable • mplsInSegmentMapTable • mplsXCUp • mplsXCDown 	ACX Series, M Series, MX Series, PTX Series, SRX Series, and T Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 3826, <i>The Advanced Encryption Standard (AES) Cipher Algorithm in the SNMP User-based Security Model</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 3877, <i>Alarm Management Information Base</i>	<ul style="list-style-type: none"> Junos OS does not support the alarmActiveStatsTable. Traps that do not conform to the alarm model are not supported. However, these traps can be redefined to conform to the alarm model. 	MX Series
RFC 3896, <i>Definitions of Managed Objects for the DS3/E3 Interface Type</i>	Unsupported tables and objects: <ul style="list-style-type: none"> dsx3FarEndConfigTable dsx3FarEndCurrentTable dsx3FarEndIntervalTable dsx3FarEndTotalTable dsx3FracTable 	M Series and T Series
RFC 4087, <i>IP Tunnel MIB</i>	Describes MIB objects in the following tables for managing tunnels of any type over IPv4 and IPv6 networks: <ul style="list-style-type: none"> tunnelIfTable—Provides information about the tunnels known to a router. tunnelInetConfigTable—Assists dynamic creation of tunnels and provides mapping from end-point addresses to the current interface index value. <p>NOTE: Junos OS supports MAX-ACCESS of read-only for all the MIB objects in tunnelIfTable and tunnelInetConfigTable tables.</p>	M Series, MX Series, and T Series
RFC 4133, <i>Entity MIB</i>	Unsupported tables and objects: <ul style="list-style-type: none"> entityLogicalGroup table entPhysicalMfgDate and entPhysicalUris objects in entityPhysical2Group table entLPMMappingTable and entPhysicalContainsTable in entityMappingGroup table entityNotificationsGroup table 	Only MX240, MX480, and MX960 routers, and EX2200 and EX3300 switches
RFC 4188, <i>Definitions of Managed Objects for Bridges</i>	<ul style="list-style-type: none"> Supports 802.1D STP(1998) Supported subtrees and objects: <ul style="list-style-type: none"> dot1dStp subtree is supported on MX Series 5G Universal Routing Platforms. dot1dTpFdbAddress, dot1dTpFdbPort, and dot1dTpFdbStatus objects from the dot1dTpFdbTable of the dot1dTp subtree are supported on EX Series Ethernet Switches. dot1dTpLearnedEntryDiscards and dot1dTpAgingTime objects are supported on M Series and T Series routers. 	MX Series, EX Series, and M Series and T Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 4268, <i>Entity State MIB</i>	No exceptions	Only MX240, MX480, and MX960 routers, and EX2200 and EX3300 switches
RFC 4273, <i>Definitions of Managed Objects for BGP-4</i>	Supported tables and objects: <ul style="list-style-type: none"> • <code>jnxBgpM2PrefixInPrefixesAccepted</code> • <code>jnxBgpM2PrefixInPrefixesRejected</code> 	ACX Series, EX Series, M Series, MX Series, SRX Series, and T Series
RFC 4292, <i>IP Forwarding MIB</i>	Supported tables and objects: <ul style="list-style-type: none"> • <code>inetCidrRouteTable</code> • <code>inetCidrRouteNumber</code> • <code>inetCidrRouteDiscards</code> <p>NOTE: Junos OS currently supports these MIB objects that will be deprecated in future releases: <code>ipCidrRouteTable</code>, <code>ipCidrRouteNumber</code>, and <code>ipCidrRouteDiscards</code>.</p>	ACX Series, EX Series, M Series, MX Series, PTX Series, and T Series
RFC 4293, <i>Management Information Base for the Internet Protocol (IP)</i>	Supports only the mandatory groups.	MX Series and EX Series
RFC 4318, <i>Definitions of Managed Objects for Bridges with Rapid Spanning Tree Protocol</i>	Supports 802.1w and 802.1t extensions for RSTP.	EX Series, M Series, MX Series, and T Series
RFC 4363b, <i>Q-Bridge VLAN MIB</i>	No exceptions	MX Series and EX Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 4382, <i>MPLS/BGP Layer 3 Virtual Private Network (VPN) MIB</i>	Supported tables and objects: <ul style="list-style-type: none"> • mplsL3VpnActiveVrfs • mplsL3VpnConfiguredVrfs • mplsL3VpnConnectedInterfaces • mplsL3VpnVrfConfMidRteThresh • mplsL3VpnVrfConfHighRteThresh • mplsL3VpnIfConfRowStatus • mplsL3VpnIlliLbIRcvThresh • mplsL3VpnNotificationEnable • mplsL3VpnVrfConfMaxPossRts • mplsL3VpnVrfConfRteMxThreshTime • mplsL3VpnVrfOperStatus • mplsL3VpnVrfPerfCurrNumRoutes • mplsL3VpnVrfPerfTable • mplsL3VpnVrfRteTable • mplsVpnVrfRTTable • mplsL3VpnVrfTable • mplsL3VpnIfConfTable 	EX Series, M Series, MX Series, PTX Series, and T Series
RFC 4444, <i>IS-IS MIB</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 4668, <i>RADIUS Accounting Client Management Information Base (MIB) for IPv6</i> (read-only access)	No exceptions	MX Series
RFC 4670, <i>RADIUS Accounting Client Management Information Base (MIB)</i> (read-only access)	No exceptions	MX Series
RFC 4801, <i>Definitions of Textual Conventions for Generalized Multiprotocol Label Switching (GMPLS) Management Information Base (MIB)</i> (read-only access)	No exceptions	M Series, MX Series, and T Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 4802, <i>Generalized Multiprotocol Label Switching (GMPLS) Traffic Engineering (TE) Management Information Base (MIB)</i> (read-only access)	Unsupported tables and objects: <ul style="list-style-type: none"> • <code>gmplsTunnelReversePerfTable</code> • <code>gmplsTeScalars</code> • <code>gmplsTunnelTable</code> • <code>gmplsTunnelARHopTable</code> • <code>gmplsTunnelCHopTable</code> • <code>gmplsTunnelErrorTable</code> 	M Series, MX Series, and T Series
RFC 4803, <i>Generalized Multiprotocol Label Switching (GMPLS) Label Switching Router (LSR) Management Information Base (MIB)</i> (read-only access) NOTE: The tables in GMPLS TE (RFC 4802) and LSR (RFC 4803) MIBs are extensions of the corresponding tables from the MPLS TE (RFC 3812) and LSR (RFC 3813) MIBs and use the same index as the MPLS MIB tables.	Unsupported tables and objects: <ul style="list-style-type: none"> • <code>gmplsLabelTable</code> • <code>gmplsOutsegmentTable</code> 	M Series, MX Series, and T Series
RFC 5132, <i>IP Multicast MIB</i> NOTE: This RFC obsoletes RFC2932.	Unsupported table: <ul style="list-style-type: none"> • <code>ipMcastZoneTable</code> 	All platforms

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 5643, <i>Management Information Base for OSPFv3</i> (read-only access)	Unsupported tables and objects: <ul style="list-style-type: none"> • ospfv3HostTable • ospfv3CfgNbrTable • ospfv3ExitOverflowInterval • ospfv3ReferenceBandwidth • ospfv3RestartSupport • ospfv3RestartInterval • ospfv3RestartStrictLsaChecking • ospfv3RestartStatus • ospfv3RestartAge • ospfv3RestartExitReason • ospfv3NotificationEnable • ospfv3StubRouterSupport • ospfv3StubRouterAdvertisement • ospfv3DiscontinuityTime • ospfv3RestartTime • ospfv3AreaNssaTranslatorRole • ospfv3AreaNssaTranslatorState • ospfv3AreaNssaTranslatorStabInterval • ospfv3AreaNssaTranslatorEvents • ospfv3AreaTEEnabled • ospfv3IfMetricValue • ospfv3IfDemandNbrProbe 	M Series, MX Series, PTX Series, SRX Series, and T Series
RFC 6527, <i>Definitions of Managed Objects for the Virtual Router Redundancy Protocol Version 3 (VRRPv3)</i>	<ul style="list-style-type: none"> • Row creation • The Set operation • Unsupported tables and objects: <ul style="list-style-type: none"> • vrrpv3StatisticsRowDiscontinuityTime • vrrpv3StatisticsPacketLengthErrors 	ACX Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
RFC 7420, <i>Path Computation Element Communication</i>	<p>The PCEP MIB module is limited to "read-only" access except for pcePcepNotificationsMaxRate, which is used to throttle the rate at which the implementation generates notifications. In the mentioned tables only PCEP peer and PCEP session table will be supported in this release.</p> <p>For pcePcepPeerTable, the following members are not supported:</p> <ul style="list-style-type: none"> pcePcepPeerDiscontinuityTime TimeStamp, pcePcepPeerLWMRspTime Unsigned32, pcePcepPeerHWMRspTime Unsigned32, pcePcepPeerNumPCReqSent Counter32, pcePcepPeerNumPCReqRcvd Counter32, pcePcepPeerNumPCRepSent Counter32, pcePcepPeerNumPCRepRcvd Counter32, pcePcepPeerAvgRspTime Unsigned32, pcePcepPeerNumReqSent Counter32, pcePcepPeerNumReqSentEroRcvd Counter32, pcePcepPeerNumReqSentErrorRcvd Counter32, pcePcepPeerNumReqSentTimeout Counter32, pcePcepPeerNumReqSentPendRep Counter32, pcePcepPeerNumReqSentCancelSent Counter32, pcePcepPeerNumReqSentClosed Counter32, pcePcepPeerNumReqRcvd Counter32, pcePcepPeerNumPCNtfSent Counter32, pcePcepPeerNumPCNtfRcvd Counter32, pcePcepPeerNumSvecSent Counter32, pcePcepPeerNumSvecReqSent Counter32, pcePcepPeerNumSvecRcvd Counter32, pcePcepPeerNumSvecReqRcvd Counter32, pcePcepPeerNumReqRcvdPendRep Counter32, pcePcepPeerNumReqRcvdEroSent Counter32, pcePcepPeerNumReqRcvdNoPathSent Counter32, pcePcepPeerNumReqRcvdCancelSent Counter32, pcePcepPeerNumReqRcvdErrorSent Counter32, pcePcepPeerNumReqRcvdCancelRcvd Counter32, pcePcepPeerNumReqRcvdClosed Counter32, pcePcepPeerNumRepRcvdUnknown Counter32, pcePcepPeerNumReqRcvdUnknown Counter32, pcePcepPeerNumReqSentNoPathRcvd Counter32, pcePcepPeerNumReqSentCancelRcvd Counter32 	MX Series and PTX Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
	<p>For <code>pcePcepSessTable</code>, the following members are not supported:</p> <ul style="list-style-type: none"> • <code>pcePcepSessNumPCReqSent Counter32</code>, • <code>pcePcepSessNumPCReqRcvd Counter32</code>, • <code>pcePcepSessKAHoldTimeRem Unsigned32</code>, • <code>pcePcepSessOverloaded TruthValue</code>, • <code>pcePcepSessOverloadTime Unsigned32</code>, • <code>pcePcepSessPeerOverloaded TruthValue</code>, • <code>pcePcepSessPeerOverloadTime Unsigned32</code>, • <code>pcePcepSessNumPCNtfSent Counter32</code>, • <code>pcePcepSessNumPCNtfRcvd Counter32</code>, • <code>pcePcepSessNumReqSent Counter32</code>, • <code>pcePcepSessNumReqSentPendRep Counter32</code>, • <code>pcePcepSessNumReqSentEroRcvd Counter32</code>, • <code>pcePcepSessNumReqSentNoPathRcvd Counter32</code>, • <code>pcePcepSessNumReqSentCancelRcvd Counter32</code>, • <code>pcePcepSessNumReqSentErrorRcvd Counter32</code>, • <code>pcePcepSessNumReqSentTimeout Counter32</code>, • <code>pcePcepSessNumReqSentCancelSent Counter32</code>, • <code>pcePcepSessAvgRspTime Unsigned32</code>, • <code>pcePcepSessLWMRspTime Unsigned32</code>, • <code>pcePcepSessHWMRspTime Unsigned32</code>, • <code>pcePcepSessNumSvecSent Counter32</code>, • <code>pcePcepSessNumSvecReqSent Counter32</code>, • <code>pcePcepSessNumReqRcvd Counter32</code>, • <code>pcePcepSessNumSvecRcvd Counter32</code>, • <code>pcePcepSessNumSvecReqRcvd Counter32</code>, • <code>pcePcepSessNumReqRcvdPendRep Counter32</code>, • <code>pcePcepSessNumReqRcvdEroSent Counter32</code>, • <code>pcePcepSessNumReqRcvdNoPathSent Counter32</code>, • <code>pcePcepSessNumReqRcvdCancelSent Counter32</code>, • <code>pcePcepSessNumReqRcvdErrorSent Counter32</code>, • <code>pcePcepSessNumReqRcvdCancelRcvd Counter32</code>, • <code>pcePcepSessNumRepRcvdUnknown Counter32</code>, • <code>pcePcepSessNumReqRcvdUnknown Counter32</code> 	
<p>ESO Consortium MIB, which can be found at http://www.snmp.com/eso/</p> <p>NOTE: The ESO Consortium MIB has been replaced by RFC 3826.</p>	No exceptions	<p>ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series</p>

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
Internet Assigned Numbers Authority, <i>IANAiftype Textual Convention MIB</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
Internet draft draft-ietf-atommib-sonetaps-mib-10.txt, <i>Definitions of Managed Objects for SONET Linear APS Architectures</i>	As defined under the Juniper Networks enterprise branch [jnxExperiment] only	M Series, MX Series, and T Series
Internet draft draft-ietf-bfd-mib-02.txt, <i>Bidirectional Forwarding Detection Management Information Base</i>	(Represented by mib-jnx-bfd-exp.txt and implemented under the Juniper Networks enterprise branch [jnxExperiment]. Read only. Includes bfdSessUp and bfdSessDown traps. Does not support bfdSessPerfTable and bfdSessMapTable .)	ACX Series, EX Series, M Series, MX Series, SRX Series, and T Series
Internet draft draft-ietf-idmr-igmp-mib-13.txt, <i>Internet Group Management Protocol (IGMP) MIB</i>	No exceptions	EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
Internet draft draft-ietf-idmr-pim-mib-09.txt, <i>Protocol Independent Multicast (PIM) MIB</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
Internet draft draft-ietf-isis-wg-mib-07.txt, <i>Management Information Base for IS-IS</i> NOTE: Replaced with RFC 4444, <i>IS-IS MIB</i> in Junos OS Release 11.3 and later.	Unsupported tables and objects: <ul style="list-style-type: none"> • isisSAdjTable • isisSAdjAreaAddrTable • isisSAdjIPAddrTable • isisSAdjProtSuppTable 	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series
Internet draft draft-ietf-l3vpn-mvpn-mib-03.txt, <i>MPLS/BGP Layer 3 VPN Multicast Management Information Base</i>	(Implemented under the Juniper Networks enterprise branch [jnxExperiment]. OID for jnxMvpnExperiment is .1.3.6.1.4.1.2636.5.12 . Read only. Includes jnxMvpnNotifications traps.)	M Series, MX Series, and T Series
Internet draft draft-ietf-mpls-mldp-mib-02.txt, <i>Definitions of Managed Objects for the LDP Point-to-Multipoint and Multipoint-to-Multipoint Label Switched Paths</i>	Unsupported tables and objects: <ul style="list-style-type: none"> • mplsMldpInterfaceStatsTable <p>Also, the following fields of the mplsMldpFecUpstreamSessTable are not implemented because these statistics are not currently supported in LDP or PFE:</p> <ul style="list-style-type: none"> • mplsMldpFecUpstreamSessPackets • mplsMldpFecUpstreamSessBytes • mplsMldpFecUpstreamSessDiscontinuityTime 	M Series, MX Series, PTX Series, and T Series

Table 9: Standard MIBs supported by Junos OS (continued)

Standard MIB	Exceptions	Platforms
Internet draft draft-ietf-mpls-p2mp-te-mib-09.txt, <i>P2MP MPLS-TE MIB</i> (read-only access)	Unsupported table: <ul style="list-style-type: none"> • <code>mplsTeP2mpTunnelBranchPerfTable</code> 	ACX Series, M Series, MX Series, PTX Series, and T Series
Internet draft draft-ietf-ospf-ospfv3-mib-11.txt, <i>Management Information Base for OSPFv3</i>	Support for <code>ospfv3NbrTable</code> only.	M Series, MX Series, PTX Series, SRX Series, and T Series
Internet draft draft-ietf-ppvpn-mpls-vpn-mib-04.txt, <i>MPLS/BGP Virtual Private Network Management Information Base Using SMIv2</i>	Supported tables and objects: <ul style="list-style-type: none"> • <code>mplsVpnScalars</code> • <code>mplsVpnVrfTable</code> • <code>mplsVpnPerTable</code> • <code>mplsVpnVrfRouteTargetTable</code> 	M Series, MX Series, PTX Series, and T Series
Internet draft draft-kamathy-gdoi-mib-01, <i>Management Information Base for the Group Domain of Interpretation (GDOI)</i>	Caveats: <ul style="list-style-type: none"> • The GDOI MIB from the IETF draft is modified to include only the group member tables and notifications. • Only the SNMP notifications that are applicable to MX Series group members are supported. 	MX Series
Internet draft draft-reeder-smmpv3-usm-3desede-00.txt, <i>Extension to the User-Based Security Model (USM) to Support Triple-DES EDE in 'Outside' CBC Mode</i>	No exceptions	ACX Series, EX Series, M Series, MX Series, PTX Series, SRX Series, and T Series

For information about standard SNMP MIB objects, see the [SNMP MIB Explorer](#).

- Related Documentation**
- [Enterprise-Specific SNMP MIBs Supported by Junos OS on page 115](#)
 - *Network Management and Monitoring Guide*

Standard SNMP Traps Supported by Junos OS

This topic provides the list of standard SNMPv1 and SNMPv2 traps supported by devices running Junos OS. For more information about traps see [SNMP MIB Explorer](#).

Standard SNMP Version 1 Traps

Table 10 on page 147 provides an overview of the standard traps for SNMPv1. The traps are organized first by trap category and then by trap name, and include their enterprise ID, generic trap number, and specific trap number. The system logging severity levels are listed for those traps that have them with their corresponding system log tag. Traps that

do not have corresponding system logging severity levels are marked with an en dash (–) in the table.

For more information about system log messages, see the [System Log Explorer](#). For more information about configuring system logging, see the *Junos OS System Basics Configuration Guide*.

Table 10: Standard Supported SNMP Version 1 Traps

Defined in	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number	System Logging Severity Level	Syslog Tag	Supported On
Startup Notifications							
RFC 1215, <i>Conventions for Defining Traps for Use with the SNMP</i>	authenticationFailure	1.3.6.1.4.1.2636	4	0	Notice	SNMPD_TRAP_GEN_FAILURE	All devices running Junos OS.
	coldStart	1.3.6.1.4.1.2636	0	0	Critical	SNMPD_TRAP_COLD_START	All devices running Junos OS.
	warmStart	1.3.6.1.4.1.2636	1	0	Error	SNMPD_TRAP_WARM_START	All devices running Junos OS.
Link Notifications							
RFC 1215, <i>Conventions for Defining Traps for Use with the SNMP</i>	linkDown	1.3.6.1.4.1.2636	2	0	Warning	SNMP_TRAP_LINK_DOWN	All devices running Junos OS.
	linkUp	1.3.6.1.4.1.2636	3	0	Info	SNMP_TRAP_LINK_UP	All devices running Junos OS.
Remote Operations Notifications							
RFC 2925, <i>Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations</i>	pingProbeFailed	1.3.6.1.2.1.80.0	6	1	Info	SNMP_TRAP_PING_PROBE_FAILED	All devices running Junos OS.
	pingTestFailed	1.3.6.1.2.1.80.0	6	2	Info	SNMP_TRAP_PING_TEST_FAILED	All devices running Junos OS.
	pingTestCompleted	1.3.6.1.2.1.80.0	6	3	Info	SNMP_TRAP_PING_TEST_COMPLETED	All devices running Junos OS.
	traceRoutePathChange	1.3.6.1.2.1.81.0	6	1	Info	SNMP_TRAP_TRACE_ROUTE_PATH_CHANGE	All devices running Junos OS.
	traceRouteTestFailed	1.3.6.1.2.1.81.0	6	2	Info	SNMP_TRAP_TRACE_ROUTE_TEST_FAILED	All devices running Junos OS.
	traceRouteTestCompleted	1.3.6.1.2.1.81.0	6	3	Info	SNMP_TRAP_TRACE_ROUTE_TEST_COMPLETED	All devices running Junos OS.

Table 10: Standard Supported SNMP Version 1 Traps (continued)

Defined in	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number	System Logging Severity Level	Syslog Tag	Supported On
RMON Alarms							
RFC 2819a, <i>RMON MIB</i>	fallingAlarm	1.3.6.1.2.1.16	6	2	–	–	All devices running Junos OS.
	risingAlarm	1.3.6.1.2.1.16	6	1	–	–	All devices running Junos OS.
Routing Notifications							
<i>BGP 4 MIB</i>	bgpEstablished	1.3.6.1.2.1.15.7	6	1	–	–	M, T, MX, J, EX, and SRX Series devices.
	bgpBackwardTransition	1.3.6.1.2.1.15.7	6	2	–	–	M, T, MX, J, EX, and SRX Series devices.

Table 10: Standard Supported SNMP Version 1 Traps (continued)

Defined in	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number	System Logging Severity Level	Syslog Tag	Supported On
<i>OSPF TRAP MIB</i>	ospfVirtIfStateChange	1.3.6.1.2.1.14.16.2	6	1	–	–	M, T, MX, J, EX, and SRX Series devices.
	ospfNbrStateChange	1.3.6.1.2.1.14.16.2	6	2	–	–	M, T, MX, J, EX, and SRX Series devices.
	ospfVirtNbrStateChange	1.3.6.1.2.1.14.16.2	6	3	–	–	M, T, MX, J, EX, and SRX Series devices.
	ospfIfConfigError	1.3.6.1.2.1.14.16.2	6	4	–	–	M, T, MX, J, EX, and SRX Series devices.
	ospfVirtIfConfigError	1.3.6.1.2.1.14.16.2	6	5	–	–	M, T, MX, J, EX, and SRX Series devices.
	ospfIfAuthFailure	1.3.6.1.2.1.14.16.2	6	6	–	–	M, T, MX, J, EX, and SRX Series devices.
	ospfVirtIfAuthFailure	1.3.6.1.2.1.14.16.2	6	7	–	–	M, T, MX, J, EX, and SRX Series devices.
	ospfIfRxBadPacket	1.3.6.1.2.1.14.16.2	6	8	–	–	M, T, MX, J, EX, and SRX Series devices.
	ospfVirtIfRxBadPacket	1.3.6.1.2.1.14.16.2	6	9	–	–	M, T, MX, J, EX, and SRX Series devices.
	ospfTxRetransmit	1.3.6.1.2.1.14.16.2	6	10	–	–	M, T, MX, J, EX, and SRX Series devices.
	ospfVirtIfTxRetransmit	1.3.6.1.2.1.14.16.2	6	11	–	–	M, T, MX, J, EX, and SRX Series devices.
	ospfMaxAgeLsa	1.3.6.1.2.1.14.16.2	6	13	–	–	M, T, MX, J, EX, and SRX Series devices.
	ospfIfStateChange	1.3.6.1.2.1.14.16.2	6	16	–	–	M, T, MX, J, EX, and SRX Series devices.
VRRP Notifications							
<i>RFC 2787, Definitions of Managed</i>	vrrpTrapNewMaster	1.3.6.1.2.1.68	6	1	Warning	VRRPD_NEW MASTER_TRAP	All devices running Junos OS.

Table 10: Standard Supported SNMP Version 1 Traps (continued)

Defined in	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number	System Logging Severity Level	Syslog Tag	Supported On
<i>Objects for the Virtual Router Redundancy Protocol</i>	vrrpTrapAuthFailure	1.3.6.1.2.1.68	6	2	Warning	VRRPD_AUTH_FAILURE_TRAP	All devices running Junos OS.
RFC 6527, <i>Definitions of Managed Objects for the Virtual Router Redundancy Protocol Version 3 (VRRPv3)</i>	vrrpv3NewMaster	1.3.6.1.2.1.207	6	1	Warning	VRRPD_NEW_MASTER	M and MX
	vrrpv3ProtoError	1.3.6.1.2.1.207	6	2	Warning	VRRPD_V3_PROTO_ERROR	M and MX

Standard SNMP Version 2 Traps

Table 11 on page 150 provides an overview of the standard SNMPv2 traps supported by the Junos OS. The traps are organized first by trap category and then by trap name and include their **snmpTrapOID**. The system logging severity levels are listed for those traps that have them with their corresponding system log tag. Traps that do not have corresponding system logging severity levels are marked with an en dash (–) in the table.

Table 11: Standard Supported SNMP Version 2 Traps

Defined in	Trap Name	snmpTrapOID	System Logging Severity Level	Syslog Tag	Supported On
Startup Notifications					
RFC 1907, <i>Management Information Base for Version 2 of the Simple Network Management Protocol (SNMPv2)</i>	coldStart	1.3.6.1.6.3.1.1.5.1	Critical	SNMPD_TRAP_COLD_START	All devices running Junos OS.
	warmStart	1.3.6.1.6.3.1.1.5.2	Error	SNMPD_TRAP_WARM_START	All devices running Junos OS.
	authenticationFailure	1.3.6.1.6.3.1.1.5.5	Notice	SNMPD_TRAP_GEN_FAILURE	All devices running Junos OS.
Link Notifications					

Table 11: Standard Supported SNMP Version 2 Traps (continued)

Defined in	Trap Name	snmpTrapOID	System Logging Severity Level	Syslog Tag	Supported On
RFC 2863, <i>The Interfaces Group MIB</i>	linkDown	1.3.6.1.6.3.1.1.5.3	Warning	SNMP_TRAP_LINK_DOWN	All devices running Junos OS.
	linkUp	1.3.6.1.6.3.1.1.5.4	Info	SNMP_TRAP_LINK_UP	All devices running Junos OS.
Remote Operations Notifications					
RFC 2925, <i>Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations</i>	pingProbeFailed	1.3.6.1.2.1.80.0.1	Info	SNMP_TRAP_PING_PROBE_FAILED	All devices running Junos OS.
	pingTestFailed	1.3.6.1.2.1.80.0.2	Info	SNMP_TRAP_PING_TEST_FAILED	All devices running Junos OS.
	pingTestCompleted	1.3.6.1.2.1.80.0.3	Info	SNMP_TRAP_PING_TEST_COMPLETED	All devices running Junos OS.
	traceRoutePathChange	1.3.6.1.2.1.81.0.1	Info	SNMP_TRAP_TRACE_ROUTE_PATH_CHANGE	All devices running Junos OS.
	traceRouteTestFailed	1.3.6.1.2.1.81.0.2	Info	SNMP_TRAP_TRACE_ROUTE_TEST_FAILED	All devices running Junos OS.
	traceRouteTestCompleted	1.3.6.1.2.1.81.0.3	Info	SNMP_TRAP_TRACE_ROUTE_TEST_COMPLETED	All devices running Junos OS.
RMON Alarms					
RFC 2819a, <i>RMON MIB</i>	fallingAlarm	1.3.6.1.2.1.16.0.1	—	—	All devices running Junos OS.
	risingAlarm	1.3.6.1.2.1.16.0.2	—	—	All devices running Junos OS.
Routing Notifications					
<i>BGP 4 MIB</i>	bgpEstablished	1.3.6.1.2.1.15.7.1	—	—	All devices running Junos OS.
	bgpBackwardTransition	1.3.6.1.2.1.15.7.2	—	—	All devices running Junos OS.

Table 11: Standard Supported SNMP Version 2 Traps (continued)

Defined in	Trap Name	snmpTrapOID	System Logging Severity Level	Syslog Tag	Supported On
<i>OSPF Trap MIB</i>	ospfVirtIfStateChange	1.3.6.1.2.1.14.16.2.1	–	–	All devices running Junos OS.
	ospfNbrStateChange	1.3.6.1.2.1.14.16.2.2	–	–	All devices running Junos OS.
	ospfVirtNbrStateChange	1.3.6.1.2.1.14.16.2.3	–	–	All devices running Junos OS.
	ospfIfConfigError	1.3.6.1.2.1.14.16.2.4	–	–	All devices running Junos OS.
	ospfVirtIfConfigError	1.3.6.1.2.1.14.16.2.5	–	–	All devices running Junos OS.
	ospfIfAuthFailure	1.3.6.1.2.1.14.16.2.6	–	–	All devices running Junos OS.
	ospfVirtIfAuthFailure	1.3.6.1.2.1.14.16.2.7	–	–	All devices running Junos OS.
	ospfIfRxBadPacket	1.3.6.1.2.1.14.16.2.8	–	–	All devices running Junos OS.
	ospfVirtIfRxBadPacket	1.3.6.1.2.1.14.16.2.9	–	–	All devices running Junos OS.
	ospfTxRetransmit	1.3.6.1.2.1.14.16.2.10	–	–	All devices running Junos OS.
	ospfVirtIfTxRetransmit	1.3.6.1.2.1.14.16.2.11	–	–	All devices running Junos OS.
	ospfMaxAgeLsa	1.3.6.1.2.1.14.16.2.13	–	–	All devices running Junos OS.
	ospfIfStateChange	1.3.6.1.2.1.14.16.2.16	–	–	All devices running Junos OS.

MPLS Notifications

Table 11: Standard Supported SNMP Version 2 Traps (continued)

Defined in	Trap Name	snmpTrapOID	System Logging Severity Level	Syslog Tag	Supported On
RFC 3812, <i>Multiprotocol Label Switching (MPLS) Traffic Engineering (TE) Management Information Base</i>	mplsTunnelUp				
	mplsTunnelDown				
	mplsTunnelRerouted				
	mplsTunnelReoptimized				
Entity State MIB Notifications					
RFC 4268, <i>Entity State MIB</i>	entStateOperEnabled	1.3.6.1.2.1.131.0.1	Notice	CHASSIS SNMP TRAP3	MX240, MX480, and MX960
	entStateOperDisabled	1.3.6.1.2.1.131.0.2	Notice	CHASSIS SNMP TRAP3	MX240, MX480, and MX960
L3VPN Notifications					
RFC 4382, <i>MPLS/BGP Layer 3 Virtual Private Network (VPN)</i>	mplsL3VpnVrfUp				
	mplsL3VpnVrfDown				
	mplsL3VpnVrfRouteMidThreshExceeded				
	mplsL3VpnVrfNumVrfRouteMaxThreshExceeded				
	mplsL3VpnNumVrfRouteMaxThreshCleared				
VRRP Notifications					
RFC 2787, <i>Definitions of Managed Objects for the Virtual Router Redundancy Protocol</i>	vrrpTrapNewMaster	1.3.6.1.2.1.68.0.1	Warning	VRRPD_NEWMASTER_TRAP	All devices running Junos OS.
	vrrpTrapAuthFailure	1.3.6.1.2.1.68.0.2	Warning	VRRPD_AUTH_FAILURE_TRAP	All devices running Junos OS.

Table 11: Standard Supported SNMP Version 2 Traps (continued)

Defined in	Trap Name	snmpTrapOID	System Logging Severity Level	Syslog Tag	Supported On
RFC 6527, <i>Definitions of Managed Objects for the Virtual Router Redundancy Protocol Version 3 (VRRPv3)</i>	vrrpv3NewMaster	1.3.6.1.2.1.207.0.1	Warning	VRRPD_NEW_MASTER	M and MX
	vrrpv3ProtoError	1.3.6.1.2.1.207.0.2	Warning	VRRPD_V3_PROTO_ERROR	M and MX

Related Documentation

- [Enterprise-Specific SNMP Traps Supported by Junos OS on page 154](#)
- [Enterprise-Specific SNMP MIBs Supported by Junos OS on page 115](#)
- [Standard SNMP MIBs Supported by Junos OS on page 126](#)
- [Configuring SNMP Trap Options and Groups on a Device Running Junos OS on page 219](#)
- [Managing Traps and Informs on page 111](#)

Enterprise-Specific SNMP Traps Supported by Junos OS

This topic provides the list of Juniper Networks enterprise-specific SNMPv1 and SNMPv2 traps supported on devices running Junos OS. For more information about traps see [SNMP MIB Explorer](#).

- [Juniper Networks Enterprise-Specific SNMP Version 1 Traps on page 154](#)
- [Juniper Networks Enterprise-Specific SNMP Version 2 Traps on page 160](#)

Juniper Networks Enterprise-Specific SNMP Version 1 Traps

The Junos OS supports enterprise-specific SNMP version 1 traps shown in [Table 12 on page 155](#). The traps are organized first by trap category and then by trap name. The system logging severity levels are listed for those traps that have them. Traps that do not have corresponding system logging severity levels are marked with an en dash (–).

For more information about system log messages, see the *Junos OS System Log Reference for Security Devices*.

Table 12: Juniper Networks Enterprise-Specific Supported SNMP Version 1 Traps

Defined in	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number	System Logging Severity Level	System Log Tag	Supported On
Chassis Notifications (Alarm Conditions)							
<i>Chassis MIB</i> (jnx-chassis.mib)	jnxPowerSupplyFailure	1.3.6.1.4.1.2636.4.1	6	1	Warning	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFanFailure	1.3.6.1.4.1.2636.4.1	6	2	Critical	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxOverTemperature	1.3.6.1.4.1.2636.4.1	6	3	Alert	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxRedundancySwitchOver	1.3.6.1.4.1.2636.4.1	6	4	Critical	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruRemoval	1.3.6.1.4.1.2636.4.1	6	5	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruInsertion	1.3.6.1.4.1.2636.4.1	6	6	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruPowerOff	1.3.6.1.4.1.2636.4.1	6	7	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruPowerOn	1.3.6.1.4.1.2636.4.1	6	8	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruFailed	1.3.6.1.4.1.2636.4.1	6	9	Warning	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruOffline	1.3.6.1.4.1.2636.4.1	6	10	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruOnline	1.3.6.1.4.1.2636.4.1	6	11	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruCheck	1.3.6.1.4.1.2636.4.1	6	12	Warning	CHASSISD_SNMP_TRAP	All devices running Junos OS.

Table 12: Juniper Networks Enterprise-Specific Supported SNMP Version 1 Traps (continued)

Defined in	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number	System Logging Severity Level	System Log Tag	Supported On
	jnxFEBSwitchover	1.3.6.1.4.1.2636.4.1	6	13	Warning	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxHardDiskFailed	1.3.6.1.4.1.2636.4.1	6	14	Warning	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxHardDiskMissing	1.3.6.1.4.1.2636.4.1	6	15	Warning	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxPowerSupplyOk	1.3.6.1.4.1.2636.4.2	6	1	Critical	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFanOK	1.3.6.1.4.1.2636.4.2	6	2	Critical	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxTemperatureOK	1.3.6.1.4.1.2636.4.2	6	3	Alert	CHASSISD_SNMP_TRAP	All devices running Junos OS.
Configuration Notifications							
Configuration Management MIB (jnx-configmgmt.mib)	jnxCmCfgChange	1.3.6.1.4.1.2636.4.5	6	1	—	—	All devices running Junos OS.
	jnxCmRescueChange	1.3.6.1.4.1.2636.4.5	6	2	—	—	All devices running Junos OS.

Table 12: Juniper Networks Enterprise-Specific Supported SNMP Version 1 Traps (continued)

Defined in	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number	System Logging Severity Level	System Log Tag	Supported On
<i>Flow Collection Services MIB (jnx-coll.mib)</i>	jnxCollUnavailableDest	1.3.6.1.4.1.2636.4.8	6	1	–	–	Devices that run Junos OS and have collector PICs installed.
	jnxCollUnavailableDestCleared	1.3.6.1.4.1.2636.4.8	6	2	–	–	Devices that run Junos OS and have collector PICs installed.
	jnxCollUnsuccessfulTransfer	1.3.6.1.4.1.2636.4.8	6	3	–	–	Devices that run Junos OS and have collector PICs installed.
	jnxCollFlowOverload	1.3.6.1.4.1.2636.4.8	6	4	–	–	Devices that run Junos OS and have collector PICs installed.
	jnxCollFlowOverloadCleared	1.3.6.1.4.1.2636.4.8	6	5	–	–	Devices that run Junos OS and have collector PICs installed.
	jnxCollMemoryUnavailable	1.3.6.1.4.1.2636.4.8	6	6	–	–	Devices that run Junos OS and have collector PICs installed.
	jnxCollMemoryAvailable	1.3.6.1.4.1.2636.4.8	6	7	–	–	Devices that run Junos OS and have collector PICs installed.
	jnxCollFtpSwitchover	1.3.6.1.4.1.2636.4.8	6	8	–	–	Devices that run Junos OS and have collector PICs installed.

Table 12: Juniper Networks Enterprise-Specific Supported SNMP Version 1 Traps (continued)

Defined in	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number	System Logging Severity Level	System Log Tag	Supported On
<i>Passive Monitoring MIB</i> (jnx-pmonmib)	jnxPMonOverloadSet	1.3.6.1.4.1.2636.4.7.0.1	6	1	–	–	Devices that run Junos OS and have PICs that support passive monitoring installed.
	jnxPMonOverloadCleared	1.3.6.1.4.1.2636.4.7.0.2	6	2	–	–	Devices that run Junos OS and have PICs that support passive monitoring installed.
<i>SONET APS MIB</i> (jnx-sonetaps.mib)	apsEventChannelMismatch	1.3.6.1.4.1.2636.3.24.2	6	3	–	–	Devices that run Junos OS and have SONET PICs installed.
	apsEventPSBF	1.3.6.1.4.1.2636.3.24.2	6	4	–	–	Devices that run Junos OS and have SONET PICs installed.
	apsEventFEPLF	1.3.6.1.4.1.2636.3.24.2	6	5	–	–	Devices that run Junos OS and have SONET PICs installed.
Remote Operations							
<i>PING MIB</i> (jnx-ping.mib)	jnxPingRttThresholdExceeded	1.3.6.1.4.1.2636.4.9	6	1	–	–	All devices running Junos OS.
	jnxPingRttStdDevThreshold Exceeded	1.3.6.1.4.1.2636.4.9	6	2	–	–	All devices running Junos OS.
	jnxPingRttJitterThreshold Exceeded	1.3.6.1.4.1.2636.4.9	6	3	–	–	All devices running Junos OS.
	jnxPingEgressThreshold Exceeded	1.3.6.1.4.1.2636.4.9	6	4	–	–	All devices running Junos OS.

Table 12: Juniper Networks Enterprise-Specific Supported SNMP Version 1 Traps (continued)

Defined in	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number	System Logging Severity Level	System Log Tag	Supported On
	jnxPingEgressStdDevThresholdExceeded	1.3.6.1.4.1.2636.4.9	6	5	–	–	All devices running Junos OS.
	jnxPingEgressJitterThresholdExceeded	1.3.6.1.4.1.2636.4.9	6	6	–	–	All devices running Junos OS.
	jnxPingIngressThreshold Exceeded	1.3.6.1.4.1.2636.4.9	6	7	–	–	All devices running Junos OS.
	jnxPingIngressStddevThreshold Exceeded	1.3.6.1.4.1.2636.4.9	6	8	–	–	All devices running Junos OS.
	jnxPingIngressJitterThreshold Exceeded	1.3.6.1.4.1.2636.4.9	6	9	–	–	All devices running Junos OS.
Routing Notifications							
<i>BFD Experimental MIB (jnx-bfd-exp.mib)</i>	bfdSessUp	1.3.6.1.4.1.2636.5.3.1	6	1	–	–	All devices running Junos OS.
	bfdSessDown	1.3.6.1.4.1.2636.5.3.1	6	2	–	–	All devices running Junos OS.
<i>LDP MIB (jnx-ldp.mib)</i>	jnxLdpLspUp	1.3.6.1.4.1.2636.4.4	6	1	–	–	M, T, and MX Series routers.
	jnxLdpLspDown	1.3.6.1.4.1.2636.4.4	6	2	–	–	M, T, and MX Series routers.
	jnxLdpSesUp	1.3.6.1.4.1.2636.4.4	6	3	–	–	M, T, and MX Series routers.
	jnxLdpSesDown	1.3.6.1.4.1.2636.4.4	6	4	–	–	M, T, and MX Series routers.

Table 12: Juniper Networks Enterprise-Specific Supported SNMP Version 1 Traps (continued)

Defined in	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number	System Logging Severity Level	System Log Tag	Supported On
<i>MPLS MIB</i> (<i>jnx-mpls.mib</i>)	mplsLspUp (Deprecated)	1.3.6.1.4.1.2636.3.2.4	6	1	—	—	
	mplsLspDown (Deprecated)	1.3.6.1.4.1.2636.3.2.4	6	2	—	—	
	mplsLspChange (Deprecated)	1.3.6.1.4.1.2636.3.2.4	6	3	—	—	
	mplsLspPathDown (Deprecated)	1.3.6.1.4.1.2636.3.2.4	6	4	—	—	
<i>VPN MIB</i> (<i>jnx-vpn.mib</i>)	jnxVpnIfUp	1.3.6.1.4.1.2636.3.2.6	6	1	—	—	M, T, and MX Series routers.
	jnxVpnIfDown	1.3.6.1.4.1.2636.3.2.6	6	2	—	—	M, T, and MX Series routers.
	jnxVpnPwUp	1.3.6.1.4.1.2636.3.2.6	6	3	—	—	M, T, and MX Series routers.
	jnxVpnPwDown	1.3.6.1.4.1.2636.3.2.6	6	4	—	—	M, T, and MX Series routers.
RMON Alarms							
<i>RMON MIB</i> (<i>jnx-rmon.mib</i>)	jnxRmonAlarmGetFailure	1.3.6.1.4.1.2636.4.3	6	1	—	—	All devices running Junos OS.
	jnxRmonGetOk	1.3.6.1.4.1.2636.4.3	6	2	—	—	All devices running Junos OS.
SONET Alarms							
<i>SONET MIB</i> (<i>jnx-sonet.mib</i>)	jnxSonetAlarmSet	1.3.6.1.4.1.2636.4.6	6	1	—	—	Devices that run Junos OS and have SONET PICs installed.
	jnxSonetAlarmCleared	1.3.6.1.4.1.2636.4.6	6	2	—	—	Devices that run Junos OS and have SONET PICs installed.

Juniper Networks Enterprise-Specific SNMP Version 2 Traps

The Junos OS supports the enterprise-specific SNMP version 2 traps shown in [Table 13 on page 161](#). The traps are organized first by trap category and then by trap name.

The system logging severity levels are listed for those traps that have them. Traps that do not have corresponding system logging severity levels are marked with an en dash (–).

For more information about system messages, see the [System Log Explorer](#). For more information about configuring system logging, see the [Junos OS Administration Library for Routing Devices](#).

Table 13: Juniper Networks Enterprise-Specific Supported SNMP Version 2 Traps

Source MIB	Trap Name	snmpTrapOID	System Logging Severity Level	System Log Tag	Supported On
Chassis (Alarm Conditions) Notifications					
<i>Chassis MIB</i> (jnx-chassis.mib)	jnxPowerSupplyFailure	1.3.6.1.4.1.2636.4.1.1	Alert	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFanFailure	1.3.6.1.4.1.2636.4.1.2	Critical	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxOverTemperature	1.3.6.1.4.1.2636.4.1.3	Critical	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruNotifAdminStatus		Notice		
	jnxFruNotifMismatch		Notice		
	jnxFruNotifOperStatus		Notice		
	jnxRedundancySwitchOver	1.3.6.1.4.1.2636.4.1.4	Critical	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruRemoval	1.3.6.1.4.1.2636.4.1.5	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruInsertion	1.3.6.1.4.1.2636.4.1.6	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruPowerOff	1.3.6.1.4.1.2636.4.1.7	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruPowerOn	1.3.6.1.4.1.2636.4.1.8	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruFailed	1.3.6.1.4.1.2636.4.1.9	Warning	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruOffline	1.3.6.1.4.1.2636.4.1.10	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.

Table 13: Juniper Networks Enterprise-Specific Supported SNMP Version 2 Traps (continued)

Source MIB	Trap Name	snmpTrapOID	System Logging Severity Level	System Log Tag	Supported On
	jnxFruOnline	1.3.6.1.4.1.2636.4.1.11	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFruCheck	1.3.6.1.4.1.2636.4.1.12	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxFEBSwitchover	1.3.6.1.4.1.2636.4.1.13	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxHardDiskFailed	1.3.6.1.4.1.2636.4.1.14	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
	jnxHardDiskMissing	1.3.6.1.4.1.2636.4.1.15	Notice	CHASSISD_SNMP_TRAP	All devices running Junos OS.
jnxPowerSupplyOK	1.3.6.1.4.1.2636.4.2.1	Critical	CHASSISD_SNMP_TRAP	All devices running Junos OS.	
jnxFanOK	1.3.6.1.4.1.2636.4.2.2	Critical	CHASSISD_SNMP_TRAP	All devices running Junos OS.	
jnxTemperatureOK	1.3.6.1.4.1.2636.4.2.3	Alert	CHASSISD_SNMP_TRAP	All devices running Junos OS.	
Configuration Notifications					
<i>Configuration Management MIB (jnx-cfgmgmt.mib)</i>	jnxCmCfgChange	1.3.6.1.4.1.2636.4.5.0.1	–	–	All devices running Junos OS.
	jnxCmRescueChange	1.3.6.1.4.1.2636.4.5.0.2	–	–	All devices running Junos OS.
Link Notifications					

Table 13: Juniper Networks Enterprise-Specific Supported SNMP Version 2 Traps (continued)

Source MIB	Trap Name	snmpTrapOID	System Logging Severity Level	System Log Tag	Supported On
<i>Flow Collection Services MIB (jnx-coll.mib)</i>	jnxCollUnavailableDest	1.3.6.1.4.1.2636.4.8.0.1	–	–	Devices that run Junos OS and have collector PICs installed.
	jnxCollUnavailableDestCleared	1.3.6.1.4.1.2636.4.8.0.2	–	–	Devices that run Junos OS and have collector PICs installed.
	jnxCollUnsuccessfulTransfer	1.3.6.1.4.1.2636.4.8.0.3	–	–	Devices that run Junos OS and have collector PICs installed.
	jnxCollFlowOverload	1.3.6.1.4.1.2636.4.8.0.4	–	–	Devices that run Junos OS and have collector PICs installed.
	jnxCollFlowOverloadCleared	1.3.6.1.4.1.2636.4.8.0.5	–	–	Devices that run Junos OS and have collector PICs installed.
	jnxCollMemoryUnavailable	1.3.6.1.4.1.2636.4.8.0.6	–	–	Devices that run Junos OS and have collector PICs installed.
	jnxCollMemoryAvailable	1.3.6.1.4.1.2636.4.8.0.7	–	–	Devices that run Junos OS and have collector PICs installed.
	jnxCollFtpSwitchover	1.3.6.1.4.1.2636.4.8.0.8	–	–	Devices that run Junos OS and have collector PICs installed.
<i>PMON MIB (jnx-pmon.mib)</i>	jnxPMonOverloadSet	1.3.6.1.4.1.2636.4.7.0.1	–	–	Devices that run Junos OS and have PICs that support passive monitoring installed.
	jnxPMonOverloadCleared	1.3.6.1.4.1.2636.4.7.0.2	–	–	Devices that run Junos OS and have PICs that support passive monitoring installed.

Table 13: Juniper Networks Enterprise-Specific Supported SNMP Version 2 Traps (continued)

Source MIB	Trap Name	snmpTrapOID	System Logging Severity Level	System Log Tag	Supported On
<i>SONET APS MIB (jnx-sonetaps.mib)</i>	apsEventChannelMismatch	1.3.6.1.4.1.2636.3.24.2.0.3	–	–	Devices that run Junos OS and have SONET PICs installed.
	apsEventPSBF	1.3.6.1.4.1.2636.3.24.2.0.4	–	–	Devices that run Junos OS and have SONET PICs installed.
	apsEventFEPLF	1.3.6.1.4.1.2636.3.24.2.0.5	–	–	Devices that run Junos OS and have SONET PICs installed.
Remote Operations Notifications					
<i>PING MIB (jnx-ping.mib)</i>	jnxPingRttThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.1	–	–	All devices running Junos OS.
	jnxPingRttStdDevThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.2	–	–	All devices running Junos OS.
	jnxPingRttJitterThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.3	–	–	All devices running Junos OS.
	jnxPingEgressThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.4	–	–	All devices running Junos OS.
	jnxPingEgressStdDevThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.5	–	–	All devices running Junos OS.
	jnxPingEgressJitterThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.6	–	–	All devices running Junos OS.
	jnxPingIngressThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.7	–	–	All devices running Junos OS.
	jnxPingIngressStddevThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.8	–	–	All devices running Junos OS.
	jnxPingIngressJitterThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.9	–	–	All devices running Junos OS.
Routing Notifications					
<i>BFD Experimental MIB (jnx-bfd-exp.mib)</i>	bfdSessUp	1.3.6.1.4.1.2636.5.3.1.0.1	–	–	All devices running Junos OS.
	bfdSessDown	1.3.6.1.4.1.2636.5.3.1.0.2	–	–	All devices running Junos OS.

Table 13: Juniper Networks Enterprise-Specific Supported SNMP Version 2 Traps (continued)

Source MIB	Trap Name	snmpTrapOID	System Logging Severity Level	System Log Tag	Supported On
<i>BGP4 V2 MIB</i> (jnx-bgpmib2.mib)	jnxBgpM2Established	1.3.6.1.4.1.2636.5.1.1.1.0.1	–	–	All devices running Junos OS.
	jnxBgpM2BackwardTransition	1.3.6.1.4.1.2636.5.1.1.1.0.2	–	–	All devices running Junos OS.
<i>DHCP MIB</i> (jnx-dhcp.mib)	jnxJdhcpLocalServer DuplicateClient	1.3.6.1.4.1.2636.3.6.1.6.1.13.1	–	–	All devices running Junos OS.
	jnxJdhcpLocalServer InterfaceLimitExceeded	1.3.6.1.4.1.2636.3.6.1.6.1.13.2	–	–	All devices running Junos OS.
	jnxJdhcpLocalServer InterfaceLimitAbated	1.3.6.1.4.1.2636.3.6.1.6.1.13.3	–	–	All devices running Junos OS.
	jnxJdhcpLocalServer Health	1.3.6.1.4.1.2636.3.6.1.6.1.13.4	–	–	All devices running Junos OS.
	jnxJdhcpRelayInterface LimitExceeded	1.3.6.1.4.1.2636.3.6.1.6.1.23.1	–	–	All devices running Junos OS.
	jnxJdhcpRelayInterface LimitAbated	1.3.6.1.4.1.2636.3.6.1.6.1.23.2	–	–	All devices running Junos OS.
<i>DHCPv6 MIB</i> (jnx-dhcpv6.mib)	jnxJdhcpv6LocalServer InterfaceLimitExceeded	1.3.6.1.4.1.2636.3.6.2.6.2.23.1	–	–	All devices running Junos OS.
	jnxJdhcpv6LocalServer InterfaceLimitAbated	1.3.6.1.4.1.2636.3.6.2.6.2.23.2	–	–	All devices running Junos OS.
	jnxJdhcpv6LocalServer Health	1.3.6.1.4.1.2636.3.6.2.6.2.23.3	–	–	All devices running Junos OS.
<i>LDP MIB</i> (jnx-ldp.mib)	jnxLdpLspUp	1.3.6.1.4.1.2636.4.4.0.1	–	–	M, T, and MX Series routers.
	jnxLdpLspDown	1.3.6.1.4.1.2636.4.4.0.2	–	–	M, T, and MX Series routers.
	jnxLdpSesUp	1.3.6.1.4.1.2636.4.4.0.3	–	–	M, T, and MX Series routers.
	jnxLdpSesDown	1.3.6.1.4.1.2636.4.4.0.4	–	–	M, T, and MX Series routers.

Table 13: Juniper Networks Enterprise-Specific Supported SNMP Version 2 Traps (continued)

Source MIB	Trap Name	snmpTrapOID	System Logging Severity Level	System Log Tag	Supported On
MPLS MIB (jnx-mpls.mib)	mplsLspUp (Deprecated)	1.3.6.1.4.1.2636.3.2.4.1	–	–	
	mplsLspInfoUp	1.3.6.1.4.1.2636.3.2.0.1	–	–	M, T, and MX Series routers.
	mplsLspDown (Deprecated)	1.3.6.1.4.1.2636.3.2.4.2	–	–	
	mplsLspInfoDown	1.3.6.1.4.1.2636.3.2.0.2	–	–	M, T, and MX Series routers.
	mplsLspChange (Deprecated)	1.3.6.1.4.1.2636.3.2.4.3	–	–	
	mplsLspInfoChange	1.3.6.1.4.1.2636.3.2.0.3	–	–	M, T, and MX Series routers.
	mplsLspPathDown (Deprecated)	1.3.6.1.4.1.2636.3.2.4.4	–	–	
	mplsLspInfoPathDown	1.3.6.1.4.1.2636.3.2.0.4	–	–	M, T, and MX Series routers.
mplsLspInfoPathUp	1.3.6.1.4.1.2636.3.2.0.5	–	–	M, T, and MX Series routers.	
VPN MIB (jnx-vpn.mib)	jnxVpnIfUp	1.3.6.1.4.1.2636.3.26.0.1	–	–	M, T, and MX Series routers.
	jnxVpnIfDown	1.3.6.1.4.1.2636.3.26.0.2	–	–	M, T, and MX Series routers.
	jnxVpnPwUp	1.3.6.1.4.1.2636.3.26.0.3	–	–	M, T, and MX Series routers.
	jnxVpnPwDown	1.3.6.1.4.1.2636.3.26.0.4	–	–	M, T, and MX Series routers.

Table 13: Juniper Networks Enterprise-Specific Supported SNMP Version 2 Traps (continued)

Source MIB	Trap Name	snmpTrapOID	System Logging Severity Level	System Log Tag	Supported On
AAA MIB (jnx-user-aaa.mib)	jnxAccessAuthAddressPoolHighThreshold	1.3.6.1.4.1.2636.3.51.1.0.5	–	–	SRX Series devices.
	jnxAccessAuthAddressPoolAbateThreshold	1.3.6.1.4.1.2636.3.51.1.0.6	–	–	SRX Series devices.
	jnxAccessAuthAddressPoolOutOfAddresses	1.3.6.1.4.1.2636.3.51.1.0.7	–	–	SRX Series devices.
	jnxAccessAuthAddressPoolOutOfMemory	1.3.6.1.4.1.2636.3.51.1.0.8	–	–	SRX Series devices.
	jnxAccessAuthService Up	1.3.6.1.4.1.2636.3.51.1.0.1	–	–	SRX Series devices.
	jnxAccessAuthService Down	1.3.6.1.4.1.2636.3.51.1.0.2	–	–	SRX Series devices.
	jnxAccessAuthServer Disabled	1.3.6.1.4.1.2636.3.51.1.0.3	–	–	SRX Series devices.
	jnxAccessAuthServer Enabled	1.3.6.1.4.1.2636.3.51.1.0.4	–	–	SRX Series devices.
Access Authentication Methods MIB (jnx-js-auth.mib)	jnxJsFwAuthServiceUp	1.3.6.1.4.1.2636.3.39.1.2.1.0.2	–	–	SRX Series devices.
	jnxJsFwAuthServiceDown	1.3.6.1.4.1.2636.3.39.1.2.1.0.3	–	–	SRX Series devices.
	jnxJsFwAuthCapacityExceeded	1.3.6.1.4.1.2636.3.39.1.2.1.0.4	–	–	SRX Series devices.
	jnxJsNatAddrPoolThresholdStatus	1.3.6.1.4.1.2636.3.39.1.7.1.0.1	–	–	SRX Series devices.
Network Address Translation Resources-Monitoring MIB (jnxNatMIB)	jnxNatAddrPoolUtil	1.3.6.1.4.1.2636.3.59.1.2.1	–	–	M Series and MX Series routers
	jnxNatTrapSrcPoolName	1.3.6.1.4.1.2636.3.59.1.2.2	–	–	M Series and MX Series routers
	jnxNatAddrPoolThresholdStatus	1.3.6.1.4.1.2636.3.59.1.0.1	–	–	M Series and MX Series routers

Table 13: Juniper Networks Enterprise-Specific Supported SNMP Version 2 Traps (continued)

Source MIB	Trap Name	snmpTrapOID	System Logging Severity Level	System Log Tag	Supported On
<i>Network Address Translation MIB</i> (jnx-js-nat.mib)	jnxJsScreen Attack	1.3.6.1.4.1.2636.3.39.1.8.1.0.1	Warning	RT_SCREEN_ICMP, RT_SCREEN_IP, RT_SCREEN_SESSION_LIMIT, RT_SCREEN_TCP, RT_SCREEN_UDP	SRX Series devices.
<i>Security Screening Objects MIB</i> (jnx-js-screening.mib)	jnxJsScreenCfg Change	1.3.6.1.4.1.2636.3.39.1.8.1.0.2	–	–	SRX Series devices.
RMON Alarms					
<i>RMON MIB</i> (jnx-rmon.mib)	jnxRmonGetOk	1.3.6.1.4.1.2636.4.3.0.2	–	–	All devices running Junos OS.
SONET Alarms					
<i>SONET MIB</i> (jnx-sonet.mib)	jnxSonetAlarm Cleared	1.3.6.1.4.1.2636.4.6.0.2	–	–	Devices that run Junos OS and have SONET PICs installed.

- Related Documentation**
- [Standard SNMP Traps Supported by Junos OS on page 146](#)
 - [Standard SNMP MIBs Supported by Junos OS on page 126](#)
 - [Enterprise-Specific SNMP MIBs Supported by Junos OS on page 115](#)
 - [Configuring SNMP Trap Options and Groups on a Device Running Junos OS on page 219](#)
 - [Managing Traps and Informs on page 111](#)

Customized SNMP MIBs for Syslog Traps

SNMP syslog traps are alert messages sent from a remote SNMP-enabled device to a central collector notifying you of a component failure or when critical resources are out of configurable limits. This information is captured in a Management Information Base (MIB). The Juniper Networks enterprise-specific System Log MIB enables notification of an SNMP trap-based application when an important system log message occurs. The MIB is defined to map the syslog entry to the generic jnxSyslogTrap OID.

The jnxSyslogTrap OID is a trap based on the logs generated in the syslog. The Event process (eventd) monitors syslog and, based on the event policy **raise-trap** configuration

statement for syslog events, sends all syslog events into one generic syslog-defined trap MIB, which is `jnxSyslogTrap`.

Using one generic MIB OID is inconvenient for customers who want to process syslog trap OID values to discover specific events because it is impossible to distinguish alarms having the same OID. But as of Junos OS Release 18.3R1, you can map a custom OID to a particular log and load it on the device dynamically.

The benefit of this feature is that because there is a way to assign specific OIDs to different types of syslog events, you can now effectively monitor for each different type of syslog event.

- [Overview of Custom SNMP MIBs on page 169](#)
- [Defining a Custom MIB for a Syslog Trap on page 171](#)
- [Limitations of Using Custom SNMP Traps on page 176](#)
- [Example Custom Syslog Trap on page 176](#)

Overview of Custom SNMP MIBs

To create a custom SNMP MIB for a syslog trap, you must complete the following tasks:

- Write the custom MIB.
- Convert the MIB file to YANG format and copy the YANG file to the device.
- Load the YANG file onto the device.

The following sections overview these steps.

- [Write the MIB File on page 169](#)
- [Convert to a YANG File on page 170](#)
- [CLI Commands to Use for Managing YANG Files on page 170](#)

Write the MIB File

Before you can map a particular log with a custom OID, you must write a custom MIB. To avoid collisions, you must define your MIB objects and traps only under the reserved roots shown in [Table 14 on page 169](#).

Table 14: MIB Roots for Custom MIB Modules

Root	Description	OID
<code>.iso.org.dod.internet.private.enterprises.juniperMIB.jnxMibs.jnxCustomMibRoot</code>	Custom MIB module	<code>.1.3.6.1.4.1.2636.3.86</code>
<code>.iso.org.dod.internet.private.enterprises.juniperMIB.jnxTraps.jnxCustomSyslogNotifications</code>	Custom trap notification	<code>.1.3.6.1.4.1.2636.4.30</code>

Convert to a YANG File

Before loading your MIB definition onto the device, you must convert the MIB file to YANG format. The recommended way to convert the MIB file to YANG is to use the `smidump v0.5.0` tool. The `smidump` tool is an open source application which can be installed on your laptop (see <https://www.ibr.cs.tu-bs.de/projects/libsmi/smidump.html>).

Once the file is in YANG format, you must copy it to the device. Then, using a CLI command, you load the into the SNMP process (`snmpd`). A corresponding JSON file is then generated, which `snmpd` parses and from it builds the database of the OID hierarchy. If some unknown tag is found, `snmpd` returns the appropriate error message.

CLI Commands to Use for Managing YANG Files

To load the YANG module into `snmpd`, use the `snmp` option with the **`request system yang add`** command:

```
user@host> request system yang add snmp module yang-filename package package-name
```

The ***yang-filename*** includes the absolute path.



NOTE: In order to run the `request system yang add` command, you must have super-user access.

There are two other commands for managing YANG files on devices: **`show system yang package`** and **`request system yang delete`**.

- See Also**
- *`show system yang package`*
 - *`request system yang delete`*
 - *`request system yang add`*

Defining a Custom MIB for a Syslog Trap

In this procedure, we use the following example files:

- MIB file to convert: [mib-jnx-example-custom-syslog.txt on page 172](#)
- output: [JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB.yang on page 173](#)



NOTE: Although YANG can be written manually by referring to the example YANG provided in this documentation, we recommend you convert the MIB to YANG format using the `smidump` tool v0.5.0.

To define a custom MIB for a syslog trap:

1. Load your MIB onto the network management system (NMS) and check if there are any errors.
2. Invoke the `smidump` tool using the following command, where *dependency-mib*, *input-custom-mib-file*, and *YANG-MODULE-NAME* are variables for specific filenames:

```
$ smidump -p dependency-mib input-custom-mib-file -f yang -o
YANG-MODULE-NAME.yang
```

For example:

```
$ smidump -p mib-jnx-smi.txt mib-jnx-example-custom-syslog.txt -f yang -o
JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB.yang
```

As output, you will get the converted YANG file **JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB.yang**.

Notice that the input custom MIB file **mib-jnx-example-custom-syslog.txt** is dependent on SNMPv2-SMI, JUNIPER-SMI, and IF-MIB. But since SNMPv2-SMI and IF-MIB are standard MIBs, their definitions are already present in `smidump`. So, the only dependent MIB file required is **mib-jnx-smi.txt**, which has module JUNIPER-SMI definitions.

3. Copy the file **JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB.yang** to any path on the device, and copy all the dependent YANG files to the device at the following path: **/opt/lib/python2.7/site-packages/pyang/modules**.



NOTE: You must convert all the dependent MIBs to YANG files and copy to these to the device.

Following are some of the standard MIBs that have been converted to YANG modules and are present in the above path: **IANAifType-MIB.yang**, **ietf-yang-types.yang**, **ietf-inet-types.yang**, **IF-MIB.yang**, **JUNIPER-SMI.yang**, **SNMPv2-TC.yang**.

4. Using the CLI, load the YANG modules into snmpd using this command:

```
user@host> request system yang add snmp module yang-filename package
package-name
```

For example:

```
user@host> request system yang add snmp module
/var/tmp/JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB.yang package p1
```

The YANG module is converted to JSON format and goes to snmpd for parsing and creating the internal database.

5. To verify the trap based on the syslog with the newly added trap definitions is working, spoof (mimic) the trap. You can do this either using the CLI or an event policy. The following is an example of spoofing the trap using the CLI. See [“Example Custom Syslog Trap” on page 176](#) for an example of using an event policy.

```
user@host> request snmp spoof-trap jnxExampleSyslogTrap?
```

Possible completions:

<trap>	The name of the trap to spoof
jnxExampleSyslogTrap1	(Dynamic)
jnxExampleSyslogTrap2	(Dynamic)
jnxExampleSyslogTrap3	(Dynamic)

```
user@host> request snmp spoof-trap jnxExampleSyslogTrap1
```

```
Spoof-trap request result: trap sent successfully
```

mib-jnx-example-custom-syslog.txt

```
-- *****
-- Juniper enterprise specific custom syslog MIB.
--
-- Copyright (c) 2002-2004, 2006, Juniper Networks, Inc.
-- All rights reserved.
--
-- The contents of this document are subject to change without notice.
-- *****

JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE, Integer32
    FROM SNMPv2-SMI
    jnxCustomMibRoot, jnxCustomSyslogNotifications
    FROM JUNIPER-SMI
    ifName
    FROM IF-MIB
;

jnxExampleCustomSyslog MODULE-IDENTITY
    LAST-UPDATED "201711270000Z"
    ORGANIZATION "Juniper Networks, Inc."
```

```

CONTACT-INFO
    "Juniper Technical Assistance Center
    Juniper Networks, Inc.
    1133 Innovation Way
    Sunnyvale, CA 94089
    E-mail: support@juniper.net"
DESCRIPTION
    "Example MIB objects for custom syslog"
REVISION    "201711270000Z"
DESCRIPTION
    "Initial draft"
::= { jnxCustomMibRoot 1 }

jnxExampleCustomSyslogMessage OBJECT-TYPE
    SYNTAX      OCTET STRING
    MAX-ACCESS   accessible-for-notify
    STATUS      current
    DESCRIPTION
        "The syslog message string."
    ::= { jnxExampleCustomSyslog 1 }

jnxExampleCustomSyslogInteger OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS   accessible-for-notify
    STATUS      current
    DESCRIPTION
        "Example OID for adding custom Integer OID"
    ::= { jnxExampleCustomSyslog 2 }

jnxExampleSyslogTrap1 NOTIFICATION-TYPE
    OBJECTS { jnxExampleCustomSyslogMessage }
    STATUS      current
    DESCRIPTION
        "This TRAP is reserved to be sent when event 1 occurs"
    ::= { jnxCustomSyslogNotifications 1 }

jnxExampleSyslogTrap2 NOTIFICATION-TYPE
    OBJECTS { jnxExampleCustomSyslogInteger, jnxExampleCustomSyslogMessage }
    STATUS      current
    DESCRIPTION
        "This TRAP is reserved to be sent when event 2 occurs"
    ::= { jnxCustomSyslogNotifications 2 }

jnxExampleSyslogTrap3 NOTIFICATION-TYPE
    OBJECTS { ifName, jnxExampleCustomSyslogMessage }
    STATUS      current
    DESCRIPTION
        "This TRAP is reserved to be sent when event 3 occurs"
    ::= { jnxCustomSyslogNotifications 3 }

END

```

JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB.yang

```

/*
 * This YANG module has been generated by smidump 0.5.0:
 *
 *      smidump -f yang JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB
 *

```

```
* Do not edit. Edit the source file instead!
*/

module JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB {

    namespace "urn:ietf:params:xml:ns:yang:smiv2:JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB";

    prefix "juniper-example";

    import IF-MIB {
        prefix "if-mib";
    }

    import JUNIPER-SMI {
        prefix "juniper-smi";
    }

    import ietf-yang-smiv2 {
        prefix "smiv2";
    }

    organization
        "Juniper Networks, Inc.";

    contact
        "Juniper Technical Assistance Center
        Juniper Networks, Inc.
        1133 Innovation Way
        Sunnyvale, CA 94089
        E-mail: support@juniper.net";

    description
        "Example MIB objects for custom syslog";

    revision 2017-11-27 {
        description
            "Initial draft";
    }

    container JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB {
        config false;
    }

    notification jnxExampleSyslogTrap1 {
        description
            "This TRAP is reserved to be sent when event 1 occurs";
        smiv2:oid "1.3.6.1.4.1.2636.4.30.1";

        container object-1 {

            leaf jnxExampleCustomSyslogMessage {
                type binary;
                description
                    "The syslog message string.";
                smiv2:max-access "accessible-for-notify";
                smiv2:oid "1.3.6.1.4.1.2636.3.86.1.1";
            }
        }
    }
}
```

```

notification jnxExampleSyslogTrap2 {
  description
    "This TRAP is reserved to be sent when event 2 occurs";
  smiv2:oid "1.3.6.1.4.1.2636.4.30.2";

  container object-1 {

    leaf jnxExampleCustomSyslogInteger {
      type int32;
      description
        "Example OID for adding custom Integer OID";
      smiv2:max-access "accessible-for-notify";
      smiv2:oid "1.3.6.1.4.1.2636.3.86.1.2";
    }
  }

  container object-2 {

    leaf jnxExampleCustomSyslogMessage {
      type binary;
      description
        "The syslog message string.";
      smiv2:max-access "accessible-for-notify";
      smiv2:oid "1.3.6.1.4.1.2636.3.86.1.1";
    }
  }
}

notification jnxExampleSyslogTrap3 {
  description
    "This TRAP is reserved to be sent when event 3 occurs";
  smiv2:oid "1.3.6.1.4.1.2636.4.30.3";

  container object-1 {

    leaf ifIndex {
      type leafref {
        path "/if-mib:IF-MIB/if-mib:ifTable/if-mib:ifEntry/if-mib:ifIndex";
      }
    }

    leaf ifName {
      type leafref {
        path "/if-mib:IF-MIB/if-mib:ifTable/if-mib:ifEntry/if-mib:ifName";
      }
    }
  }

  container object-2 {

    leaf jnxExampleCustomSyslogMessage {
      type binary;
      description
        "The syslog message string.";
      smiv2:max-access "accessible-for-notify";
      smiv2:oid "1.3.6.1.4.1.2636.3.86.1.1";
    }
  }
}

```

```
smiv2:alias "jnxExampleCustomSyslog" {
  smiv2:oid "1.3.6.1.4.1.2636.3.86.1";
}
}
```

Limitations of Using Custom SNMP Traps

Be careful to write the event scripts in such a way that they won't trigger traps for frequently occurring syslogs. This practice avoids introducing more load on the device.

If you add an object whose access type is **readonly** or **readwrite**, that object will not be available for polling in snmp polling operations such as `snmpget` or `snmpwalk`; it will be treated as access type **notifyonly**. This is because this feature is for adding dynamic TRAP OID definitions to the device so that customer can write scripts to send custom traps for each syslog. Access types **readonly** and **readwrite** are for snmp polling, whereas **notifyonly** is for traps.

For custom MIBs, the definition of a custom table is not supported. If you want to send a trap that has a table object as a varbind, use the already defined table in Junos MIBs rather than defining a custom table in your custom MIB.

The YANG file needs to be loaded on all the chassis nodes and Routing Engines separately. The **request system yang add** command does not automatically copy it to backup Routing Engine.

Example Custom Syslog Trap

This example custom syslog trap illustrates a use case in which the operator wants to receive traps when either of the following occur:

- A user enters the configuration mode in the CLI (event defined as **ui_dbase_login_event**)
- A user does a commit (event defined as **ui_commit**)

Before the custom syslog trap feature was supported, the only way to do this was to use `jnxSyslogTrap`, which has a fixed OID, for both events. With the custom syslog trap feature, you can now generate traps that have custom defined OIDs.

To define a custom syslog trap:

1. Use the sample `mib-jnx-example-custom-syslog-txt` file provided (see [Sample MIB file on page 177](#)) and convert it to `JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB.yang` (see [Sample YANG Converted File on page 178](#)).

```
smidump -p mib-jnx-smi.txt mib-jnx-example-custom-syslog.txt -f yang -o
JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB.yang
```

2. Copy the YANG file onto your device.

3. Load the SNMP YANG file.

```
root@host> request system yang add snmp package p1 module
~/JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB.yang
```

4. Copy the slax script (see [slax Script custom_trap.slax \(in /var/db/scripts/event\) on page 180](#)) to `/var/db/scripts/event` to spoof the trap.

For `ui_dbase_login_event`, you will configure the `enteredConfigMode` trap which has the username `varbind`.

For `ui_commit`, you will configure the `configCommitted` trap which has the username `command` and `comment` as three `varbinds`.

5. Configure the trap:

```
set event-options policy custom-trap events ui_dbase_login_event
set event-options policy custom-trap events ui_commit
set event-options policy custom-trap then event-script custom_trap.slax
set event-options event-script file custom_trap.slax
```

6. Enable `snmpd` traceoptions and trap target to verify the traps that are sent.

```
set snmp trap-group trap-group targets ip-address
set snmp traceoptions flag all
```

7. Verify trap is working.

Sample MIB file

```
-- *****
-- Juniper enterprise specific custom syslog MIB.
--
-- Copyright (c) 2002-2004, 2006, Juniper Networks, Inc.
-- All rights reserved.
--
-- The contents of this document are subject to change without notice.
-- *****

JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE
    FROM SNMPv2-SMI
    jnxCustomMibRoot, jnxCustomSyslogNotifications
    FROM JUNIPER-SMI
;

jnxExampleCustomSyslog MODULE-IDENTITY
    LAST-UPDATED "201806220000Z"
    ORGANIZATION "Juniper Networks, Inc."
    CONTACT-INFO
        "Juniper Technical Assistance Center
        Juniper Networks, Inc."
```

```

        1133 Innovation Way
        Sunnyvale, CA 94089
        E-mail: support@juniper.net"
    DESCRIPTION
    "Example MIB objects for custom syslog"
    REVISION    "201806220000Z"
    DESCRIPTION
    "Initial draft"
    ::= { jnxCustomMibRoot 1 }

username OBJECT-TYPE
    SYNTAX      OCTET STRING
    MAX-ACCESS   accessible-for-notify
    STATUS       current
    DESCRIPTION
        "Username"
    ::= { jnxExampleCustomSyslog 1 }

command OBJECT-TYPE
    SYNTAX      OCTET STRING
    MAX-ACCESS   accessible-for-notify
    STATUS       current
    DESCRIPTION
        "Executed command"
    ::= { jnxExampleCustomSyslog 2 }

comment OBJECT-TYPE
    SYNTAX      OCTET STRING
    MAX-ACCESS   accessible-for-notify
    STATUS       current
    DESCRIPTION
        "Additional comment"
    ::= { jnxExampleCustomSyslog 3 }

enteredConfigMode NOTIFICATION-TYPE
    OBJECTS { username }
    STATUS       current
    DESCRIPTION
        "This TRAP is sent when a user enters config mode. "
    ::= { jnxCustomSyslogNotifications 1 }

configCommitted NOTIFICATION-TYPE
    OBJECTS { username, command, comment }
    STATUS       current
    DESCRIPTION
        "This TRAP is sent when a user does config commit"
    ::= { jnxCustomSyslogNotifications 2 }

END

```

Sample YANG Converted File

```

/*
 * This YANG module has been generated by smidump 0.5.0:
 *
 *      smidump -f yang JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB
 *
 * Do not edit. Edit the source file instead!
 */

```



```

module JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB {

    namespace "urn:ietf:params:xml:ns:yang:smiv2:JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB";

    prefix "juniper-example";

    import JUNIPER-SMI {
        prefix "juniper-smi";
    }

    import ietf-yang-smiv2 {
        prefix "smiv2";
    }

    organization
        "Juniper Networks, Inc.";

    contact
        "Juniper Technical Assistance Center
        Juniper Networks, Inc.
        1133 Innovation Way
        Sunnyvale, CA 94089
        E-mail: support@juniper.net";

    description
        "Example MIB objects for custom syslog";

    revision 2018-06-22 {
        description
            "Initial draft";
    }

    container JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB {
        config false;
    }

    notification enteredConfigMode {
        description
            "This TRAP is sent when a user enters config mode. ";
        smiv2:oid "1.3.6.1.4.1.2636.4.30.1";

        container object-1 {

            leaf username {
                type binary;
                description
                    "Username";
                smiv2:max-access "accessible-for-notify";
                smiv2:oid "1.3.6.1.4.1.2636.3.86.1.1";
            }
        }
    }

    notification configCommitted {
        description
            "This TRAP is sent when a user does config commit";
        smiv2:oid "1.3.6.1.4.1.2636.4.30.2";
    }
}

```

```

container object-1 {

    leaf username {
        type binary;
        description
            "Username";
        smiv2:max-access "accessible-for-notify";
        smiv2:oid "1.3.6.1.4.1.2636.3.86.1.1";
    }
}

container object-2 {

    leaf command {
        type binary;
        description
            "Executed command";
        smiv2:max-access "accessible-for-notify";
        smiv2:oid "1.3.6.1.4.1.2636.3.86.1.2";
    }
}

container object-3 {

    leaf comment {
        type binary;
        description
            "Additional comment";
        smiv2:max-access "accessible-for-notify";
        smiv2:oid "1.3.6.1.4.1.2636.3.86.1.3";
    }
}

smiv2:alias "jnxExampleCustomSyslog" {
    smiv2:oid "1.3.6.1.4.1.2636.3.86.1";
}
}

```

slax Script cutom_trap.slax (in /var/db/scripts/event)

```

version 1.0;
ns junos = "http://xml.juniper.net/junos/*/junos";
ns xnm = "http://xml.juniper.net/xnm/1.1/xnm";
ns jcs = "http://xml.juniper.net/junos/commit-scripts/1.0";
import "../import/junos.xsl";
match / {
    <event-script-results> {
        expr jcs:syslog("external.warning",event-script-input/trigger-event/id);

        var $id = event-script-input/trigger-event/id;
        if ($id == 'UI_DBASE_LOGIN_EVENT'){
            var $committing-user =
event-script-input/trigger-event/attribute-list/attribute[name=="username"]/value;

            var $requestSnmpTrap = <request-snmp-spoof-trap> {
                <trap> "enteredConfigMode";
                <variable-bindings>

```

```

        "username=" _ $committing-user;
    }
    var $snmpTrapResults = jcs:invoke( $requestSnmpTrap );
}
else if ($id == 'UI_COMMIT'){
    var $committing-user =
event-script-input/trigger-event/attribute-list/attribute[name=="username"]/value;

    var $committing-command =
event-script-input/trigger-event/attribute-list/attribute[name=="command"]/value;

    var $committing-comment =
event-script-input/trigger-event/attribute-list/attribute[name=="message"]/value;

    var $requestSnmpTrap = <request-snmp-spoof-trap> {
        <trap> "configCommitted";
        <variable-bindings>
            "username=" _ $committing-user _ ", command=" _
$committing-command _ ", comment=" _ $committing-comment;
        }
        var $snmpTrapResults = jcs:invoke( $requestSnmpTrap );
    }
}
}
}

```

Example Custom Syslog Trap

This example custom syslog trap illustrates a use case in which the operator wants to receive traps when either of the following occur:

- A user enters the configuration mode in the CLI (event defined as `ui_dbase_login_event`)
- A user does a commit (event defined as `ui_commit`)

Before the custom syslog trap feature was supported, the only way to do this was to use `jnxSyslogTrap`, which has a fixed OID, for both events. With the custom syslog trap feature, you can now generate traps that have custom defined OIDs.

To define a custom syslog trap:

1. Use the sample `mib-jnx-example-custom-syslog.txt` file provided (see [Sample MIB file on page 177](#)) and convert it to `JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB.yang` (see [Sample YANG Converted File on page 178](#)).

```

smidump -p mib-jnx-smi.txt mib-jnx-example-custom-syslog.txt -f yang -o
JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB.yang

```

2. Copy the YANG file onto your device.
3. Load the SNMP YANG file.

```

root@host> request system yang add snmp package p1 module
~/JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB.yang

```

4. Copy the slax script (see [slax Script custom_trap.slax \(in /var/db/scripts/event\) on page 180](#)) to `/var/db/scripts/event` to spoof the trap.

For `ui_dbase_login_event`, you will configure the `enteredConfigMode` trap which has the username varbind.

For `ui_commit`, you will configure the `configCommitted` trap which has the username command and comment as three varbinds.

5. Configure the trap:

```
set event-options policy custom-trap events ui_dbase_login_event
set event-options policy custom-trap events ui_commit
set event-options policy custom-trap then event-script custom-trap.slax
set event-options event-script file custom-trap.slax
```

6. Enable `snmpd` traceoptions and trap target to verify the traps that are sent.

```
set snmp trap-group trap-group targets ip-address
set snmp traceoptions flag all
```

7. Verify trap is working.

Sample MIB file

```
-- *****
-- Juniper enterprise specific custom syslog MIB.
--
-- Copyright (c) 2002-2004, 2006, Juniper Networks, Inc.
-- All rights reserved.
--
-- The contents of this document are subject to change without notice.
-- *****

JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE
    FROM SNMPv2-SMI
    jnxCustomMibRoot, jnxCustomSyslogNotifications
    FROM JUNIPER-SMI
;

jnxExampleCustomSyslog MODULE-IDENTITY
    LAST-UPDATED "201806220000Z"
    ORGANIZATION "Juniper Networks, Inc."
    CONTACT-INFO
        "Juniper Technical Assistance Center
        Juniper Networks, Inc.
        1133 Innovation Way
        Sunnyvale, CA 94089
        E-mail: support@juniper.net"
    DESCRIPTION
        "Example MIB objects for custom syslog"
```

```

    REVISION      "201806220000Z"
    DESCRIPTION
    "Initial draft"
    ::= { jnxCustomMibRoot 1 }

username OBJECT-TYPE
    SYNTAX      OCTET STRING
    MAX-ACCESS   accessible-for-notify
    STATUS       current
    DESCRIPTION
        "Username"
    ::= { jnxExampleCustomSyslog 1 }

command OBJECT-TYPE
    SYNTAX      OCTET STRING
    MAX-ACCESS   accessible-for-notify
    STATUS       current
    DESCRIPTION
        "Executed command"
    ::= { jnxExampleCustomSyslog 2 }

comment OBJECT-TYPE
    SYNTAX      OCTET STRING
    MAX-ACCESS   accessible-for-notify
    STATUS       current
    DESCRIPTION
        "Additional comment"
    ::= { jnxExampleCustomSyslog 3 }

enteredConfigMode NOTIFICATION-TYPE
    OBJECTS { username }
    STATUS       current
    DESCRIPTION
        "This TRAP is sent when a user enters config mode. "
    ::= { jnxCustomSyslogNotifications 1 }

configCommitted NOTIFICATION-TYPE
    OBJECTS { username, command, comment }
    STATUS       current
    DESCRIPTION
        "This TRAP is sent when a user does config commit"
    ::= { jnxCustomSyslogNotifications 2 }

END

```

Sample YANG Converted File

```

/*
 * This YANG module has been generated by smidump 0.5.0:
 *
 *      smidump -f yang JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB
 *
 * Do not edit. Edit the source file instead!
 */

module JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB {

    namespace "urn:ietf:params:xml:ns:yang:smiv2:JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB";

```

```
prefix "juniper-example";

import JUNIPER-SMI {
    prefix "juniper-smi";
}

import ietf-yang-smiv2 {
    prefix "smiv2";
}

organization
    "Juniper Networks, Inc.";

contact
    "Juniper Technical Assistance Center
    Juniper Networks, Inc.
    1133 Innovation Way
    Sunnyvale, CA 94089
    E-mail: support@juniper.net";

description
    "Example MIB objects for custom syslog";

revision 2018-06-22 {
    description
        "Initial draft";
}

container JUNIPER-EXAMPLE-CUSTOM-SYSLOG-MIB {
    config false;
}

notification enteredConfigMode {
    description
        "This TRAP is sent when a user enters config mode. ";
    smiv2:oid "1.3.6.1.4.1.2636.4.30.1";

    container object-1 {

        leaf username {
            type binary;
            description
                "Username";
            smiv2:max-access "accessible-for-notify";
            smiv2:oid "1.3.6.1.4.1.2636.3.86.1.1";
        }
    }
}

notification configCommitted {
    description
        "This TRAP is sent when a user does config commit";
    smiv2:oid "1.3.6.1.4.1.2636.4.30.2";

    container object-1 {

        leaf username {
            type binary;
            description
```

```

        "Username";
        smiv2:max-access "accessible-for-notify";
        smiv2:oid "1.3.6.1.4.1.2636.3.86.1.1";
    }
}

container object-2 {

    leaf command {
        type binary;
        description
            "Executed command";
        smiv2:max-access "accessible-for-notify";
        smiv2:oid "1.3.6.1.4.1.2636.3.86.1.2";
    }
}

container object-3 {

    leaf comment {
        type binary;
        description
            "Additional comment";
        smiv2:max-access "accessible-for-notify";
        smiv2:oid "1.3.6.1.4.1.2636.3.86.1.3";
    }
}
}

smiv2:alias "jnxExampleCustomSyslog" {
    smiv2:oid "1.3.6.1.4.1.2636.3.86.1";
}
}

```

slax Script cutom_trap.slax (in /var/db/scripts/event)

```

version 1.0;
ns junos = "http://xml.juniper.net/junos/*/junos";
ns xnm = "http://xml.juniper.net/xnm/1.1/xnm";
ns jcs = "http://xml.juniper.net/junos/commit-scripts/1.0";
import "../import/junos.xsl";
match / {
    <event-script-results> {
        expr jcs:syslog("external.warning",event-script-input/trigger-event/id);

        var $id = event-script-input/trigger-event/id;
        if ($id == 'UI_DBASE_LOGIN_EVENT'){
            var $committing-user =
event-script-input/trigger-event/attribute-list/attribute[name=="username"]/value;

            var $requestSnmpTrap = <request-snmp-spoof-trap> {
                <trap> "enteredConfigMode";
                <variable-bindings>
                    "username=" _ $committing-user;
            }
            var $snmpTrapResults = jcs:invoke( $requestSnmpTrap );
        }
        else if ($id == 'UI_COMMIT'){

```

```
        var $committing-user =  
event-script-input/trigger-event/attribute-list/attribute[name=="username"]/value;  
  
        var $committing-command =  
event-script-input/trigger-event/attribute-list/attribute[name=="command"]/value;  
  
        var $committing-comment =  
event-script-input/trigger-event/attribute-list/attribute[name=="message"]/value;  
  
        var $requestSnmpTrap = <request-snmp-spoof-trap> {  
            <trap> "configCommitted";  
            <variable-bindings>  
                "username=" _ $committing-user _ ", command=" _  
$committing-command _ ", comment=" _ $committing-comment;  
            }  
            var $snmpTrapResults = jcs:invoke( $requestSnmpTrap );  
        }  
    }  
}
```


CHAPTER 9

Configuring Basic SNMP

- [Configuration Statements at the \[edit snmp\] Hierarchy Level on page 188](#)
- [Configuring SNMP on page 192](#)
- [Optimizing the Network Management System Configuration for the Best Results on page 196](#)
- [Configuring Options on Managed Devices for Better SNMP Response Time on page 197](#)
- [Best Practices for Configuring SNMP on page 199](#)
- [Configuring the System Contact on a Device Running Junos OS on page 203](#)
- [Configuring SNMP on a Device Running Junos OS on page 203](#)
- [Configuring the System Location for a Device Running Junos OS on page 205](#)
- [Configuring the System Description on a Device Running Junos OS on page 206](#)
- [Configuring SNMP Details on page 206](#)
- [Configuring a Different System Name on page 208](#)
- [Configuring the Commit Delay Timer on page 208](#)
- [Filtering Duplicate SNMP Requests on page 209](#)
- [Configuring SNMP Communities on page 210](#)
- [Configuring the SNMP Community String on page 213](#)
- [Examples: Configuring the SNMP Community String on page 214](#)
- [Adding a Group of Clients to an SNMP Community on page 215](#)
- [Configuring a Proxy SNMP Agent on page 216](#)
- [Configuring SNMP Traps on page 218](#)
- [Configuring SNMP Trap Options and Groups on a Device Running Junos OS on page 219](#)
- [Configuring SNMP Trap Options on page 220](#)
- [Configuring SNMP Trap Groups on page 224](#)
- [SNMP Traps Support on page 227](#)
- [Example: Configuring SNMP Trap Groups on page 239](#)
- [Configuring the Interfaces on Which SNMP Requests Can Be Accepted on page 239](#)
- [Example: Configuring Secured Access List Checking on page 240](#)
- [Filtering Interface Information Out of SNMP Get and GetNext Output on page 240](#)

- [Configuring MIB Views on page 241](#)
- [Configuring Ping Proxy MIB on page 242](#)
- [Understanding the Integrated Local Management Interface on page 243](#)
- [Utility MIB on page 244](#)
- [SNMP MIBs Support on page 245](#)
- [MIB Objects for the QFX Series on page 258](#)
- [Fabric Chassis MIB on page 260](#)
- [Monitoring RMON MIB Tables on page 264](#)
- [Using the Enterprise-Specific Utility MIB to Enhance SNMP Coverage on page 265](#)
- [Using the Enterprise-Specific Utility MIB to Enhance SNMP Coverage on page 267](#)
- [Example: Configuring SNMP on page 269](#)
- [Configuring Health Monitoring on page 272](#)
- [Configuring Health Monitoring on Devices Running Junos OS on page 273](#)
- [Configuring RMON Alarms and Events on page 276](#)

Configuration Statements at the [edit snmp] Hierarchy Level

This topic shows all possible configuration statements at the **[edit snmp]** hierarchy level and their level in the configuration hierarchy. When you are configuring Junos OS, your current hierarchy level is shown in the banner on the line preceding the **user@host#** prompt.

```
[edit]
snmp {
  alarm-management {
    alarm-list-name list-name {
      alarm-id id {
        alarm-state state {
          description alarm-description;
          notification-id notification-id-of-alarm;
          resource-prefix alarm-resource-prefix;
          varbind-index varbind-index-in-alarm-varbind-list;
          varbind-subtree alarm-varbind-subtree;
          varbind-value alarm-varbind-value;
        }
      }
    }
  }
  client-list client-list-name {
    ip-addresses;
  }
  community community-name {
    authorization authorization;
    client-list-name client-list-name;
    clients {
      address <restrict>;
    }
  }
}
```

```

logical-system logical-system-name {
    routing-instance routing-instance-name;
    clients {
        address <restrict>;
    }
}
routing-instance routing-instance-name {
    clients {
        address <restrict>;
    }
}
view view-name;
}
contact contact;
description description;
engine-id {
    (local engine-id | use-default-ip-address | use-mac-address);
}
filter-duplicates;
interface [ interface-names ];
location location;
name name;
nonvolatile {
    commit-delay seconds;
}
rmon {
    alarm index {
        description description;
        falling-event-index index;
        falling-threshold integer;
        falling-threshold-interval seconds;
        interval seconds;
        request-type (get-next-request | get-request | walk-request);
        rising-event-index index;
        rising-threshold integer;
        sample-type type;
        startup-alarm alarm;
        syslog-subtag syslog-subtag;
        variable oid-variable;
    }
    event index {
        community community-name;
        description description;
        type type;
    }
}
traceoptions {
    file filename <files number> <size size> <world-readable | no-world-readable> <match
        regular-expression>;
    flag flag;
    memory-trace;
    no-remote-trace;
    no-default-memory-trace;
}
trap-group group-name {

```

```

categories {
    category;
}
destination-port port-number;
routing-instance instance;
logical-system logical-system-name;
targets {
    address;
}
version (all | v1 | v2);
}
trap-options {
    agent-address outgoing-interface;
    source-address address;
    enterprise-oid;
    logical-system logical-system-name {
        routing-instance routing-instance-name {
            source-address address;
        }
    }
    routing-instance routing-instance-name {
        source-address address;
    }
}
v3 {
    notify name {
        tag tag-name;
        type (trap | inform);
    }
    notify-filter profile-name {
        oid oid (include | exclude);
    }
    snmp-community community-index {
        community-name community-name;
        security-name security-name;
        tag tag-name;
    }
    target-address target-address-name {
        address address;
        address-mask address-mask;
        logical-system logical-system;
        port port-number;
        retry-count number;
        routing-instance instance;
        tag-list tag-list;
        target-parameters target-parameters-name;
        timeout seconds;
    }
    target-parameters target-parameters-name {
        notify-filter profile-name;
        parameters {
            message-processing-model (v1 | v2c | v3);
            security-level (authentication | none | privacy);
            security-model (usm | v1 | v2c);
            security-name security-name;

```

```

    }
  }
  usm {
    local-engine {
      user username {
        authentication-md5 {
          authentication-password authentication-password;
        }
        authentication-none;
        authentication-sha {
          authentication-password authentication-password;
        }
        privacy-3des {
          privacy-password privacy-password;
        }
        privacy-aes128 {
          privacy-password privacy-password;
        }
        privacy-des {
          privacy-password privacy-password;
        }
        privacy-none;
      }
    }
  }
  vacm {
    access {
      group group-name {
        (default-context-prefix | context-prefix context-prefix){
          security-model (any | usm | v1 | v2c) {
            security-level (authentication | none | privacy) {
              notify-view view-name;
              read-view view-name;
              write-view view-name;
            }
          }
        }
      }
    }
  }
  security-to-group {
    security-model (usm | v1 | v2c) {
      security-name security-name {
        group group-name;
      }
    }
  }
}
view view-name {
  oid object-identifier (include | exclude);
}
}

```

Related Documentation

- *Understanding the SNMP Implementation in Junos OS*

Configuring SNMP

SNMP is implemented in the Junos OS Software running on the QFX Series and OCX Series products. By default, SNMP is not enabled. To enable SNMP, you must include the SNMP configuration statements at the **[edit]** hierarchy level.

To configure the minimum requirements for SNMP, include the following statements at the **[edit]** hierarchy level of the configuration:

```
[edit]
snmp {
  community public;
}
```

To configure complete SNMP features, include the following statements at the **[edit]** hierarchy level of the configuration:

```
snmp {
  client-list client-list-name {
    ip-addresses;
  }
  community community-name {
    authorization authorization;
    client-list-name client-list-name;
    clients {
      address restrict;
    }
  }
  logical-system logical-system-name {
    routing-instance routing-instance-name {
      clients {
        addresses;
      }
    }
  }
  routing-instance routing-instance-name {
    clients {
      addresses;
    }
  }
  view view-name;
}
contact contact;
description description;
filter-duplicates;
filter-interfaces;
health-monitor {
  falling-threshold integer;
  interval seconds;
  rising-threshold integer;
}
```

```

interface [ interface-names ];
location location;
name name;
nonvolatile {
    commit-delay seconds;
}
rmon {
    alarm index {
        description description;
        falling-event-index index;
        falling-threshold integer;
        falling-threshold-interval seconds;
        interval seconds;
        request-type;
        rising-event-index index;
        rising-threshold integer;
        sample-type (absolute-value | delta-value);
        startup-alarm (falling-alarm | rising-alarm | rising-or-falling alarm);
        syslog-subtag syslog-subtag;
        variable oid-variable;
    }
    event index {
        community community-name;
        description description;
        type type;
    }
    history history-index {
        bucket-size number;
        interface interface-name;
        interval seconds;
        owner owner-name;
    }
}
traceoptions {
    file filename <files number> <size size> <world-readable | no-world-readable> <match
        regular-expression>;
    flag flag;
}
trap-group group-name {
    categories {
        category;
    }
    destination-port port-number;
    routing-instance routing-instance-name;
    targets {
        address;
    }
    version (all | v1 | v2);
}
trap-options {
    agent-address outgoing-interface;
    source-address address;
}
v3 {
    notify name {

```

```

    tag tag-name;
    type trap;
}
notify-filter profile-name {
    oid object-identifier (include | exclude);
}
snmp-community community-index {
    community-name community-name;
    security-name security-name;
    tag tag-name;
}
target-address target-address-name {
    address address;
    address-mask address-mask;
    logical-system logical-system;
    port port-number;
    retry-count number;
    routing-instance routing-instance-name;
    tag-list tag-list;
    target-parameters target-parameters-name;
    timeout seconds;
}
target-parameters target-parameters-name {
    notify-filter profile-name;
    parameters {
        message-processing-model (v1 | v2c | V3);
        security-level (authentication | none | privacy);
        security-model (usm | v1 | v2c);
        security-name security-name;
    }
}
usm {
    local-engine {
        user username {
            authentication-sha {
                authentication-password authentication-password;
            }
            authentication-md5 {
                authentication-password authentication-password;
            }
            authentication-none;
            privacy-aes128 {
                privacy-password privacy-password;
            }
            privacy-des {
                privacy-password privacy-password;
            }
            privacy-3des {
                privacy-password privacy-password;
            }
            privacy-none;
        }
    }
    remote-engine engine-id {
        user username {

```



```

authentication-sha {
    authentication-password authentication-password;
}
authentication-md5 {
    authentication-password authentication-password;
}
authentication-none;
privacy-aes128 {
    privacy-password privacy-password;
}
privacy-des {
    privacy-password privacy-password;
}
privacy-3des {
    privacy-password privacy-password;
}
privacy-none {
    privacy-password privacy-password;
}
}
}
}
vacm {
    access {
        group group-name {
            (default-context-prefix | context-prefix context-prefix) {
                security-model (any | usm | v1 | v2c) {
                    security-level (authentication | none | privacy) {
                        notify-view view-name;
                        read-view view-name;
                        write-view view-name;
                    }
                }
            }
        }
    }
}
security-to-group {
    security-model (usm | v1 | v2c) {
        security-name security-name {
            group group-name;
        }
    }
}
}
}
view view-name {
    oid object-identifier (include | exclude);
}
}

```

- Related Documentation**
- [Understanding SNMP Implementation in Junos OS on page 75](#)
 - [snmp on page 1627](#)

Optimizing the Network Management System Configuration for the Best Results

You can modify your network management system configuration to optimize the response time for SNMP queries. The following sections contain a few tips on how you can configure the network management system:

- [Changing the Polling Method from Column-by-Column to Row-by-Row on page 196](#)
- [Reducing the Number of Variable Bindings per PDU on page 196](#)
- [Increasing Timeout Values in Polling and Discovery Intervals on page 196](#)
- [Reducing Incoming Packet Rate at the snmpd on page 196](#)

Changing the Polling Method from Column-by-Column to Row-by-Row

You can configure the network management system to use the row-by-row method for SNMP data polling. It has been proven that the row-by-row and multiple row-by-multiple-row polling methods are more efficient than column-by-column polling. By configuring the network management system to use the row-by-row data polling method, you can ensure that data for only one interface is polled in a request instead of a single request polling data for multiple interfaces, as is the case with column-by-column polling. Row-by-row polling also reduces the risk of requests timing out.

Reducing the Number of Variable Bindings per PDU

By reducing the number of variable bindings per protocol data unit (PDU), you can improve the response time for SNMP requests. A request that polls for data related to multiple objects, which are mapped to different index entries, translates into multiple requests at the device-end because the subagent might have to poll different modules to obtain data that are linked to different index entries. The recommended method is to ensure that a request has only objects that are linked to one index entry instead of multiple objects linked to different index entries.



NOTE: If responses from a device are slow, avoid using the **GetBulk** option for the device, because a **GetBulk** request might contain objects that are linked to various index entries and might further increase the response time.

Increasing Timeout Values in Polling and Discovery Intervals

By increasing the timeout values for polling and discovery intervals, you can increase the queuing time at the device end and reduce the number of throttle drops that occur because of the request timing out.

Reducing Incoming Packet Rate at the snmpd

By reducing the frequency of sending SNMP requests to a device, you can reduce the risk of SNMP requests piling up at any particular device. Apart from reducing the frequency of sending SNMP requests to a device, you can also increase the polling interval, control the use of **GetNext** requests, and reduce the number of polling stations per device.

Related Documentation

- [Understanding SNMP Implementation in Junos OS on page 75](#)
- [Best Practices for Configuring SNMP on page 199](#)
- [Monitoring SNMP Activity and Tracking Problems That Affect SNMP Performance on a Device Running Junos OS on page 363](#)
- [Configuring Options on Managed Devices for Better SNMP Response Time on page 197](#)
- [Managing Traps and Informs on page 111](#)
- [Using the Enterprise-Specific Utility MIB to Enhance SNMP Coverage on page 265](#)

Configuring Options on Managed Devices for Better SNMP Response Time

The following sections contain information about configuration options on the managed devices that can enhance SNMP performance:

- [Enabling the stats-cache-lifetime Option on page 197](#)
- [Filtering Out Duplicate SNMP Requests on page 197](#)
- [Excluding Interfaces That Are Slow in Responding to SNMP Queries on page 198](#)

Enabling the stats-cache-lifetime Option

The Junos OS provides you with an option to configure the length of time an SNMP request stays active and queued so as to reduce the possibility of request drops during slow response times. You can use the **stats-cache-lifetime seconds** option at the **[edit snmp]** hierarchy level to specify the length of time that an SNMP request remains queued. The recommended value for the **stats-cache-lifetime** option is in the range of 30 to 60 seconds.



NOTE: The **set snmp stats-cache-lifetime seconds** command is a hidden command and is supported only on devices running Junos OS Release 9.3 and later.

Filtering Out Duplicate SNMP Requests

If a network management station retransmits a **Get**, **GetNext**, or **GetBulk** SNMP request too frequently to a device, that request might interfere with the processing of previous requests and slow down the response time of the agent. Filtering these duplicate requests improves the response time of the SNMP agent. The Junos OS enables you to filter out duplicate **Get**, **GetNext**, and **GetBulk** SNMP requests. The Junos OS uses the following information to determine if an SNMP request is a duplicate:

- Source IP address of the SNMP request
- Source UDP port of the SNMP request
- Request ID of the SNMP request



NOTE: By default, filtering of duplicate SNMP requests is disabled on devices running the Junos OS.

To enable filtering of duplicate SNMP requests on devices running the Junos OS, include the **filter-duplicates** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
filter-duplicates;
```

Excluding Interfaces That Are Slow in Responding to SNMP Queries

An interface that is slow in responding to SNMP requests for interface statistics can delay kernel responses to SNMP requests. You can review the mib2d log file to find out how long the kernel takes to respond to various SNMP requests. For more information about reviewing the log file for kernel response data, see “Checking Kernel and Packet Forwarding Engine Response” under “[Monitoring SNMP Activity and Tracking Problems That Affect SNMP Performance on a Device Running Junos OS](#)” on page 363. If you notice that a particular interface is slow in responding, and think that it is slowing down the kernel from responding to SNMP requests, exclude that interface from the SNMP queries to the device. You can exclude an interface from the SNMP queries either by configuring the **filter-interface** statement or by modifying the SNMP view settings.

The following example shows a sample configuration for excluding interfaces from the SNMP **Get**, **GetNext**, and **Set** operations:

```
[edit]
snmp {
  filter-interfaces {
    interfaces { # exclude the specified interfaces
      interface1;
      interface2;
    }
    all-internal-interfaces; # exclude all internal interfaces
  }
}
```

The following example shows the SNMP view configuration for excluding the interface with an interface index (ifIndex) value of 312 from a request for information related to the ifTable and ifXTable objects:

```
[edit snmp]
view test {
  oid .1 include;
  oid ifTable.1.*312 exclude;
  oid ifXTable.1.*312 exclude
}
```

Alternatively, you can take the interface that is slow in responding offline.

Related Documentation

- [Understanding SNMP Implementation in Junos OS on page 75](#)
- [Best Practices for Configuring SNMP on page 199](#)
- [Monitoring SNMP Activity and Tracking Problems That Affect SNMP Performance on a Device Running Junos OS on page 363](#)
- [Optimizing the Network Management System Configuration for the Best Results on page 196](#)
- [Managing Traps and Informs on page 111](#)
- [Using the Enterprise-Specific Utility MIB to Enhance SNMP Coverage on page 265](#)

Best Practices for Configuring SNMP

The following sections contain information about basic SNMP configuration and a few examples of configuring the basic SNMP operations on devices running Junos OS:

- [Configuring Basic Settings for SNMPv1 and SNMPv2 on page 199](#)
- [Configuring Basic Settings for SNMPv3 on page 200](#)
- [Configuring System Name, Location, Description, and Contact Information on page 202](#)

Configuring Basic Settings for SNMPv1 and SNMPv2

By default, SNMP is not enabled on devices running Junos OS. To enable SNMP on devices running Junos OS, include the **community public** statement at the **[edit snmp]** hierarchy level.

**Enabling SNMPv1 and
SNMPv2 Get and
GetNext Operations**

```
[edit]
snmp {
  community public;
}
```

A community that is defined as public grants access to all MIB data to any client.

To enable SNMPv1 and SNMPv2 **Set** operations on the device, you must include the following statements at the **[edit snmp]** hierarchy level:

**Enabling SNMPv1 and
SNMPv2 Set
Operations**

```
[edit snmp]
view all {
  oid .1;
}
community private {
  view all;
  authorization read-write;
}
```

The following example shows the basic minimum configuration for SNMPv1 and SNMPv2 traps on a device:

**Configuring SNMPv1
and SNMPv2 Traps**

```
[edit snmp]
trap-group jnpr {
  targets {
    192.168.69.179;
  }
}
```

Configuring Basic Settings for SNMPv3

The following example shows the minimum SNMPv3 configuration for enabling **Get**, **GetNext**, and **Set** operations on a device (note that the configuration has authentication set to **md5** and privacy to **none**):

**Enabling SNMPv3 Get,
GetNext, and Set
Operations**

```
[edit snmp]
v3 {
  usm {
    local-engine {
      user jnpruser {
        authentication-md5 {
          authentication-key "$9$guaDiQFnAuOQzevMWx7ikqP"; ## SECRET-DATA
        }
        privacy-none;
      }
    }
  }
  vacm {
    security-to-group {
      security-model usm {
        security-name jnpruser {
          group grpnm;
        }
      }
    }
    access {
      group grpnm {
        default-context-prefix {
          security-model any {
            security-level authentication {
              read-view all;
              write-view all;
            }
          }
        }
      }
    }
  }
  view all {
    oid .1;
  }
}
```

The following example shows the basic configuration for SNMPv3 informs on a device (the configuration has authentication and privacy set to **none**):

Configuring SNMPv3 Informs

```
[edit snmp]
v3 {
  usm {
    remote-engine 00000063200133a2c0a845c3 {
      user RU2_v3_sha_none {
        authentication-none;
        privacy-none;
      }
    }
  }
  vacm {
    security-to-group {
      security-model usm {
        security-name RU2_v3_sha_none {
          group g1_usm_auth;
        }
      }
    }
    access {
      group g1_usm_auth {
        default-context-prefix {
          security-model usm {
            security-level authentication {
              read-view all;
              write-view all;
              notify-view all;
            }
          }
        }
      }
    }
  }
  target-address TA2_v3_sha_none {
    address 192.168.69.179;
    tag-list tl1;
    address-mask 255.255.252.0;
    target-parameters TP2_v3_sha_none;
  }
  target-parameters TP2_v3_sha_none {
    parameters {
      message-processing-model v3;
      security-model usm;
      security-level none;
      security-name RU2_v3_sha_none;
    }
    notify-filter nf1;
  }
  notify N1_all_tl1_informs {
    type inform; # Replace inform with trap to convert informs to traps.
    tag tl1;
  }
  notify-filter nf1 {
    oid .1 include;
  }
}
```

```
view all {
  oid .1 include;
}
```

You can convert the SNMPv3 informs to traps by setting the value of the **type** statement at the **[edit snmp v3 notify N1_all_tl1_informs]** hierarchy level to **trap** as shown in the following example:

Converting Informs to Traps

```
user@host# set snmp v3 notify N1_all_tl1_informs type trap
```

Configuring System Name, Location, Description, and Contact Information

Junos OS enables you to include the name and location of the system, administrative contact information, and a brief description of the system in the SNMP configuration.



NOTE: Always keep the name, location, contact, and description information configured and updated for all your devices that are managed by SNMP.

The following example shows a typical configuration.



TIP: Use quotation marks to enclose the system name, contact, location, and description information that contain spaces.

```
[edit]
snmp {
  name "snmp 001"; # Overrides the system name.
  contact "Juniper Berry, (650) 555 1234"; # Specifies the name and phone number of
    the administrator.
  location "row 11, rack C"; # Specifies the location of the device.
  description "M40 router with 8 FPCs" # Configures a description for the device.
}
```

Related Documentation

- [Understanding SNMP Implementation in Junos OS on page 75](#)
- [Monitoring SNMP Activity and Tracking Problems That Affect SNMP Performance on a Device Running Junos OS on page 363](#)
- [Optimizing the Network Management System Configuration for the Best Results on page 196](#)
- [Configuring Options on Managed Devices for Better SNMP Response Time on page 197](#)
- [Managing Traps and Informs on page 111](#)
- [Using the Enterprise-Specific Utility MIB to Enhance SNMP Coverage on page 265](#)

Configuring the System Contact on a Device Running Junos OS

You can specify an administrative contact for each system being managed by SNMP. This name is placed into the MIB II sysContact object. To configure a contact name, include the **contact** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
contact contact;
```

If the name contains spaces, enclose it in quotation marks (" ").

To define a system contact name that contains spaces:

```
[edit]
snmp {
  contact "Juniper Berry, (650) 555-1234";
}
```

Related Documentation

- [Configuring the System Location for a Device Running Junos OS on page 205](#)
- [Configuring the System Description on a Device Running Junos OS on page 206](#)
- [Configuring a Different System Name on page 208](#)
- [Configuration Statements at the \[edit snmp\] Hierarchy Level on page 188](#)

Configuring SNMP on a Device Running Junos OS

By default, SNMP is disabled on devices running Junos OS. To enable SNMP on a router or switch, you must include the SNMP configuration statements at the **[edit snmp]** hierarchy level.

To configure the minimum requirements for SNMP, include the following statements at the **[edit snmp]** hierarchy level of the configuration:

```
[edit]
snmp {
  community public;
}
```

The community defined here as **public** grants read access to all MIB data to any client.

To configure complete SNMP features, include the following statements at the **[edit snmp]** hierarchy level:

```
snmp {
  client-list client-list-name {
    ip-addresses;
  }
  community community-name {
    authorization authorization;
  }
}
```

```

client-list-name client-list-name;
clients {
    address restrict;
}
routing-instance routing-instance-name {
    clients {
        addresses;
    }
}
logical-system logical-system-name {
    routing-instance routing-instance-name {
        clients {
            addresses;
        }
    }
}
view view-name;
}
contact contact;
description description;
engine-id {
    (local engine-id | use-mac-address | use-default-ip-address);
}
filter-duplicates;
health-monitor {
    falling-threshold integer;
    interval seconds;
    rising-threshold integer;
}
interface [ interface-names ];
location location;
name name;
nonvolatile {
    commit-delay seconds;
}
rmon {
    alarm index {
        description text-description;
        falling-event-index index;
        falling-threshold integer;
        falling-threshold-interval seconds;
        interval seconds;
        request-type (get-next-request | get-request | walk-request);
        rising-event-index index;
        sample-type type;
        startup-alarm alarm;
        syslog-subtag syslog-subtag;
        variable oid-variable;
    }
    event index {
        community community-name;
        description text-description;
        type type;
    }
}

```

```

traceoptions {
  file filename <files number> <size size> <world-readable | no-world-readable> <match
    regular-expression>;
  flag flag;
}
trap-group group-name {
  categories {
    category;
  }
  destination-port port-number;
  routing-instance instance;
  targets {
    address;
  }
  version (all | v1 | v2);
}
trap-options {
  agent-address outgoing-interface;
  source-address address;
}
view view-name {
  oid object-identifier (include | exclude);
}
}

```

**Related
Documentation**

- [Understanding the SNMP Implementation in Junos OS](#)
- [Configuration Statements at the \[edit snmp\] Hierarchy Level on page 188](#)

Configuring the System Location for a Device Running Junos OS

You can specify the location of each system being managed by SNMP. This string is placed into the MIB II sysLocation object. To configure a system location, include the **location** statement at the **[edit snmp]** hierarchy level:

```

[edit snmp]
location location;

```

If the location contains spaces, enclose it in quotation marks (" ").

To specify the system location:

```

[edit]
snmp {
  location "Row 11, Rack C";
}

```

**Related
Documentation**

- [Configuring the System Contact on a Device Running Junos OS on page 203](#)
- [Configuring the System Description on a Device Running Junos OS on page 206](#)
- [Configuring a Different System Name on page 208](#)

- [Configuration Statements at the \[edit snmp\] Hierarchy Level on page 188](#)

Configuring the System Description on a Device Running Junos OS

You can specify a description for each system being managed by SNMP. This string is placed into the MIB II sysDescription object. To configure a description, include the **description** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
description description;
```

If the description contains spaces, enclose it in quotation marks (" ").

To specify the system description:

```
[edit]
snmp {
  description "M40 router with 8 FPCs";
}
```

Related Documentation

- [Configuring the System Contact on a Device Running Junos OS on page 203](#)
- [Configuring the System Location for a Device Running Junos OS on page 205](#)
- [Configuring a Different System Name on page 208](#)
- [Configuration Statements at the \[edit snmp\] Hierarchy Level on page 188](#)

Configuring SNMP Details

You can use SNMP to store basic administrative details, such as a contact name and the location of the device. Your management system can then retrieve this information remotely, when you are troubleshooting an issue or performing an audit. In SNMP terminology, these are the sysContact, sysDescription, and sysLocation objects found within the system group of MIB-2 (as defined in RFC 1213, *Management Information Base for Network Management of TCP/IP-based internets: MIB-II*). You can set initial values directly in the Junos OS configuration for each system being managed by SNMP.

To set the system contact details:

1. Set the system contact details by including the **contact** statement at the **[edit snmp]** hierarchy level, or in an appropriate configuration group as shown here.

This administrative contact is placed into the MIB II sysContact object.

If the name contains spaces, enclose it in quotation marks (" ").

```
[edit groups global snmp]
user@host# set contact contact
```

For example:

```
[edit groups global snmp]
user@host# set contact "Enterprise Support, (650) 555-1234"
```

2. Configure a system description.

This string is placed into the MIB II sysDescription object. If the description contains spaces, enclose it in quotation marks (" ").

```
[edit groups global snmp]
user@host# set description description
```

For example:

```
[edit groups global snmp]
user@host# set description "M10i router with 8 FPCs"
```

3. Configure a system location.

This string is placed into the MIB II sysLocation object. If the location contains spaces, enclose it in quotation marks (" ").

To specify the system location:

```
[edit]
snmp {
  location "Row 11, Rack C";
}
```

```
[edit groups global snmp]
user@host# set location location
```

For example:

```
[edit groups global snmp]
user@host# set location "London Corporate Office, Lab 5, Row 11, Rack C"
```

4. At the top level of the configuration, apply the configuration group.

If you use a configuration group, you must apply it for it to take effect.

```
[edit]
user@host# set apply-groups global
```

5. Commit the configuration.

```
user@host# commit
```

6. To verify the configuration, enter the **show snmp mib walk system** operational-mode command.

The **show snmp mib walk system** command performs a MIB walk through of the system table (from MIB-2 as defined in RFC 1213). The SNMP agent in Junos OS responds by printing each row in the table and its associated value. You can use the same command to perform a MIB walk through any part of the MIB tree supported by the agent.

```
user@host> show snmp mib walk system
sysDescr.0    = M10i router with 8 FPCs
sysObjectID.0 = jnxProductNameM10i
sysUpTime.0   = 173676474
sysContact.0  = Enterprise Support, (650) 555-1234
sysName.0     = host
sysLocation.0 = London Corporate Office, Lab 5, Row 11, Rack C
sysServices.0 = 4
```

- Related Documentation**
- [Configuring SNMP Communities on page 210](#)
 - [Configuring SNMP Traps on page 218](#)

Configuring a Different System Name

Junos OS enables you to override the system name by including the **name** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
name name;
```

If the name contains spaces, enclose it in quotation marks (" ").

To specify the system name override:

```
[edit]
snmp {
  name "snmp 1";
}
```

- Related Documentation**
- [Configuring the System Contact on a Device Running Junos OS on page 203](#)
 - [Configuring the System Location for a Device Running Junos OS on page 205](#)
 - [Configuring the System Description on a Device Running Junos OS on page 206](#)
 - [Configuration Statements at the \[edit snmp\] Hierarchy Level on page 188](#)

Configuring the Commit Delay Timer

When a router or switch first receives an SNMP nonvolatile **Set** request, a Junos OS XML protocol session opens and prevents other users or applications from changing the candidate configuration (equivalent to the command-line interface [CLI] **configure exclusive** command). If the router does not receive new SNMP **Set** requests within 5 seconds (the default value), the candidate configuration is committed and the

Junos OS XML protocol session closes (the configuration lock is released). If the router receives new SNMP **Set** requests while the candidate configuration is being committed, the SNMP **Set** request is rejected and an error is generated. If the router receives new SNMP **Set** requests before 5 seconds have elapsed, the commit-delay timer (the length of time between when the last SNMP request is received and the commit is requested) resets to 5 seconds.

By default, the timer is set to 5 seconds. To configure the timer for the SNMP **Set** reply and start of the commit, include the **commit-delay** statement at the **[edit snmp nonvolatile]** hierarchy level:

```
[edit snmp nonvolatile]
commit-delay seconds;
```

seconds is the length of the time between when the SNMP request is received and the commit is requested for the candidate configuration. For more information about the **configure exclusive** command and locking the configuration, see the *Junos OS CLI User Guide*.

Filtering Duplicate SNMP Requests

By default, filtering duplicate **get**, **getNext**, and **getBulk** SNMP requests is disabled on devices running Junos OS. If a network management station retransmits a **Get**, **GetNext**, or **GetBulk** SNMP request too frequently to the router, that request might interfere with the processing of previous requests and slow down the response time of the agent. Filtering these duplicate requests improves the response time of the SNMP agent. Junos OS uses the following information to determine if an SNMP request is a duplicate:

- Source IP address of the SNMP request
- Source UDP port of the SNMP request
- Request ID of the SNMP request

To filter duplicate SNMP requests, include the **filter-duplicates** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
filter-duplicates;
```

Related Documentation

- [Configuring the Interfaces on Which SNMP Requests Can Be Accepted on page 239](#)
- [Filtering Interface Information Out of SNMP Get and GetNext Output on page 240](#)
- [Configuration Statements at the \[edit snmp\] Hierarchy Level on page 188](#)

Configuring SNMP Communities

Configuring the SNMP agent in Junos OS is a straightforward task that shares many familiar settings common to other managed devices in your network. For example, you need to configure Junos OS with an SNMP community string and a destination for traps. Community strings are administrative names that group collections of devices and the agents that are running on them together into common management domains. If a manager and an agent share the same community, they can communicate with each other. An SNMP community defines the level of authorization granted to its members, such as which MIB objects are available, which operations (read-only or read-write) are valid for those objects, and which SNMP clients are authorized, based on their source IP addresses.

The SNMP community string defines the relationship between an SNMP server system and the client systems. This string acts like a password to control the clients' access to the server.

To create a read-only SNMP community:

1. Enter the SNMP community used in your network.

If the community name contains spaces, enclose it in quotation marks (" ").

Community names must be unique.



NOTE: You cannot configure the same community name at the [edit snmp community] and [edit snmp v3 snmp-community *community-index*] hierarchy levels.

```
[edit groups global]
user@host# set snmp community name
```

This example uses the standard name **public** to create a community that gives limited read-only access.

```
[edit groups global]
user@host# set snmp community public
```

2. Define the authorization level for the community.

The default authorization level for a community is **read-only**.

To allow **Set** requests within a community, you need to define that community as **authorization read-write**. For **Set** requests, you also need to include the specific MIB objects that are accessible with read-write privileges using the **view** statement. The default view includes all supported MIB objects that are accessible with read-only privileges. No MIB objects are accessible with read-write privileges. For more information about the **view** statement, see ["Configuring MIB Views" on page 241](#).


```
[edit groups global snmp community name]
user@host# set authorization authorization
```

This example confines the public community to read-only access. Any SNMP client (for example, an SNMP management system) that belongs to the public community can read MIB variables but cannot set (change) them.

```
[edit groups global snmp community public]
user@host# set authorization read-only
```

3. Define a list of clients in the community who are authorized to communicate with the SNMP agent in Junos OS.

The **clients** statement lists the IP addresses of the clients (community members) that are allowed to use this community. List the clients by IP address and prefix. Typically, the list includes the SNMP network management system in your network or the address of your management network. If no **clients** statement is present, all clients are allowed. For **address**, you must specify an IPv4 or IPv6 address, not a hostname.

```
[edit groups global snmp community name]
user@host# set clients address
```

The following statement defines the hosts in the 192.168.1.0/24 network as being authorized in the public community.

```
[edit groups global snmp community public]
user@host# set clients 192.168.1.0/24
```

4. Define the clients that are not authorized within the community by specifying their IP address, followed by the **restrict** statement.

```
[edit groups global snmp community name]
user@host# set clients address restrict
```

The following statement defines all other hosts as being restricted from the public community.

```
[edit groups global snmp community public]
user@host# set clients 0/0 restrict
```

5. At the top level of the configuration, apply the configuration group.

If you use a configuration group, you must apply it for it to take effect.

```
[edit]
user@host# set apply-groups global
```

6. Commit the configuration.

```
user@host# commit
```

To create a read-write SNMP community:

1. Enter the SNMP community used in your network.

```
[edit groups global]  
user@host# set snmp community name
```

This example standard community string **private** to identify the community granted read-write access to the SNMP agent running on the device.

```
[edit groups global]  
user@host# set snmp community private
```

2. Define the authorization level for the community.

```
[edit groups global snmp community name]  
user@host# set authorization authorization
```

This example confines the public community to read-only access. Any SNMP client (for example, an SNMP management system) that belongs to the public community can read MIB variables but cannot set (change) them.

```
[edit groups global snmp community public]  
user@host# set authorization read-write
```

3. Define a list of clients in the community who are authorized to make changes to the SNMP agent in Junos OS.

List the clients by IP address and prefix.

```
[edit groups global snmp community name]  
user@host# set clients address
```

For example:

```
[edit groups global snmp community private]  
user@host# set clients 192.168.1.15/24  
user@host# set clients 192.168.1.18/24
```

4. Define the clients that are not authorized within the community by specifying their IP address, followed by the **restrict** statement.

```
[edit groups global snmp community name]  
user@host# set clients address restrict
```

The following statement defines all other hosts as being restricted from the public community.

```
[edit groups global snmp community private]
user@host# set clients 0/0 restrict
```

- At the top level of the configuration, apply the configuration group.

If you use a configuration group, you must apply it for it to take effect.

```
[edit]
user@host# set apply-groups global
```

- Commit the configuration.

```
user@host# commit
```

Related Documentation

- [Adding a Group of Clients to an SNMP Community on page 215](#)
- [Configuration Statements at the \[edit snmp\] Hierarchy Level on page 188](#)
- [Examples: Configuring the SNMP Community String on page 214](#)

Configuring the SNMP Community String

The SNMP community string defines the relationship between an SNMP server system and the client systems. This string acts like a password to control the clients' access to the server. To configure a community string in a Junos OS configuration, include the **community** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
community name {
  authorization authorization;
  clients {
    default restrict;
    address restrict;
  }
  view view-name;
}
```

If the community name contains spaces, enclose it in quotation marks (" ").

The default authorization level for a community is **read-only**. To allow **Set** requests within a community, you need to define that community as **authorization read-write**. For **Set** requests, you also need to include the specific MIB objects that are accessible with read-write privileges using the **view** statement. The default view includes all supported MIB objects that are accessible with read-only privileges; no MIB objects are accessible with read-write privileges. For more information about the **view** statement, see [“Configuring MIB Views” on page 241](#).

The **clients** statement lists the IP addresses of the clients (community members) that are allowed to use this community. If no **clients** statement is present, all clients are

allowed. For **address**, you must specify an IPv4 address, not a hostname. Include the **default restrict** option to deny access to all SNMP clients for which access is not explicitly granted. We recommend that you always include the **default restrict** option to limit SNMP client access to the local switch.



NOTE: Community names must be unique within each SNMP system.

Related Documentation

- [Configuring SNMP on page 192](#)

Examples: Configuring the SNMP Community String

Grant read-only access to all clients. With the following configuration, the system responds to SNMP **Get**, **GetNext**, and **GetBulk** requests that contain the community string **public**:

```
[edit]
snmp {
  community public {
    authorization read-only;
  }
}
```

Grant all clients read-write access to the ping MIB and **jnxPingMIB**. With the following configuration, the system responds to SNMP **Get**, **GetNext**, **GetBulk**, and **Set** requests that contain the community string **private** and specify an OID contained in the ping MIB or **jnxPingMIB** hierarchy:

```
[edit]
snmp {
  view ping-mib-view {
    oid pingMIB include;
    oid jnxPingMIB include;
    community private {
      authorization read-write;
      view ping-mib-view;
    }
  }
}
```

The following configuration allows read-only access to clients with IP addresses in the range **1.2.3.4/24**, and denies access to systems in the range **fe80::1:2:3:4/64**:

```
[edit]
snmp {
  community field-service {
    authorization read-only;
    clients {
      default restrict; # Restrict access to all SNMP clients not explicitly
                        # listed on the following lines.
      1.2.3.4/24; # Allow access by all clients in 1.2.3.4/24 except
```

```

        fe80::1:2:3:4/64 restrict;# fe80::1:2:3:4/64.
    }
}
}

```

Related Documentation

- [Configuring SNMP Communities on page 210](#)

Adding a Group of Clients to an SNMP Community

Junos OS enables you to add one or more groups of clients to an SNMP community. You can include the **client-list-name** *name* statement at the **[edit snmp community community-name]** hierarchy level to add all the members of the client list or prefix list to an SNMP community.

To define a list of clients, include the **client-list** statement followed by the IP addresses of the clients at the **[edit snmp]** hierarchy level:

```

[edit snmp]
  client-list client-list-name {
    ip-addresses;
  }

```

You can configure a prefix list at the **[edit policy options]** hierarchy level. Support for prefix lists in the SNMP community configuration enables you to use a single list to configure the SNMP and routing policies. For more information about the **prefix-list** statement, see the *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide*.

To add a client list or prefix list to an SNMP community, include the **client-list-name** statement at the **[edit snmp community community-name]** hierarchy level:

```

[edit snmp community community-name]
  client-list-name client-list-name;

```



NOTE: The client list and prefix list must not have the same name.

The following example shows how to define a client list:

```

[edit]
snmp {
  client-list clentlist1 {
    10.1.1.1/32;
    10.2.2.2/32;
  }
}

```

The following example shows how to add a client list to an SNMP community:

```

[edit]

```

```
snmp {  
  community community1 {  
    authorization read-only;  
    client-list-name clientlist1;  
  }  
}
```

The following example shows how to add a prefix list to an SNMP community:

```
[edit]  
policy-options {  
  prefix-list prefixlist {  
    10.3.3.3/32;  
    10.5.5.5/32;  
  }  
}  
snmp {  
  community community2 {  
    client-list-name prefixlist;  
  }  
}
```

- Related Documentation
- [client-list on page 1545](#)
 - [client-list-name on page 1546](#)

Configuring a Proxy SNMP Agent

Starting with Release 12.3, Junos OS enables you to assign one of the devices in the network as a proxy SNMP agent through which the network management system (NMS) can query other devices in the network. When you configure a proxy, you can specify the names of devices to be managed through the proxy SNMP agent.

When the NMS queries the proxy SNMP agent, the NMS specifies the community name (for SNMPv1 and SNMPv2) or the context and security name (for SNMPv3) associated with the device from which it requires the information.



NOTE: If you have configured authentication and privacy methods and passwords for SNMPv3, those parameters are also specified in the query for SNMPv3 information.

To configure a proxy SNMP agent and specify devices to be managed by the proxy SNMP agent, you can include the following configuration statements at the **[edit snmp]** hierarchy level:

```
proxy proxy-name {  
  device-name device-name;  
  logical-system logical-system {  
    routing-instance routing-instance;  
  }  
}
```

```

    }
    routing-instance routing-instance;
    <version-v1 | version-v2c> {
        snmp-community community-name;
        no-default-comm-to-v3-config;
    }
    version-v3 {
        security-name security-name;
        context context-name;
    }
}

```

- The **proxy** statement enables you to specify a unique name for the proxy configuration.
- The **version-v1**, **version-v2c**, and **version-v3** statements enable you to specify the SNMP version.
- The **no-default-comm-to-v3-config** statement is an optional statement at the `[edit snmp proxy proxy-name <version-v1 | version-v2c>]` hierarchy level that when included in the configuration requires you to manually configure the statements at the `[edit snmp v3 snmp-community community-name]` and `[edit snmp v3 vacm]` hierarchy levels.
If the **no-default-comm-to-v3-config** statement is not included at the `[edit snmp proxy proxy-name <version-v1 | version-v2c>]` hierarchy level, the `[edit snmp v3 snmp-community community-name]` and `[edit snmp v3 vacm]` hierarchy level configurations are automatically initialized.
- The **logical-system** and **routing-instance** statements are optional statements that enable you to specify logical system and routing instance names if you want to create proxies for logical systems or routing instances on the device.



NOTE: Starting with Junos OS Release 15.2, you must configure interface `<interface-name>` statement at the `[edit snmp]` hierarchy level for the proxy SNMP agent.



NOTE: The community and security configuration for the proxy should match the corresponding configuration on the device that is to be managed.



NOTE: Because the proxy SNMP agent does not have trap forwarding capabilities, the devices that are managed by the proxy SNMP agent send the traps directly to the network management system.

You can use the **show snmp proxy** operational mode command to view proxy details on a device. The **show snmp proxy** command returns the proxy names, device names, SNMP version, community/security, and context information.

Related Documentation • [proxy \(snmp\) on page 1600](#)

Configuring SNMP Traps

Traps are unsolicited messages sent from an SNMP agent to remote network management systems or trap receivers. Many enterprises use SNMP traps as part of a fault-monitoring solution, in addition to system logging. In Junos OS, SNMP traps are not forwarded by default, so you must configure a trap-group if you wish to use SNMP traps.

You can create and name a group of one or more types of SNMP traps and then define which systems receive the group of SNMP traps. The name of the trap group is embedded in SNMP trap notification packets as one variable binding (varbind) known as the community name.

To configure an SNMP trap:

1. Create a single, consistent source address that Junos OS applies to all outgoing traps in your device.

A source address is useful, because although most Junos OS devices have a number of outbound interfaces, using one source address helps a remote NMS to associate the source of the traps with an individual device

```
[edit groups global snmp]
user@host# set trap-options source-address address
```

This example uses the IP address of the loopback interface (lo0) as the source address for all the SNMP traps that originate from the device.

```
[edit groups global snmp]
user@host# set trap-options source-address lo0
```

2. Create a trap group in which you can list the types of traps to be forwarded and the targets (addresses) of the receiving remote management systems.

```
[edit groups global snmp trap-group group-name]
user@host# set version (all | v1 | v2) targets address
```

This example creates a trap group called **managers**, allows SNMP version 2-formatted notifications (traps) to be sent to the host at address 192.168.1.15. This statement forwards all categories of traps.

```
[edit groups global snmp trap-group managers]
user@host# set version v2 targets 192.168.1.15
```

3. Define the specific subset of trap categories to be forwarded.

For a list of categories, see [“Configuring SNMP Trap Groups” on page 224](#).


```
[edit groups global snmp trap-group group-name]
user@host# set categories category
```

The following statement configures the standard MIB-II authentication failures on the agent (the device).

```
[edit groups global snmp trap-group managers]
user@host# set categories authentication
```

4. At the top level of the configuration, apply the configuration group.

If you use a configuration group, you must apply it for it to take effect.

```
[edit]
user@host# set apply-groups global
```

5. Commit the configuration.

```
user@host# commit
```

6. To verify the configuration, generate an authentication failure trap.

This means that the SNMP agent received a request with an unknown community. Other traps types can also be spoofed as well.

This feature enables you to trigger SNMP traps from routers and ensure that they are processed correctly within your existing network management infrastructure. This is also useful for testing and debugging SNMP behavior on the switch or NMS.

Using the **monitor traffic** command, you can verify that the trap is sent to the network management system.

```
user@host> request snmp spoof-trap authenticationFailure
Spoof-trap request result: trap sent successfully
```

Related Documentation

- [Adding a Group of Clients to an SNMP Community on page 215](#)
- [Configuration Statements at the \[edit snmp\] Hierarchy Level on page 188](#)
- [Examples: Configuring the SNMP Community String on page 214](#)

Configuring SNMP Trap Options and Groups on a Device Running Junos OS

Some carriers have more than one trap receiver that forwards traps to a central NMS. This allows for more than one path for SNMP traps from a router to the central NMS through different trap receivers. A device running Junos OS can be configured to send the same copy of each SNMP trap to every trap receiver configured in the trap group.

The source address in the IP header of each SNMP trap packet is set to the address of the outgoing interface by default. When a trap receiver forwards the packet to the central NMS, the source address is preserved. The central NMS, looking only at the source address of each SNMP trap packet, assumes that each SNMP trap came from a different source.

In reality, the SNMP traps came from the same router, but each left the router through a different outgoing interface.

The statements discussed in the following sections are provided to allow the NMS to recognize the duplicate traps and to distinguish SNMPv1 traps based on the outgoing interface.

To configure SNMP trap options and trap groups, include the **trap-options** and **trap-group** statements at the **[edit snmp]** hierarchy level:

```
[edit snmp]
trap-options {
  agent-address outgoing-interface;
  source-address address;
}
trap-group group-name {
  categories {
    category;
  }
  destination-port port-number;
  targets {
    address;
  }
  version (all | v1 | v2);
}
```

**Related
Documentation**

- [Configuring SNMP Trap Options on page 220](#)
- [Configuring SNMP Trap Groups on page 224](#)
- [Configuration Statements at the \[edit snmp\] Hierarchy Level on page 188](#)

Configuring SNMP Trap Options

Using SNMP trap options, you can set the source address of every SNMP trap packet sent by the router to a single address regardless of the outgoing interface. In addition, you can set the agent address of the SNMPv1 traps. For more information about the contents of SNMPv1 traps, see RFC 1157.



NOTE: SNMP cannot be associated with any routing instances other than the master routing instance.

To configure SNMP trap options, include the **trap-options** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
trap-options {
  agent-address outgoing-interface;
  context-oid;
  enterprise-oid;
  logical-system logical-system-name {
    routing-instance routing-instance-name {
      source-address address;
    }
  }
  routing-instance routing-instance-name {
    source-address address;
  }
}
```

You must also configure a trap group for the trap options to take effect. For information about trap groups, see [“Configuring SNMP Trap Groups” on page 224](#).

This topic contains the following sections:

- [Configuring the Source Address for SNMP Traps on page 221](#)
- [Configuring the Agent Address for SNMP Traps on page 223](#)
- [Adding snmpTrapEnterprise Object Identifier to Standard SNMP Traps on page 224](#)

Configuring the Source Address for SNMP Traps

You can configure the source address of trap packets in many ways: lo0, a valid IPv4 address or IPv6 address configured on one of the router interfaces, a logical-system address, or the address of a routing-instance. The value lo0 indicates that the source address of the SNMP trap packets is set to the lowest loopback address configured on the interface lo0.



NOTE: If the source address is an invalid IPv4 or IPv6 address or is not configured, SNMP traps are not generated.

You can configure the source address of trap packets in one of the following formats:

- A valid IPv4 address configured on one of the router interfaces
- A valid IPv6 address configured on one of the router interfaces
- **lo0**; that is, the lowest loopback address configured on the interface lo0
- A logical-system name
- A routing-instance name

**A Valid IPv4 Address
As the Source Address**

To specify a valid IPv4 interface address as the source address for SNMP traps on one of the router interfaces, include the **source-address** statement at the **[edit snmp trap-options]** hierarchy level:

```
[edit snmp trap-options]
source-address address;
```

address is a valid IPv4 address configured on one of the router interfaces.

**A Valid IPv6 Address
As the Source Address**

To specify a valid IPv6 interface address as the source address for SNMP traps on one of the router interfaces, include the **source-address** statement at the **[edit snmp trap-options]** hierarchy level:

```
[edit snmp trap-options]
source-address address;
```

address is a valid IPv6 address configured on one of the router interfaces.

**The Lowest Loopback
Address As the Source
Address**

To specify the source address of the SNMP traps so that they use the lowest loopback address configured on the interface lo0 as the source address, include the **source-address** statement at the **[edit snmp trap-options]** hierarchy level:

```
[edit snmp trap-options]
source-address lo0;
```

To enable and configure the loopback address, include the **address** statement at the **[edit interfaces lo0 unit 0 family inet]** hierarchy level:

```
[edit interfaces]
lo0 {
  unit 0 {
    family inet {
      address ip-address;
    }
  }
}
```

To configure the loopback address as the source address of trap packets:

```
[edit snmp]
trap-options {
  source-address lo0;
}
trap-group "urgent-dispatcher" {
  version v2;
  categories link startup;
  targets {
    192.168.10.22;
    172.17.1.2;
  }
}
[edit interfaces]
```

```

lo0 {
  unit 0 {
    family inet {
      address 10.0.0.1/32;
      address 127.0.0.1/32;
    }
  }
}

```

In this example, the IP address 10.0.0.1 is the source address of every trap sent from this router.

Logical System Name as the Source Address

To specify a logical system name as the source address of SNMP traps, include the **logical-system** *logical-system-name* statement at the **[edit snmp trap-options]** hierarchy level.

For example, the following configuration sets logical system name **ls1** as the source address of SNMP traps:

```

[edit snmp]
  trap-options {
    logical-system ls1;
  }

```

Routing Instance Name as the Source Address

To specify a routing instance name as the source address of SNMP traps, include the **routing-instance** *routing-instance-name* statement at the **[edit snmp trap-options]** hierarchy level.

For example, the following configuration sets the routing instance name **ri1** as the source address for SNMP traps:

```

[edit snmp]
  trap-options {
    routing-instance ri1;
  }

```

Configuring the Agent Address for SNMP Traps

The agent address is only available in SNMPv1 trap packets (see RFC 1157). By default, the router's default local address is not specified in the agent address field of the SNMPv1 trap. To configure the agent address, include the **agent-address** statement at the **[edit snmp trap-options]** hierarchy level. Currently, the agent address can only be the address of the outgoing interface:

```

[edit snmp]
  trap-options {
    agent-address outgoing-interface;
  }

```

To configure the outgoing interface as the agent address:

```

[edit snmp]

```

```
trap-options {  
  agent-address outgoing-interface;  
}  
trap-group "urgent-dispatcher" {  
  version v1;  
  categories link startup;  
  targets {  
    192.168.10.22;  
    172.17.1.2;  
  }  
}
```

In this example, each SNMPv1 trap packet sent has its agent address value set to the IP address of the outgoing interface.

Adding snmpTrapEnterprise Object Identifier to Standard SNMP Traps

The `snmpTrapEnterprise` object helps you identify the enterprise that has defined the trap. Typically, the `snmpTrapEnterprise` object appears as the last varbind in enterprise-specific SNMP version 2 traps. However, starting Release 10.0, Junos OS enables you to add the `snmpTrapEnterprise` object identifier to standard SNMP traps as well.

To add `snmpTrapEnterprise` to standard traps, include the **enterprise-oid** statement at the `[edit snmp trap-options]` hierarchy level. If the **enterprise-oid** statement is not included in the configuration, `snmpTrapEnterprise` is added only for enterprise-specific traps.

```
[edit snmp]  
trap-options {  
  enterprise-oid;  
}
```

Related Documentation

- [Configuring SNMP Trap Options and Groups on a Device Running Junos OS on page 219](#)
- [Configuring SNMP Trap Groups on page 224](#)

Configuring SNMP Trap Groups

You can create and name a group of one or more types of SNMP traps and then define which systems receive the group of SNMP traps. The trap group must be configured for SNMP traps to be sent. To create an SNMP trap group, include the **trap-group** statement at the `[edit snmp]` hierarchy level:

```
[edit snmp]  
trap-group group-name {  
  categories {  
    category;  
  }  
  destination-port port-number;  
  routing-instance instance;  
  targets {
```

```

    address;
  }
  version (all | v1 | v2);
}

```

The trap group name can be any string and is embedded in the community name field of the trap. To configure your own trap group port, include the **destination-port** statement. The default destination port is port 162.

For each trap group that you define, you must include the **target** statement to define at least one system as the recipient of the SNMP traps in the trap group. Specify the IPv4 or IPv6 address of each recipient, not its hostname.

Specify the types of traps the trap group can receive in the **categories** statement. For information about the category to which the traps belong, see the “[Standard SNMP Traps Supported by Junos OS](#)” on page 146 and “[Enterprise-Specific SNMP Traps Supported by Junos OS](#)” on page 154 topics.

Specify the routing instance used by the trap group in the **routing-instance** statement. All targets configured in the trap group use this routing instance.

A trap group can receive the following categories:

- **authentication**—Authentication failures
- **chassis**—Chassis or environment notifications
- **chassis-cluster**—Clustering notifications
- **configuration**—Configuration notifications
- **link**—Link-related notifications (up-down transitions, DS-3 and DS-1 line status change, IPv6 interface state change, and Passive Monitoring PIC overload)



NOTE: To send Passive Monitoring PIC overload interface traps, select the **link** trap category.

- **otn-alarms**—OTN alarm trap subcategories
- **remote-operations**—Remote operation notifications
- **rmon-alarm**—Alarm for RMON events
- **routing**—Routing protocol notifications
- **services**—Services notifications
- **sonet-alarms**—SONET/SDH alarms



NOTE: If you omit the SONET/SDH subcategories, all SONET/SDH trap alarm types are included in trap notifications.

- **loss-of-light**—Loss of light alarm notification
- **pll-lock**—PLL lock alarm notification
- **loss-of-frame**—Loss of frame alarm notification
- **loss-of-signal**—Loss of signal alarm notification
- **severely-errored-frame**—Severely errored frame alarm notification
- **line-ais**—Line alarm indication signal (AIS) alarm notification
- **path-ais**—Path AIS alarm notification
- **loss-of-pointer**—Loss of pointer alarm notification
- **ber-defect**—SONET/SDH bit error rate alarm defect notification
- **ber-fault**—SONET/SDH error rate alarm fault notification
- **line-remote-defect-indication**—Line remote defect indication alarm notification
- **path-remote-defect-indication**—Path remote defect indication alarm notification
- **remote-error-indication**—Remote error indication alarm notification
- **unequipped**—Unequipped alarm notification
- **path-mismatch**—Path mismatch alarm notification
- **loss-of-cell**—Loss of cell delineation alarm notification
- **vt-ais**—Virtual tributary (VT) AIS alarm notification
- **vt-loss-of-pointer**—VT loss of pointer alarm notification
- **vt-remote-defect-indication**—VT remote defect indication alarm notification
- **vt-unequipped**—VT unequipped alarm notification
- **vt-label-mismatch**—VT label mismatch error notification
- **vt-loss-of-cell**—VT loss of cell delineation notification
- **startup**—System warm and cold starts
- **timing-events**—Timing events and defects notification
- **vrrp-events**—Virtual Router Redundancy Protocol (VRRP) events such as new-master or authentication failures
- **startup**—System warm and cold starts
- **vrrp-events**—Virtual Router Redundancy Protocol (VRRP) events such as new-master or authentication failures

If you include SONET/SDH subcategories, only those SONET/SDH trap alarm types are included in trap notifications.

The **version** statement allows you to specify the SNMP version of the traps sent to targets of the trap group. If you specify **v1** only, SNMPv1 traps are sent. If you specify **v2** only, SNMPv2 traps are sent. If you specify **all**, both an SNMPv1 and an SNMPv2 trap are sent

for every trap condition. For more information about the **version** statement, see [version \(SNMP\)](#).

Related Documentation

- [Configuring SNMP Trap Options and Groups on a Device Running Junos OS on page 219](#)
- [Configuring SNMP Trap Options on page 220](#)
- [Configuring SNMP on a Device Running Junos OS on page 203](#)
- [Configuration Statements at the \[edit snmp\] Hierarchy Level on page 188](#)
- [Example: Configuring SNMP Trap Groups on page 239](#)

SNMP Traps Support

The QFX Series standalone switches, QFX Series Virtual Chassis, and QFabric systems support standard SNMP traps and Juniper Networks enterprise-specific traps.

For more information, see:

- [SNMP Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis on page 227](#)
- [SNMP Traps Supported on QFabric Systems on page 235](#)

SNMP Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis

QFX Series standalone switches and QFX Series Virtual Chassis support SNMPv1 and v2 traps. For more information, see:

- [SNMPv1 Traps on page 227](#)
- [SNMPv2 Traps on page 231](#)

SNMPv1 Traps

QFX Series standalone switches and QFX Series Virtual Chassis support both standard SNMPv1 traps and Juniper Networks enterprise-specific SNMPv1 traps. See:

- [Table 15 on page 228](#) for standard SNMPv1 traps.
- [Table 16 on page 230](#) for enterprise-specific SNMPv1 traps.

The traps are organized first by trap category and then by trap name. The system logging severity levels are listed for those traps that have them. Traps that do not have corresponding system logging severity levels are marked with an en dash (–).

Table 15: Standard SNMP Version 1 Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis

Defined in	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number	System Logging Severity Level	Syslog Tag
Link Notifications						
RFC 1215, <i>Conventions for Defining Traps for Use with the SNMP</i>	linkDown	1.3.6.1.4.1.2636	2	0	Warning	SNMP_TRAP_LINK_DOWN
	linkUp	1.3.6.1.4.1.2636	3	0	Info	SNMP_TRAP_LINK_UP
Remote Operations Notifications						
RFC 2925, <i>Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations</i>	pingProbeFailed	1.3.6.1.2.1.80.0	6	1	Info	SNMP_TRAP_PING_PROBE_FAILED
	pingTestFailed	1.3.6.1.2.1.80.0	6	2	Info	SNMP_TRAP_PING_TEST_FAILED
	pingTestCompleted	1.3.6.1.2.1.80.0	6	3	Info	SNMP_TRAP_PING_TEST_COMPLETED
	traceRoutePathChange	1.3.6.1.2.1.81.0	6	1	Info	SNMP_TRAP_TRACE_ROUTE_PATH_CHANGE
	traceRouteTestFailed	1.3.6.1.2.1.81.0	6	2	Info	SNMP_TRAP_TRACE_ROUTE_TEST_FAILED
	traceRouteTestCompleted	1.3.6.1.2.1.81.0	6	3	Info	SNMP_TRAP_TRACE_ROUTE_TEST_COMPLETED
RMON Alarms						
RFC 2819a, <i>RMON MIB</i>	fallingAlarm	1.3.6.1.2.1.16	6	2	—	—
	risingAlarm	1.3.6.1.2.1.16	6	1	—	—
Routing Notifications						
<i>BGP 4 MIB</i>	bgpEstablished	1.3.6.1.2.1.15.7	6	1	—	—
	bgpBackwardTransition	1.3.6.1.2.1.15.7	6	2	—	—

Table 15: Standard SNMP Version 1 Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis (continued)

Defined in	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number	System Logging Severity Level	Syslog Tag
<i>OSPF TRAP MIB</i>	ospfVirtIfStateChange	1.3.6.1.2.1.14.16.2	6	1	–	–
	ospfNbrStateChange	1.3.6.1.2.1.14.16.2	6	2	–	–
	ospfVirtNbrStateChange	1.3.6.1.2.1.14.16.2	6	3	–	–
	ospfIfConfigError	1.3.6.1.2.1.14.16.2	6	4	–	–
	ospfVirtIfConfigError	1.3.6.1.2.1.14.16.2	6	5	–	–
	ospfIfAuthFailure	1.3.6.1.2.1.14.16.2	6	6	–	–
	ospfVirtIfAuthFailure	1.3.6.1.2.1.14.16.2	6	7	–	–
	ospfIfRxBadPacket	1.3.6.1.2.1.14.16.2	6	8	–	–
	ospfVirtIfRxBadPacket	1.3.6.1.2.1.14.16.2	6	9	–	–
	ospfTxRetransmit	1.3.6.1.2.1.14.16.2	6	10	–	–
	ospfVirtIfTxRetransmit	1.3.6.1.2.1.14.16.2	6	11	–	–
	ospfMaxAgeLsa	1.3.6.1.2.1.14.16.2	6	13	–	–
	ospfIfStateChange	1.3.6.1.2.1.14.16.2	6	16	–	–
Startup Notifications						
RFC 1215, <i>Conventions for Defining Traps for Use with the SNMP</i>	authenticationFailure	1.3.6.1.4.1.2636	4	0	Notice	SNMPD_TRAP_GEN_FAILURE
	coldStart	1.3.6.1.4.1.2636	0	0	Critical	SNMPD_TRAP_COLD_START
	warmStart	1.3.6.1.4.1.2636	1	0	Error	SNMPD_TRAP_WARM_START
VRRP Notifications						
RFC 2787, <i>Definitions of Managed Objects for the Virtual Router Redundancy Protocol</i>	vrrpTrapNewMaster	1.3.6.1.2.1.68	6	1	Warning	VRRPD_NEW_MASTER_TRAP
	vrrpTrapAuthFailure	1.3.6.1.2.1.68	6	2	Warning	VRRPD_AUTH_FAILURE_TRAP

Table 16: Enterprise-Specific SNMPv1 Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis

Defined in	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number	System Logging Severity Level	System Log Tag
Chassis Notifications (Alarm Conditions)						
<i>Chassis MIB</i> (jnx-chassis. mib)	jnxPowerSupplyFailure	1.3.6.1.4.1.2636.4.1	6	1	Warning	CHASSISD_SNMP_TRAP
	jnxFanFailure	1.3.6.1.4.1.2636.1	6	2	Critical	CHASSISD_SNMP_TRAP
	jnxOverTemperature	11.4.1.2636.4.1	6	3	Alert	CHASSISD_SNMP_TRAP
	jnxFruRemoval	1.3.6.1.4.1.2636.4.1	6	5	Notice	CHASSISD_SNMP_TRAP
	jnxFruInsertion	1.3.6.1.4.1.2636.4.1	6	6	Notice	CHASSISD_SNMP_TRAP
	jnxFruPowerOff	1.3.6.1.4.1.2636.4.1	6	7	Notice	CHASSISD_SNMP_TRAP
	jnxFruPowerOn	1.3.6.1.4.1.2636.4.1	6	8	Notice	CHASSISD_SNMP_TRAP
	jnxFruFailed	1.3.6.1.4.1.2636.4.1	6	9	Warning	CHASSISD_SNMP_TRAP
	jnxFruOffline	1.3.6.1.4.1.2636.4.1	6	10	Notice	CHASSISD_SNMP_TRAP
	jnxFruOnline	1.3.6.1.4.1.2636.4.1	6	11	Notice	CHASSISD_SNMP_TRAP
	jnxFruCheck	1.3.6.1.4.1.2636.4.1	6	12	Warning	CHASSISD_SNMP_TRAP
	jnxPowerSupplyOk	1.3.6.1.4.1.2636.4.2	6	1	Critical	CHASSISD_SNMP_TRAP
	jnxFanOK	1.3.6.1.4.1.2636.4.2	6	2	Critical	CHASSISD_SNMP_TRAP
	jnxTemperatureOK	1.3.6.1.4.1.2636.4.2	6	3	Alert	CHASSISD_SNMP_TRAP
Configuration Notifications						

Table 16: Enterprise-Specific SNMPv1 Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis (continued)

Defined in	Trap Name	Enterprise ID	Generic Trap Number	Specific Trap Number	System Logging Severity Level	System Log Tag
<i>Configuration Management MIB</i> (jnx-configmgmt.mib)	jnxCmCfgChange	1.3.6.1.4.1.2636.4.5	6	1	–	–
	jnxCmRescueChange	1.3.6.1.4.1.2636.4.5	6	2	–	–
Remote Operations						
<i>Ping MIB</i> (jnx-ping.mib)	jnxPingRttThresholdExceeded	1.3.6.1.4.1.2636.4.9	6	1	–	–
	jnxPingRttStdDevThreshold Exceeded	1.3.6.1.4.1.2636.4.9	6	2	–	–
	jnxPingRttJitterThreshold Exceeded	1.3.6.1.4.1.2636.4.9	6	3	–	–
	jnxPingEgressThreshold Exceeded	1.3.6.1.4.1.2636.4.9	6	4	–	–
	jnxPingEgressStdDev ThresholdExceeded	1.3.6.1.4.1.2636.4.9	6	5	–	–
	jnxPingEgressJitterThreshold Exceeded	1.3.6.1.4.1.2636.4.9	6	6	–	–
	jnxPingIngressThreshold Exceeded	1.3.6.1.4.1.2636.4.9	6	7	–	–
	jnxPingIngressStddevThreshold Exceeded	1.3.6.1.4.1.2636.4.9	6	8	–	–
	jnxPingIngressJitterThreshold Exceeded	1.3.6.1.4.1.2636.4.9	6	9	–	–
RMON Alarms						
<i>RMON MIB</i> (jnx-rmon.mib)	jnxRmonAlarmGetFailure	1.3.6.1.4.1.2636.4.3	6	1	–	–
	jnxRmonGetOk	1.3.6.1.4.1.2636.4.3	6	2	–	–

SNMPv2 Traps

- [Table 17 on page 232](#) lists the standard SNMP traps
- [Table 18 on page 234](#) lists the Juniper Networks enterprise-specific traps

Table 17: Standard SNMPv2 Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis

Defined in	Trap Name	SNMP Trap OID	System Logging Severity Level	Syslog Tag
Link Notifications				
RFC 2863, <i>The Interfaces Group MIB</i>	linkDown	1.3.6.1.6.3.1.1.5.3	Warning	SNMP_TRAP_LINK_DOWN
	linkUp	1.3.6.1.6.3.1.1.5.4	Info	SNMP_TRAP_LINK_UP
Remote Operations Notifications				
RFC 2925, <i>Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations</i>	pingProbeFailed	1.3.6.1.2.1.80.0.1	Info	SNMP_TRAP_PING_PROBE_FAILED
	pingTestFailed	1.3.6.1.2.1.80.0.2	Info	SNMP_TRAP_PING_TEST_FAILED
	pingTestCompleted	1.3.6.1.2.1.80.0.3	Info	SNMP_TRAP_PING_TEST_COMPLETED
	traceRoutePathChange	1.3.6.1.2.1.81.0.1	Info	SNMP_TRAP_TRACE_ROUTE_PATH_CHANGE
	traceRouteTestFailed	1.3.6.1.2.1.81.0.2	Info	SNMP_TRAP_TRACE_ROUTE_TEST_FAILED
	traceRouteTestCompleted	1.3.6.1.2.1.81.0.3	Info	SNMP_TRAP_TRACE_ROUTE_TEST_COMPLETED
RMON Alarms				
RFC 2819a, <i>RMON MIB</i>	fallingAlarm	1.3.6.1.2.1.16.0.1	–	–
	risingAlarm	1.3.6.1.2.1.16.0.2	–	–
Routing Notifications				
<i>BGP 4 MIB</i>	bgpEstablished	1.3.6.1.2.1.15.7.1	–	–
	bgpBackwardTransition	1.3.6.1.2.1.15.7.2	–	–

Table 17: Standard SNMPv2 Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis (continued)

Defined in	Trap Name	SNMP Trap OID	System Logging Severity Level	Syslog Tag
<i>OSPF Trap MIB</i>	ospfVirtIfStateChange	1.3.6.1.2.1.14.16.2.1	–	–
	ospfNbrStateChange	1.3.6.1.2.1.14.16.2.2	–	–
	ospfVirtNbrStateChange	1.3.6.1.2.1.14.16.2.3	–	–
	ospfIfConfigError	1.3.6.1.2.1.14.16.2.4	–	–
	ospfVirtIfConfigError	1.3.6.1.2.1.14.16.2.5	–	–
	ospfIfAuthFailure	1.3.6.1.2.1.14.16.2.6	–	–
	ospfVirtIfAuthFailure	1.3.6.1.2.1.14.16.2.7	–	–
	ospfIfRxBadPacket	1.3.6.1.2.1.14.16.2.8	–	–
	ospfVirtIfRxBadPacket	1.3.6.1.2.1.14.16.2.9	–	–
	ospfTxRetransmit	1.3.6.1.2.1.14.16.2.10	–	–
	ospfVirtIfTxRetransmit	1.3.6.1.2.1.14.16.2.11	–	–
	ospfMaxAgeLsa	1.3.6.1.2.1.14.16.2.13	–	–
	ospfIfStateChange	1.3.6.1.2.1.14.16.2.16	–	–
Startup Notifications				
RFC 1907, <i>Management Information Base for Version 2 of the Simple Network Management Protocol (SNMPv2)</i>	coldStart	1.3.6.1.6.3.1.1.5.1	Critical	SNMPD_TRAP_COLD_START
	warmStart	1.3.6.1.6.3.1.1.5.2	Error	SNMPD_TRAP_WARM_START
	authenticationFailure	1.3.6.1.6.3.1.1.5.5	Notice	SNMPD_TRAP_GEN_FAILURE
VRRP Notifications				
RFC 2787, <i>Definitions of Managed Objects for the Virtual Router Redundancy Protocol</i>	vrrpTrapNewMaster	1.3.6.1.2.1.68.0.1	Warning	VRRPD_NEWMASTER_TRAP
	vrrpTrapAuthFailure	1.3.6.1.2.1.68.0.2	Warning	VRRPD_AUTH_FAILURE_TRAP

Table 18: Enterprise-Specific SNMPv2 Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis

Source MIB	Trap Name	SNMP Trap OID	System Logging Severity Level	System Log Tag
Chassis (Alarm Conditions) Notifications				
<i>Chassis MIB</i> (mib-jnx-chassis)	jnxPowerSupplyFailure	1.3.6.1.4.1.2636.4.1.1	Alert	CHASSISD_ SNMP_ TRAP
	jnxFanFailure	1.3.6.1.4.1.2636.4.1.2	Critical	CHASSISD_ SNMP_ TRAP
	jnxOverTemperature	1.3.6.1.4.1.2636.4.1.3	Critical	CHASSISD_ SNMP_ TRAP
	jnxFruRemoval	1.3.6.1.4.1.2636.4.1.5	Notice	CHASSISD_ SNMP_ TRAP
	jnxFruInsertion	1.3.6.1.4.1.2636.4.1.6	Notice	CHASSISD_ SNMP_ TRAP
	jnxFruPowerOff	1.3.6.1.4.1.2636.4.1.7	Notice	CHASSISD_ SNMP_ TRAP
	jnxFruPowerOn	1.3.6.1.4.1.2636.4.1.8	Notice	CHASSISD_ SNMP_ TRAP
	jnxFruFailed	1.3.6.1.4.1.2636.4.1.9	Warning	CHASSISD_ SNMP_ TRAP
	jnxFruOffline	1.3.6.1.4.1.2636.4.1.10	Notice	CHASSISD_ SNMP_ TRAP
	jnxFruOnline	1.3.6.1.4.1.2636.4.1.11	Notice	CHASSISD_ SNMP_ TRAP
	jnxFruCheck	1.3.6.1.4.1.2636.4.1.12	Notice	CHASSISD_ SNMP_ TRAP
	jnxPowerSupplyOK	1.3.6.1.4.1.2636.4.2.1	Critical	CHASSISD_ SNMP_ TRAP
	jnxFanOK	1.3.6.1.4.1.2636.4.2.2	Critical	CHASSISD_ SNMP_ TRAP
	jnxTemperatureOK	1.3.6.1.4.1.2636.4.2.3	Alert	CHASSISD_ SNMP_ TRAP
Configuration Notifications				

Table 18: Enterprise-Specific SNMPv2 Traps Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis (continued)

Source MIB	Trap Name	SNMP Trap OID	System Logging Severity Level	System Log Tag
<i>Configuration Management MIB</i> (mib-jnx-cfgmgmt)	jnxCmCfgChange	1.3.6.1.4.1.2636.4.5.0.1	–	–
	jnxCmRescueChange	1.3.6.1.4.1.2636.4.5.0.2	–	–
Remote Operations Notifications				
<i>Ping MIB</i> (mib-jnx-ping)	jnxPingRttThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.1	–	–
	jnxPingRttStdDevThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.2	–	–
	jnxPingRttJitterThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.3	–	–
	jnxPingEgressThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.4	–	–
	jnxPingEgressStdDevThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.5	–	–
	jnxPingEgressJitterThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.6	–	–
	jnxPingIngressThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.7	–	–
	jnxPingIngressStddevThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.8	–	–
	jnxPingIngressJitterThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.9	–	–
RMON Alarms				
<i>RMON MIB</i> (mib-jnx-rmon)	jnxRmonAlarmGetFailure	1.3.6.1.4.1.2636.4.3.0.1	–	–
	jnxRmonGetOk	1.3.6.1.4.1.2636.4.3.0.2	–	–

SNMP Traps Supported on QFabric Systems

QFabric systems support standard SNMPv2 traps and Juniper Networks enterprise-specific SNMPv2 traps.



NOTE: QFabric systems do not support SNMPv1 traps.

For more information, see:

- [Table 19 on page 236](#) for standard SNMPv2 traps
- [Table 20 on page 237](#) for Juniper Networks enterprise-specific SNMPv2 traps

Table 19: Standard SNMPv2 Traps Supported on QFabric Systems

Defined in	Trap Name	SNMP Trap OID	System Logging Severity Level	Syslog Tag
Link Notifications				
RFC 2863, <i>The Interfaces Group MIB</i>	linkDown	1.3.6.1.6.3.1.1.5.3	Warning	SNMP_TRAP_LINK_DOWN
	linkUp	1.3.6.1.6.3.1.1.5.4	Info	SNMP_TRAP_LINK_UP
Startup Notifications				
RFC 1907, <i>Management Information Base for Version 2 of the Simple Network Management Protocol (SNMPv2)</i>	coldStart	1.3.6.1.6.3.1.1.5.1	Critical	SNMPD_TRAP_COLD_START
	warmStart	1.3.6.1.6.3.1.1.5.2	Error	SNMPD_TRAP_WARM_START
	authenticationFailure	1.3.6.1.6.3.1.1.5.5	Notice	SNMPD_TRAP_GEN_FAILURE

Table 20: Enterprise-Specific SNMPv2 Traps Supported on QFabric Systems

Source MIB	Trap Name	SNMP Trap OID	System Logging Severity Level	System Log Tag
<i>Fabric Chassis MIB</i> (mib-jnx-fabric-chassis)	Fabric Chassis (Alarm Conditions) Notifications			
	jnxFabricPowerSupplyFailure	1.3.6.1.4.1.2636.4.19.1	Warning	–
	jnxFabricFanFailure	1.3.6.1.4.1.2636.4.19.2	Critical	–
	jnxFabricOverTemperature	1.3.6.1.4.1.2636.4.19.3	Alert	–
	jnxFabricRedundancySwitchover	1.3.6.1.4.1.2636.4.19.4	Notice	–
	jnxFabricFruRemoval	1.3.6.1.4.1.2636.4.19.5	Notice	–
	jnxFabricFruInsertion	1.3.6.1.4.1.2636.4.19.6	Notice	–
	jnxFabricFruPowerOff	1.3.6.1.4.1.2636.4.19.7	Notice	–
	jnxFabricFruPowerOn	1.3.6.1.4.1.2636.4.19.8	Notice	–
	jnxFabricFruFailed	1.3.6.1.4.1.2636.4.19.9	Warning	–
	jnxFabricFruOffline	1.3.6.1.4.1.2636.4.19.10	Notice	–
	jnxFabricFruOnline	1.3.6.1.4.1.2636.4.19.11	Notice	–
	jnxFabricFruCheck	1.3.6.1.4.1.2636.4.19.12	Warning	–
	jnxFabricFEBSwitchover	1.3.6.1.4.1.2636.4.19.13	Warning	–
	jnxFabricHardDiskFailed	1.3.6.1.4.1.2636.4.19.14	Warning	–
	jnxFabricHardDiskMissing	1.3.6.1.4.1.2636.4.19.15	Warning	–
	jnxFabricBootFromBackup	1.3.6.1.4.1.2636.4.19.16	Warning	–
	Fabric Chassis (Alarm Cleared Conditions) Notifications			
	jnxFabricPowerSupplyOK	1.3.6.1.4.1.2636.4.20.1	Critical	–
	jnxFabricFanOK	1.3.6.1.4.1.2636.4.20.2	Critical	–
	jnxFabricTemperatureOK	1.3.6.1.4.1.2636.4.20.3	Alert	–
	jnxFabricFruOK	1.3.6.1.4.1.2636.4.20.4	–	–

Table 20: Enterprise-Specific SNMPv2 Traps Supported on QFabric Systems (continued)

Source MIB	Trap Name	SNMP Trap OID	System Logging Severity Level	System Log Tag
<i>QFabric MIB</i> (mib-jnx-qf-smi)	QFabric MIB Notifications			
	jnxQFabricDownloadIssued	1.3.6.1.4.1.2636.3.42.1.0.1	–	–
	jnxQFabricDownloadFailed	1.3.6.1.4.1.2636.3.42.1.0.2	–	–
	jnxQFabricDownloadSucceeded	1.3.6.1.4.1.2636.3.42.1.0.3	–	–
	jnxQFabricUpgradeIssued	1.3.6.1.4.1.2636.3.42.1.0.4	–	–
	jnxQFabricUpgradeFailed	1.3.6.1.4.1.2636.3.42.1.0.5	–	–
	jnxQFabricUpgradeSucceeded	1.3.6.1.4.1.2636.3.42.1.0.6	–	–
Configuration Notifications				
<i>Configuration Management MIB</i> (mib-jnx-cfgmgmt)	jnxCmCfgChange	1.3.6.1.4.1.2636.4.5.0.1	–	–
	jnxCmRescueChange	1.3.6.1.4.1.2636.4.5.0.2	–	–
Remote Operations Notifications				
<i>Ping MIB</i> (mib-jnx-ping)	jnxPingRttThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.1	–	–
	jnxPingRttStdDevThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.2	–	–
	jnxPingRttJitterThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.3	–	–
	jnxPingEgressThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.4	–	–
	jnxPingEgressStdDevThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.5	–	–
	jnxPingEgressJitterThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.6	–	–
	jnxPingIngressThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.7	–	–
	jnxPingIngressStddevThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.8	–	–
	jnxPingIngressJitterThreshold Exceeded	1.3.6.1.4.1.2636.4.9.0.9	–	–

- Related Documentation**
- [SNMP MIB Explorer](#)
 - [Understanding SNMP Implementation in Junos OS on page 75](#)
 - [Understanding the Implementation of SNMP on the QFabric System](#)
 - [SNMP MIBs Support on page 245](#)

Example: Configuring SNMP Trap Groups

Set up a trap notification list named **urgent-dispatcher** for link and startup traps. This list is used to identify the network management hosts (**1.2.3.4** and **fe80::1:2:3:4**) to which traps generated by the local router should be sent. The name specified for a trap group is used as the SNMP community string when the agent sends traps to the listed targets.

```
[edit]
snmp {
  trap-group "urgent-dispatcher" {
    version v2;
    categories link startup;
    targets {
      1.2.3.4;
      fe80::1:2:3:4;
    }
  }
}
```

- Related Documentation**
- [Configuring SNMP Trap Groups on page 224](#)
 - [Configuring SNMP Trap Options and Groups on a Device Running Junos OS on page 219](#)
 - [Configuring SNMP Trap Options on page 220](#)

Configuring the Interfaces on Which SNMP Requests Can Be Accepted

By default, all router or switch interfaces have SNMP access privileges. To limit the access through certain interfaces only, include the **interface** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
interface [ interface-names ];
```

Specify the names of any logical or physical interfaces that should have SNMP access privileges. Any SNMP requests entering the router or switch from interfaces not listed are discarded.

- Related Documentation**
- [Example: Configuring Secured Access List Checking on page 240](#)

Example: Configuring Secured Access List Checking

SNMP access privileges are granted to only devices on interfaces **so-0/0/0** and **at-1/0/1**. The following example does this by configuring a list of logical interfaces:

```
[edit]
snmp {
  interface [ so-0/0/0.0 so-0/0/0.1 at-1/0/1.0 at-1/0/1.1 ];
}
```

The following example grants the same access by configuring a list of physical interfaces:

```
[edit]
snmp {
  interface [ so-0/0/0 at-1/0/1 ];
}
```

Related Documentation

- [Configuring the Interfaces on Which SNMP Requests Can Be Accepted on page 239](#)
- [Filtering Interface Information Out of SNMP Get and GetNext Output on page 240](#)

Filtering Interface Information Out of SNMP Get and GetNext Output

Junos OS enables you to filter out information related to specific interfaces from the output of SNMP **Get** and **GetNext** requests performed on interface-related MIBs such as IF MIB, ATM MIB, RMON MIB, and the Juniper Networks enterprise-specific IF MIB.

You can use the following options of the **filter-interfaces** statement at the **[edit snmp]** hierarchy level to specify the interfaces that you want to exclude from SNMP **Get** and **GetNext** queries:

- **interfaces**—Interfaces that match the specified regular expressions.
- **all-internal-interfaces**—Internal interfaces.

```
[edit]
snmp {
  filter-interfaces {
    interfaces {
      interface-name 1;
      interface-name 2;
    }
    all-internal-interfaces;
  }
}
```

Starting with Release 12.1, Junos OS provides an except option (! operator) that enables you to filter out all interfaces except those interfaces that match all the regular expressions prefixed with the ! mark.

For example, to filter out all interfaces except the **ge** interfaces from the SNMP **get** and **get-next** results, enter the following command:

```
[edit snmp]
user@host# set filter-interfaces interfaces "!^ge-.*"
user@host# commit
```

When this is configured, Junos OS filters out all interfaces except the **ge** interfaces from the SNMP **get** and **get-next** results.



NOTE: The **!** mark is supported only as the first character of the regular expression. If it appears anywhere else in a regular expression, Junos OS considers the regular expression invalid, and returns an error.

However, note that these settings are limited to SNMP operations, and the users can continue to access information related to the interfaces (including those hidden using the **filter-interfaces** options) using the appropriate Junos OS command-line interface (CLI) commands.

Related Documentation

- [Configuring the Interfaces on Which SNMP Requests Can Be Accepted on page 239](#)

Configuring MIB Views

SNMPv3 defines the concept of MIB views in RFC 3415, *View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)*. MIB views provide an agent better control over who can access specific branches and objects within its MIB tree. A view consists of a name and a collection of SNMP object identifiers, which are either explicitly included or excluded. Once defined, a view is then assigned to an SNMPv3 group or SNMPv1/v2c community (or multiple communities), automatically masking which parts of the agent's MIB tree members of the group or community can (or cannot) access.

By default, an SNMP community grants read access and denies write access to all supported MIB objects (even communities configured as **authorization read-write**). To restrict or grant read or write access to a set of MIB objects, you must configure a MIB view and associate the view with a community.

To configure MIB views, include the **view** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
view view-name {
  oid object-identifier (include | exclude);
}
```

The **view** statement defines a MIB view and identifies a group of MIB objects. Each MIB object of a view has a common object identifier (OID) prefix. Each object identifier represents a subtree of the MIB object hierarchy. The subtree can be represented either by a sequence of dotted integers (such as **1.3.6.1.2.1.2**) or by its subtree name (such as

interfaces). A configuration statement uses a view to specify a group of MIB objects on which to define access. You can also use a wildcard character asterisk (*) to include OIDs that match a particular pattern in the SNMP view. To enable a view, you must associate the view with a community.

To remove an OID completely, use the **delete view all oid *oid-number*** command but omit the **include** parameter.

```
[edit groups global snmp]
user@host# set view view-name oid object-identifier (include | exclude)
```

The following example creates a MIB view called ping-mib-view. The **oid** statement does not require a dot at the beginning of the object identifier. The **snmp view** statement includes the branch under the object identifier .1.3.6.1.2.1.80. This includes the entire DISMAN-PINGMIB subtree (as defined in RFC 2925, *Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations*), which effectively permits access to any object under that branch.

```
[edit groups global snmp]
user@host# set view ping-mib-view oid 1.3.6.1.2.1.80 include
```

The following example adds a second branch in the same MIB view.

```
[edit groups global snmp]
user@host# set view ping-mib-view oid jnxPingMIB include
```

Assign a MIB view to a community that you want to control.

To associate MIB views with a community, include the **view** statement at the **[edit snmp community *community-name*]** hierarchy level:

```
[edit snmp community community-name]
view view-name;
```

For more information about the Ping MIB, see RFC 2925 and [PING MIB](#).

Related Documentation

- [Configuring Ping Proxy MIB on page 242](#)
- [view \(Configuring a MIB View\) on page 1663](#)
- [view on page 1662](#)
- [oid on page 1591](#)

Configuring Ping Proxy MIB

Restrict the **ping-mib** community to read and write access of the Ping MIB and **jnxpingMIB** only. Read or write access to any other MIB using this community is not allowed.

```
[edit snmp]
view ping-mib-view {
```



```
oid 1.3.6.1.2.1.80 include; #pingMIB
oid jnxPingMIB include; #jnxPingMIB
}
community ping-mib {
    authorization read-write;
    view ping-mib-view;
}
```

The following configuration prevents the *no-ping-mib* community from accessing Ping MIB and *jnxPingMIB* objects. However, this configuration does not prevent the *no-ping-mib* community from accessing any other MIB object that is supported on the device.

```
[edit snmp]
view no-ping-mib-view {
    oid 1.3.6.1.2.1.80 exclude; # deny access to pingMIB objects
    oid jnxPingMIB exclude; # deny access to jnxPingMIB objects
}
community no-ping-mib {
    authorization read-write;
    view ping-mib-view;
}
```

- Related Documentation**
- [Configuring MIB Views on page 241](#)
 - [view \(Configuring a MIB View\) on page 1663](#)
 - [oid on page 1591](#)

Understanding the Integrated Local Management Interface

The Integrated Local Management Interface (ILMI) provides a mechanism for Asynchronous Transfer Mode (ATM)-attached devices, such as hosts, routers, and ATM switches, to transfer management information. ILMI provides bidirectional exchange of management information between two ATM interfaces across a physical connection. ILMI information is exchanged over a direct encapsulation of SNMP version 1 (RFC 1157, *A Simple Network Management Protocol*) over ATM Adaptation Layer 5 (AAL5) using a virtual path identifier/virtual channel identifier (VPI/VCI) value (VPI=0, VCI=16).

Junos OS supports only two ILMI MIB variables: **atmfMYIPNmAddress** and **atmfPortMyIfname**. For ATM1 and ATM2 intelligent queuing (IQ) interfaces, you can configure ILMI to communicate directly with an attached ATM switch to enable querying of the switch's IP address and port number.

For more information about the ILMI MIB, see **atmfMYIPNmAddress** or **atmfPortMyIfname** in the [SNMP MIB Explorer](#).

- Related Documentation**
- [Understanding Device Management Functions in Junos OS on page 3](#)

Utility MIB

The Juniper Networks enterprise-specific Utility MIB, whose object ID is {jnxUtilMibRoot 1}, defines objects for counters, integers, and strings. The Utility MIB contains one table for each of the following five data types:

- 32-bit counters
- 64-bit counters
- Signed integers
- Unsigned integers
- Octet strings

Each data type has an arbitrary ASCII name, which is defined when the data is populated, and a timestamp that shows the last time when the data instance was modified. For a downloadable version of this MIB, see *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide*.

For information about the enterprise-specific Utility MIB objects, see the following topics:

- *jnxUtilCounter32Table*
- *jnxUtilCounter64Table*
- *jnxUtilIntegerTable*
- *jnxUtilUintTable*
- *jnxUtilStringTable*

Related Documentation

- [Enterprise-Specific SNMP MIBs Supported by Junos OS on page 115](#)
- [Standard SNMP MIBs Supported by Junos OS on page 126](#)
- [Understanding the Implementation of SNMP on the QFabric System](#)

SNMP MIBs Support

The QFX Series standalone switches, QFX Series Virtual Chassis, and QFabric systems support standard MIBs and Juniper Networks enterprise-specific MIBs.



NOTE: For information about enterprise-specific SNMP MIB objects, see the [SNMP MIB Explorer](#). You can use SNMP MIB Explorer to view information about various MIBs, MIB objects, and SNMP notifications supported on Juniper Networks devices

For more information, see:

- [MIBs Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis on page 245](#)
- [MIBs Supported on QFabric Systems on page 252](#)

MIBs Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis

The QFX Series standalone switches and QFX Series Virtual Chassis support both standard MIBs and Juniper Networks enterprise-specific MIBs. For more information, see:

- [Table 21 on page 245](#) for standard MIBs.
- [Table 22 on page 250](#) for Juniper Networks enterprise-specific MIBs.

Table 21: Standard MIBs Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis

RFC	Additional Information
IEEE 802.1ab section 12.1, <i>Link Layer Discovery Protocol (LLDP) MIB</i>	Supported tables and objects: <ul style="list-style-type: none">• lldpRemManAddrOID• lldpLocManAddrOID• lldpReinitDelay• lldpNotificationInterval• lldpStatsRxPortFramesDiscardedTotal• lldpStatsRxPortFramesError• lldpStatsRxPortTLVsDiscardedTotal• lldpStatsRxPortTLVsUnrecognizedTotal• lldpStatsRxPortAgeoutsTotal

Table 21: Standard MIBs Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis (continued)

RFC	Additional Information
IEEE 802.3ad, <i>Aggregation of Multiple Link Segments</i>	<p>The following tables and objects are supported:</p> <ul style="list-style-type: none"> dot3adAggPortTable, dot3adAggPortListTable, dot3adAggTable, and dot3adAggPortStatsTable dot3adAggPortDebugTable (only dot3adAggPortDebugRxState, dot3adAggPortDebugMuxState, dot3adAggPortDebugActorSyncTransitionCount, dot3adAggPortDebugPartnerSyncTransitionCount, dot3adAggPortDebugActorChangeCount, and dot3adAggPortDebugPartnerChangeCount) dot3adTablesLastChanged
RFC 1155, <i>Structure and Identification of Management Information for TCP/IP-based Internets</i>	—
RFC 1157, <i>A Simple Network Management Protocol (SNMP)</i>	—
RFC 1212, <i>Concise MIB Definitions</i>	—
RFC 1213, <i>Management Information Base for Network Management of TCP/IP-Based Internets: MIB-II</i>	<p>The following areas are supported:</p> <ul style="list-style-type: none"> MIB II and its SNMP version 2 derivatives, including: <ul style="list-style-type: none"> Statistics counters IP, except for ipRouteTable, which has been replaced by ipCidrRouteTable (RFC 2096, <i>IP Forwarding Table MIB</i>) ipAddrTable SNMP management Interface management SNMPv1 Get, GetNext requests, and SNMPv2 GetBulk request Junos OS-specific secured access list Master configuration keywords Reconfigurations upon SIGHUP
RFC 1215, <i>A Convention for Defining Traps for use with the SNMP</i>	Support is limited to MIB II SNMP version 1 traps and version 2 notifications.
RFC 1286, <i>Definitions of Managed Objects for Bridges</i>	—
RFC 1657, <i>Definitions of Managed Objects for the Fourth Version of the Border Gateway Protocol (BGP-4) using SMIv2</i>	—

Table 21: Standard MIBs Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis (continued)

RFC	Additional Information
RFC 1850, <i>OSPF Version 2 Management Information Base</i>	<p>The following table, objects, and traps are not supported:</p> <ul style="list-style-type: none"> • Host Table • ospfOriginateNewLsas and ospfRxNewLsas objects • ospfOriginateLSA, ospfLsdbOverflow, and ospfLsdbApproachingOverflow traps
RFC 1901, <i>Introduction to Community-based SNMPv2</i>	—
RFC 1905, <i>Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2)</i>	—
RFC 1907, <i>Management Information Base for Version 2 of the Simple Network Management Protocol (SNMPv2)</i>	—
RFC 2011, <i>SNMPv2 Management Information Base for the Internet Protocol Using SMIv2</i>	—
RFC 2012, <i>SNMPv2 Management Information Base for the Transmission Control Protocol Using SMIv2</i>	—
RFC 2013, <i>SNMPv2 Management Information Base for the User Datagram Protocol Using SMIv2</i>	—
RFC 2233, <i>The Interfaces Group MIB Using SMIv2</i>	NOTE: RFC 2233 has been replaced by RFC 2863. However, Junos OS supports both RFC 2233 and RFC 2863.
RFC 2287, <i>Definitions of System-Level Managed Objects for Applications</i>	<p>The following objects are supported:</p> <ul style="list-style-type: none"> • sysApplInstallPkgTable • sysApplInstallElmtTable • sysApplElmtRunTable • sysApplMapTable
RFC 2570, <i>Introduction to Version 3 of the Internet-standard Network Management Framework</i>	—
RFC 2571, <i>An Architecture for Describing SNMP Management Frameworks</i> (read-only access)	NOTE: RFC 2571 has been replaced by RFC 3411. However, Junos OS supports both RFC 2571 and RFC 3411.
RFC 2572, <i>Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)</i> (read-only access)	NOTE: RFC 2572 has been replaced by RFC 3412. However, Junos OS supports both RFC 2572 and RFC 3412.

Table 21: Standard MIBs Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis (continued)

RFC	Additional Information
RFC 2576, <i>Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework</i>	NOTE: RFC 2576 has been replaced by RFC 3584. However, Junos OS supports both RFC 2576 and RFC 3584.
RFC 2578, <i>Structure of Management Information Version 2 (SMIv2)</i>	—
RFC 2579, <i>Textual Conventions for SMIv2</i>	—
RFC 2580, <i>Conformance Statements for SMIv2</i>	—
RFC 2665, <i>Definitions of Managed Objects for the Ethernet-like Interface Types</i>	—
RFC 2787, <i>Definitions of Managed Objects for the Virtual Router Redundancy Protocol</i>	Support does not include row creation, the Set operation, and the vrrpStatsPacketLengthErrors object.
RFC 2790, <i>Host Resources MIB</i>	Support is limited to the following objects: <ul style="list-style-type: none"> Only hrStorageTable. The file systems <code>/</code>, <code>/config</code>, <code>/var</code>, and <code>/tmp</code> always return the same index number. When SNMP restarts, the index numbers for the remaining file systems might change. Only the objects of the hrSystem and hrSWInstalled groups.
RFC 2819, <i>Remote Network Monitoring Management Information Base</i>	The following objects are supported: <ul style="list-style-type: none"> etherStatsTable (for Ethernet interfaces only), alarmTable, eventTable, and logTable. historyControlTable and etherHistoryTable (except the etherHistoryUtilization object).
RFC 2863, <i>The Interfaces Group MIB</i>	NOTE: RFC 2233 has been replaced by RFC 2863. However, Junos OS supports both RFC 2233 and RFC 2863.
RFC 2932, <i>IPv4 Multicast Routing MIB</i>	—
RFC 2933, <i>Internet Group Management Protocol (IGMP) MIB</i>	—
RFC 2934, <i>Protocol Independent Multicast MIB for IPv4</i>	In Junos OS, RFC 2934 is implemented based on a draft version, <i>pimmib.mib</i> , of the now standard RFC.
RFC 3410, <i>Introduction and Applicability Statements for Internet Standard Management Framework</i>	—
RFC 3411, <i>An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks</i>	NOTE: RFC 3411 replaces RFC 2571. However, Junos OS supports both RFC 3411 and RFC 2571.

Table 21: Standard MIBs Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis (continued)

RFC	Additional Information
RFC 3412, <i>Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)</i>	NOTE: RFC 3412 replaces RFC 2572. However, Junos OS supports both RFC 3412 and RFC 2572.
RFC 3413, <i>Simple Network Management Protocol (SNMP) Applications</i>	All MIBs are supported except for the Proxy MIB.
RFC 3414, <i>User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)</i>	—
RFC 3415, <i>View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)</i>	—
RFC 3416, <i>Version 2 of the Protocol Operations for the Simple Network Management Protocol (SNMP)</i>	NOTE: RFC 3416 replaces RFC 1905, which was supported in earlier versions of Junos OS.
RFC 3417, <i>Transport Mappings for the Simple Network Management Protocol (SNMP)</i>	—
RFC 3418, <i>Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)</i>	NOTE: RFC 3418 replaces RFC 1907, which was supported in earlier versions of Junos OS.
RFC 3584, <i>Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework</i>	—
RFC 3826, <i>The Advanced Encryption Standard (AES) Cipher Algorithm in the SNMP User-based Security Model</i>	—
RFC 4188, <i>Definitions of Managed Objects for Bridges</i>	<p>The QFX3500 and QFX3600 switches support 802.1D STP (1998) and the following subtrees and objects only:</p> <ul style="list-style-type: none"> dot1dTp subtree—dot1dTpFdbAddress, dot1dTpFdbPort, and dot1dTpFdbStatus objects from the dot1dTpFdbTable table. dot1dBase subtree—dot1dBasePort and dot1dBasePortIfIndex objects from the dot1dBasePortTable table. <p>NOTE: On QFX3500 and QFX3600 switches, the dot1dTpFdbTable table is populated only with MAC addresses learned on the default VLAN. To see the MAC addresses of all VLANs, specify the dot1qTpFdbTable table (RFC 4363b, <i>Q-Bridge VLAN MIB</i>) when you issue the show snmp mib walk command.</p> <p>Not supported on OCX Series devices.</p>
RFC 4293, <i>Management Information Base for the Internet Protocol (IP)</i>	Supports the ipAddrTable table only.

Table 21: Standard MIBs Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis (continued)

RFC	Additional Information
RFC 4318, <i>Definitions of Managed Objects for Bridges with Rapid Spanning Tree Protocol</i>	Supports 802.1w and 802.1t extensions for RSTP. Not supported on OCX Series devices.
RFC 4363b, <i>Q-Bridge VLAN MIB</i>	NOTE: On QFX3500 and QFX3600 switches, the dot1dTpFdbTable table (RFC 4188, <i>Definitions of Managed Objects for Bridges</i>) is populated only with MAC addresses learned on the default VLAN. To see the MAC addresses of all VLANs, specify the dot1qTpFdbTable table (in this MIB) when you issue the show snmp mib walk command. Not supported on OCX Series devices.
RFC 4444, <i>IS-IS MIB</i>	—
Internet Assigned Numbers Authority, <i>IANAiftype Textual Convention MIB</i> (referenced by RFC 2233)	See http://www.iana.org/assignments/ianaiftype-mib .
Internet draft draft-reeder-snmpv3-usm-3desede-00.txt, <i>Extension to the User-Based Security Model (USM) to Support Triple-DES EDE in 'Outside' CBC Mode</i>	—
Internet draft draft-ietf-idmr-igmp-mib-13.txt, <i>Internet Group Management Protocol (IGMP) MIB</i>	—
ESO Consortium MIB	NOTE: The ESO Consortium MIB has been replaced by RFC 3826. See http://www.snmp.com/eso/ .

Table 22: Juniper Networks Enterprise-Specific MIBs Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis

MIB	Description
Alarm MIB (mib-jnx-chassis-alarm)	Provides support for alarms from the switch.
Analyzer MIB (mib-jnx-analyzer)	Contains analyzer and remote analyzer data related to port mirroring. Not supported on OCX Series devices.
Chassis MIB (mib-jnx-chassis)	Provides support for environmental monitoring (power supply state, board voltages, fans, temperatures, and airflow) and inventory support for the chassis, Flexible PIC Concentrators (FPCs), and PICs. NOTE: The jnxLEDTTable table has been deprecated.
Chassis Definitions for Router Model MIB (mib-jnx-chas-defines)	Contains the object identifiers (OIDs) that are used by the Chassis MIB to identify routing and switching platforms and chassis components. The Chassis MIB provides information that changes often, whereas the Chassis Definitions for Router Model MIB provides information that changes less often.

Table 22: Juniper Networks Enterprise-Specific MIBs Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis (continued)

MIB	Description
Class-of-Service MIB (mib-jnx-cos)	Provides support for monitoring interface output queue statistics per interface and per forwarding class.
Configuration Management MIB (mib-jnx-cfgmgmt)	<p>Provides notification for configuration changes and rescue configuration changes in the form of SNMP traps. Each trap contains the time at which the configuration change was committed, the name of the user who made the change, and the method by which the change was made.</p> <p>A history of the last 32 configuration changes is kept in jnxCmChgEventTable.</p>
Ethernet MAC MIB (mib-jnx-mac)	<p>Monitors media access control (MAC) statistics on Gigabit Ethernet intelligent queuing (IQ) interfaces. It collects MAC statistics; for example, inoctets, inframes, outoctets, and outframes on each source MAC address and virtual LAN (VLAN) ID for each Ethernet port.</p> <p>Not supported on OCX Series devices.</p>
Event MIB (mib-jnx-event)	<p>Defines a generic trap that can be generated using an operations script or event policy. This MIB provides the ability to specify a system log string and raise a trap if that system log string is found.</p> <p>In Junos OS release 13.2X51-D10 or later, if you configured an event policy to raise a trap when a new SNMP trap target is added, the SNMPD_TRAP_TARGET_ADD_NOTICE trap is generated with information about the new target.</p>
Firewall MIB (mib-jnx-firewall)	Provides support for monitoring firewall filter counters.
Host Resources MIB (mib-jnx-hostresources)	Extends the hrStorageTable object, providing a measure of the usage of each file system on the switch as a percentage. Previously, the objects in the hrStorageTable measured the usage in allocation units—hrStorageUsed and hrStorageAllocationUnits—only. Using the percentage measurement, you can more easily monitor and apply thresholds on usage.
Interface MIB (Extensions) (mib-jnx-if-extensions)	Extends the standard ifTable (RFC 2863) with additional statistics and Juniper Networks enterprise-specific chassis information in the ifJnxTable and ifChassisTable tables.
L2ALD MIB (mib-jnx-l2ald)	<p>Provides information about Layer 2 Address Learning and related traps, such as the routing instance MAC limit trap and interface MAC limit trap. This MIB also provides VLAN information in the jnxL2aldVlanTable table for Enhanced Layer 2 Software (ELS) EX Series and QFX Series switches.</p> <p>NOTE: Non-ELS EX Series switches use the VLAN MIB (jnxExVlanTable) for VLAN information instead of this MIB.</p>
MPLS MIB (mib-jnx-mpls)	<p>Provides MPLS information and defines MPLS notifications.</p> <p>NOTE: This MIB is not supported on the QFX5100 switch.</p>
MPLS LDP MIB (mib-jnx-mpls-ldp)	<p>Contains object definitions as described in RFC 3815, <i>Definitions of Managed Objects for the Multiprotocol Label Switching (MPLS), Label Distribution Protocol (LDP)</i>.</p> <p>NOTE: This MIB is not supported on the QFX5100 switch.</p>

Table 22: Juniper Networks Enterprise-Specific MIBs Supported on QFX Series Standalone Switches and QFX Series Virtual Chassis (continued)

MIB	Description
Ping MIB (mib-jnx-ping)	Extends the standard Ping MIB control table (RFC 2925). Items in this MIB are created when entries are created in pingCtlTable of the Ping MIB. Each item is indexed exactly as it is in the Ping MIB.
RMON Events and Alarms MIB (mib-jnx-rmon)	Supports Junos OS extensions to the standard Remote Monitoring (RMON) Events and Alarms MIB (RFC 2819). The extension augments the alarmTable object with additional information about each alarm. Two additional traps are also defined to indicate when problems are encountered with an alarm.
Structure of Management Information MIB (mib-jnx-smi)	Explains how the Juniper Networks enterprise-specific MIBs are structured.
System Log MIB (mib-jnx-syslog)	Enables notification of an SNMP trap-based application when an important system log message occurs.
Utility MIB (mib-jnx-util)	Provides you with SNMP MIB container objects of the following types: 32-bit counters, 64-bit counters, signed integers, unsigned integers, and octet strings. You can use these objects to store data that can be retrieved using other SNMP operations.
VLAN MIB (mib-jnx-vlan)	<p>Contains information about prestandard IEEE 802.10 VLANs and their association with LAN emulation clients.</p> <p>NOTE: For ELS EX Series switches and QFX Series switches, VLAN information is available in the L2ALD MIB in the jnxL2aldVlanTable table instead of in the VLAN MIB. For non-ELS EX Series switches, VLAN information is provided in the VLAN MIB in the jnxExVlanTable table.</p> <p>Not supported on OCX Series devices.</p>

MIBs Supported on QFabric Systems

The QFabric systems support both standard MIBs and Juniper Networks enterprise-specific MIBs. For more information, see:

- [Table 23 on page 252](#) for standard MIBs.
- [Table 24 on page 256](#) for Juniper Networks enterprise-specific MIBs.

Table 23: Standard MIBs Supported on QFabric Systems

RFC	Additional Information
RFC 1155, <i>Structure and Identification of Management Information for TCP/IP-based Internets</i>	—
RFC 1157, <i>A Simple Network Management Protocol (SNMP)</i>	—
RFC 1212, <i>Concise MIB Definitions</i>	—

Table 23: Standard MIBs Supported on QFabric Systems (continued)

RFC	Additional Information
RFC 1213, <i>Management Information Base for Network Management of TCP/IP-Based Internets: MIB-II</i>	<p>The following areas are supported:</p> <ul style="list-style-type: none"> MIB II and its SNMP version 2 derivatives, including: <ul style="list-style-type: none"> Statistics counters IP, except for ipRouteTable, which has been replaced by ipCidrRouteTable (RFC 2096, <i>IP Forwarding Table MIB</i>) ipAddrTable SNMP management Interface management SNMPv1 Get, GetNext requests, and version 2 GetBulk request Junos OS-specific secured access list Master configuration keywords Reconfigurations upon SIGHUP
RFC 1215, <i>A Convention for Defining Traps for use with the SNMP</i>	Support is limited to MIB II SNMP version 1 traps and version 2 notifications.
RFC 1286, <i>Definitions of Managed Objects for Bridges</i>	—
RFC 1901, <i>Introduction to Community-based SNMPv2</i>	—
RFC 1905, <i>Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2)</i>	—
RFC 1907, <i>Management Information Base for Version 2 of the Simple Network Management Protocol (SNMPv2)</i>	—
RFC 2011, <i>SNMPv2 Management Information Base for the Internet Protocol Using SMIv2</i>	NOTE: On the QFabric system, for the SNMP mibwalk request to work, you must configure the IP address of at least one interface besides the management Ethernet interfaces (me0 and me1) in the Director group.
RFC 2012, <i>SNMPv2 Management Information Base for the Transmission Control Protocol Using SMIv2</i>	—
RFC 2013, <i>SNMPv2 Management Information Base for the User Datagram Protocol Using SMIv2</i>	—
RFC 2233, <i>The Interfaces Group MIB Using SMIv2</i>	<p>NOTE: RFC 2233 has been replaced by RFC 2863. However, Junos OS supports both RFC 2233 and RFC 2863.</p> <p>NOTE: The QFabric system supports the following objects only: ifNumber, ifTable, and ifxTable.</p>

Table 23: Standard MIBs Supported on QFabric Systems (continued)

RFC	Additional Information
RFC 2571, <i>An Architecture for Describing SNMP Management Frameworks</i> (read-only access)	NOTE: RFC 2571 has been replaced by RFC 3411. However, Junos OS supports both RFC 2571 and RFC 3411.
RFC 2572, <i>Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)</i> (read-only access)	NOTE: RFC 2572 has been replaced by RFC 3412. However, Junos OS supports both RFC 2572 and RFC 3412.
RFC 2576, <i>Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework</i>	NOTE: RFC 2576 has been replaced by RFC 3584. However, Junos OS supports both RFC 2576 and RFC 3584.
RFC 2578, <i>Structure of Management Information Version 2 (SMIv2)</i>	—
RFC 2579, <i>Textual Conventions for SMIv2</i>	—
RFC 2580, <i>Conformance Statements for SMIv2</i>	—
RFC 2665, <i>Definitions of Managed Objects for the Ethernet-like Interface Types</i>	<p>The QFabric system supports the following tables only:</p> <ul style="list-style-type: none"> dot3StatsTable—There is one row with statistics for each Ethernet-like interface in the QFabric system. The dot3StatsIndex is an interface index that is unique across the system. dot3ControlTable—There is one row in this table for each Ethernet-like interface in the QFabric system that implements the MAC control sublayer. OIDs supported are dot3ControlFunctionsSupported and dot3ControlInUnknownOpcode. dot3PauseTable—There is one row in this table for each Ethernet-like interface in the QFabric system that supports the MAC control PAUSE function. OIDs supported are dot3PauseAdminMode, dot3PauseOperMode, dot3InPauseFrames, and dot3OutPauseFrames. <p>NOTE: Scalar variables are not supported on the QFabric system.</p>
RFC 2863, <i>The Interfaces Group MIB</i>	<p>NOTE: RFC 2233 has been replaced by RFC 2863. However, Junos OS supports both RFC 2233 and RFC 2863.</p> <p>NOTE: The QFabric system supports the following objects only: ifNumber, ifTable, and ifxTable.</p>
RFC 2933, <i>Internet Group Management Protocol (IGMP) MIB</i>	—
RFC 3410, <i>Introduction and Applicability Statements for Internet Standard Management Framework</i>	—

Table 23: Standard MIBs Supported on QFabric Systems (continued)

RFC	Additional Information
RFC 3411, <i>An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks</i>	NOTE: RFC 3411 replaces RFC 2571. However, Junos OS supports both RFC 3411 and RFC 2571.
RFC 3412, <i>Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)</i>	NOTE: RFC 3412 replaces RFC 2572. However, Junos OS supports both RFC 3412 and RFC 2572.
RFC 3416, <i>Version 2 of the Protocol Operations for the Simple Network Management Protocol (SNMP)</i>	NOTE: RFC 3416 replaces RFC 1905, which was supported in earlier versions of Junos OS.
RFC 3417, <i>Transport Mappings for the Simple Network Management Protocol (SNMP)</i>	—
RFC 3418, <i>Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)</i>	NOTE: RFC 3418 replaces RFC 1907, which was supported in earlier versions of Junos OS.
RFC 3584, <i>Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework</i>	—
RFC 4188, <i>Definitions of Managed Objects for Bridges</i>	<p>The QFabric system support is limited to the following objects:</p> <ul style="list-style-type: none"> Under the dot1dBase OID, the dot1dBasePortTable table supports only the first two columns in the table: dot1dBasePort and dot1dBasePortIfIndex. The system does not implement the optional traps supporting dot1dNotifications (dot1dBridge 0). Under the dot1dStp OID, supports only the dot1dStpPortTable table. Does not support the scalar variables under dot1dStp. The system does not support scalar variables under dot1dTp, but under that, the dot1dTpFdbTable table is supported (dot1dBridge 4). For OIDs with tables support only, scalar values that are returned by the SNMP agent may not be meaningful and are therefore not recommended for use. <p>Not supported on OCX Series devices.</p>
RFC 4293, <i>Management Information Base for the Internet Protocol (IP)</i>	<p>Supports the ipAddrTable table only.</p> <p>On the QFabric system, supported objects in the ipAddrTable table include: ipAdEntAddr, ipAdEntIfIndex, ipAdEntNetMask, ipAdEntBcastAddr, and ipAdEntReasmMaxSize.</p> <p>NOTE: On the QFabric system, for the SNMP mibwalk request to work, you must configure the IP address of at least one interface besides the management Ethernet interfaces (me0 and me1) in the Director group.</p>

Table 23: Standard MIBs Supported on QFabric Systems (continued)

RFC	Additional Information
RFC 4363b, <i>Q-Bridge VLAN MIB</i>	<p>The QFabric system supports the following tables only:</p> <ul style="list-style-type: none"> • dot1qTpFdbTable • dot1qVlanStaticTable • dot1qPortVlanTable • dot1qFdbTable <p>Not supported on OCX Series devices.</p>



NOTE: QFabric-specific MIBs are not supported on OCX Series devices.

Table 24: Juniper Networks Enterprise-Specific MIBs Supported on QFabric Systems

MIB	Description
Analyzer MIB (mib-jnx-analyzer)	<p>Contains analyzer and remote analyzer data related to port mirroring.</p> <p>The QFabric system supports:</p> <ul style="list-style-type: none"> • Analyzer table—jnxAnalyzerName, jnxMirroringRatio, jnxLossPriority. • Analyzer input table—jnxAnalyzerInputValue, jnxAnalyzerInputOption, jnxAnalyzerInputType. • Analyzer output table—jnxAnalyzerOutputValue, jnxAnalyzerOutputType.
Chassis MIB (mib-jnx-chassis)	<p>NOTE: The Chassis MIB has been deprecated for the QFabric system. We recommend that you use the Fabric Chassis MIB (mib-jnx-fabric-chassis) for information about the QFabric system.</p>
Class-of-Service MIB (mib-jnx-cos)	<p>Provides support for monitoring interface output queue statistics per interface and per forwarding class.</p> <p>The QFabric system supports the following tables and objects:</p> <ul style="list-style-type: none"> • Jnxcosifstatflagtable—jnxCosIfstatFlags and jnxCosIfIndex. • Jnxcosqstattable—jnxCosQstatTxedPkts, jnxCosQstatTxedPktRate, jnxCosQstatTxedBytes, and jnxCosQstatTxedByteRate. • Jnxcosfcidtable—jnxCosFcIdToFcName. • Jnxcosfctable—jnxCosFcQueueNr. <p>The QFabric system does not support any traps for this MIB.</p>

Table 24: Juniper Networks Enterprise-Specific MIBs Supported on QFabric Systems (continued)

MIB	Description
Configuration Management MIB (mib-jnx-cfgmgmt)	<p>Provides notification for configuration changes and rescue configuration changes in the form of SNMP traps. Each trap contains the time at which the configuration change was committed, the name of the user who made the change, and the method by which the change was made.</p> <p>A history of the last 32 configuration changes is kept in jnxCmChgEventTable.</p> <p>NOTE: On the QFabric system, these conditions apply:</p> <ul style="list-style-type: none"> • All scalar variables under the jnxCmCfgChg table are supported. • Supported scalar OIDs are jnxCmCfgChgLatestIndex, jnxCmCfgChgLatestTime, jnxCmCfgChgLatestDate, jnxCmCfgChgLatestSource, jnxCmCfgChgLatestUser, and jnxCmCfgChgMaxEventEntries. • Scalar variables under the jnxCmRescueChg table are not supported.
Fabric Chassis MIB (mib-jnx-fabric-chassis)	<p>Provides hardware information about the QFabric system and its component devices. This MIB is based on the Juniper Networks enterprise-specific Chassis MIB but adds another level of indexing that provides information for QFabric system component devices.</p>
Interface MIB (Extensions) (mib-jnx-if-extensions)	<p>Extends the standard ifTable (RFC 2863) with additional statistics and Juniper Networks enterprise-specific chassis information in the ifJnxTable and ifChassisTable tables.</p> <p>NOTE: On the QFabric system, scalar variables are not supported.</p>
Power Supply Unit MIB (mib-jnx-power-supply-unit)	<p>Provides support for environmental monitoring of the power supply unit for the Interconnect device of the QFabric system.</p> <p>NOTE: On the QFabric system, scalar variables for the jnxPsuObjects 1 object ID in the jnxPsuScalars table are not supported.</p>
QFabric MIB (jnx-ql-smi)	<p>Explains how the Juniper Networks enterprise-specific QFabric MIBs are structured. Defines the MIB objects that are reported by the QFabric system and the contents of the traps that can be issued by the QFabric system.</p>
Utility MIB (mib-jnx-util)	<p>Provides you with SNMP MIB container objects of the following types: 32-bit counters, 64-bit counters, signed integers, unsigned integers, and octet strings. You can use these objects to store data that can be retrieved using other SNMP operations.</p>

- Related Documentation**
- [SNMP MIB Explorer](#)
 - [Understanding SNMP Implementation in Junos OS on page 75](#)
 - [Understanding the Implementation of SNMP on the QFabric System](#)
 - [SNMP Traps Support on page 227](#)

MIB Objects for the QFX Series

This topic lists the Juniper Networks enterprise-specific SNMP Chassis MIB definition objects for the QFX Series:

- [QFX Series Standalone Switches on page 258](#)
- [QFabric Systems on page 258](#)
- [QFabric System QFX3100 Director Device on page 258](#)
- [QFabric System QFX3008-I Interconnect Device on page 259](#)
- [QFabric System QFX3600-I Interconnect Device on page 259](#)
- [QFabric System Node Devices on page 260](#)

QFX Series Standalone Switches

jnxProductLineQFXSwitch	OBJECT IDENTIFIER ::= { jnxProductLine 82 }
jnxProductNameQFXSwitch	OBJECT IDENTIFIER ::= { jnxProductName 82 }
jnxProductModelQFXSwitch	OBJECT IDENTIFIER ::= { jnxProductModel 82 }
jnxProductVariationQFXSwitch	OBJECT IDENTIFIER ::= { jnxProductVariation 82 }
jnxProductQFX3500s	OBJECT IDENTIFIER ::= { jnxProductVariationQFXSwitch 1 }
jnxProductQFX360016QS	OBJECT IDENTIFIER ::= { jnxProductVariationQFXSwitch 2 }
jnxProductQFX350048T4QS	OBJECT IDENTIFIER ::= { jnxProductVariationQFXSwitch 3 }
jnxProductQFX510024Q	OBJECT IDENTIFIER ::= { jnxProductVariationQFXSwitch 4 }
jnxProductQFX510048S6Q	OBJECT IDENTIFIER ::= { jnxProductVariationQFXSwitch 5 }
jnxChassisQFXSwitch	OBJECT IDENTIFIER ::= { jnxChassis 82 }
jnxSlotQFXSwitch	OBJECT IDENTIFIER ::= { jnxSlot 82 }
jnxQFXSwitchSlotFPC	OBJECT IDENTIFIER ::= { jnxSlotQFXSwitch 1 }
jnxQFXSwitchSlotHM	OBJECT IDENTIFIER ::= { jnxSlotQFXSwitch 2 }
jnxQFXSwitchSlotPower	OBJECT IDENTIFIER ::= { jnxSlotQFXSwitch 3 }
jnxQFXSwitchSlotFan	OBJECT IDENTIFIER ::= { jnxSlotQFXSwitch 4 }
jnxQFXSwitchSlotFPB	OBJECT IDENTIFIER ::= { jnxSlotQFXSwitch 5 }
jnxMediaCardSpaceQFXSwitch	OBJECT IDENTIFIER ::= { jnxMediaCardSpace 82 }
jnxQFXSwitchMediaCardSpacePIC	OBJECT IDENTIFIER ::= { jnxMediaCardSpaceQFXSwitch 1 }

QFabric Systems

jnxProductLineQFX3000	OBJECT IDENTIFIER ::= { jnxProductLine 84 }
jnxProductNameQFX3000	OBJECT IDENTIFIER ::= { jnxProductName 84 }
jnxProductModelQFX3000	OBJECT IDENTIFIER ::= { jnxProductModel 84 }
jnxProductVariationQFX3000	OBJECT IDENTIFIER ::= { jnxProductVariation 84 }
jnxProductQFX3000-G	OBJECT IDENTIFIER ::= { jnxProductVariationQFX3000 1 }
jnxProductQFX3000-M	OBJECT IDENTIFIER ::= { jnxProductVariationQFX3000 2 }
jnxChassisQFX3000	OBJECT IDENTIFIER ::= { jnxChassis 84 }

QFabric System QFX3100 Director Device

jnxProductLineQFX3100	OBJECT IDENTIFIER ::= { jnxProductLine 100 }
jnxProductNameQFX3100	OBJECT IDENTIFIER ::= { jnxProductName 100 }


```

jnxProductModelQFX3100 OBJECT IDENTIFIER ::= { jnxProductModel 100 }
jnxProductVariationQFX3100 OBJECT IDENTIFIER ::= { jnxProductVariation 100 }
jnxChassisQFX3100 OBJECT IDENTIFIER ::= { jnxChassis 100 }

jnxSlotQFX3100 OBJECT IDENTIFIER ::= { jnxSlot 100 }
jnxQFX3100SlotCPU OBJECT IDENTIFIER ::= { jnxSlotQFX3100 1 }
jnxQFX3100SlotMemory OBJECT IDENTIFIER ::= { jnxSlotQFX3100 2 }
jnxQFX3100SlotPower OBJECT IDENTIFIER ::= { jnxSlotQFX3100 3 }
jnxQFX3100SlotFan OBJECT IDENTIFIER ::= { jnxSlotQFX3100 4 }
jnxQFX3100SlotHardDisk OBJECT IDENTIFIER ::= { jnxSlotQFX3100 5 }
jnxQFX3100SlotNIC OBJECT IDENTIFIER ::= { jnxSlotQFX3100 6 }

```

QFabric System QFX3008-I Interconnect Device

```

jnxProductLineQFXInterconnect OBJECT IDENTIFIER ::= { jnxProductLine 60 }
jnxProductNameQFXInterconnect OBJECT IDENTIFIER ::= { jnxProductName 60 }
jnxProductModelQFXInterconnect OBJECT IDENTIFIER ::= { jnxProductModel 60 }
jnxProductVariationQFXInterconnect OBJECT IDENTIFIER ::= { jnxProductVariation 60 }
jnxProductQFX3008 OBJECT IDENTIFIER ::= { jnxProductVariationQFXInterconnect 1 }
jnxProductQFXC083008 OBJECT IDENTIFIER ::= { jnxProductVariationQFXInterconnect 2 }
jnxProductQFX3008I OBJECT IDENTIFIER ::= { jnxProductVariationQFXInterconnect 3 }

jnxChassisQFXInterconnect OBJECT IDENTIFIER ::= { jnxChassis 60 }

jnxSlotQFXInterconnect OBJECT IDENTIFIER ::= { jnxSlot 60 }
jnxQFXInterconnectSlotFPC OBJECT IDENTIFIER ::= { jnxSlotQFXInterconnect 1 }
jnxQFXInterconnectSlotHM OBJECT IDENTIFIER ::= { jnxSlotQFXInterconnect 2 }
jnxQFXInterconnectSlotPower OBJECT IDENTIFIER ::= { jnxSlotQFXInterconnect 3 }
jnxQFXInterconnectSlotFan OBJECT IDENTIFIER ::= { jnxSlotQFXInterconnect 4 }
jnxQFXInterconnectSlotCBD OBJECT IDENTIFIER ::= { jnxSlotQFXInterconnect 5 }
jnxQFXInterconnectSlotFPB OBJECT IDENTIFIER ::= { jnxSlotQFXInterconnect 6 }

jnxMediaCardSpaceQFXInterconnect OBJECT IDENTIFIER ::= { jnxMediaCardSpace 60 }
jnxQFXInterconnectMediaCardSpacePIC OBJECT IDENTIFIER ::= { jnxMediaCardSpaceQFXInterconnect 1 }

jnxMidplaneQFXInterconnect OBJECT IDENTIFIER ::= { jnxBackplane 60 }

```

QFabric System QFX3600-I Interconnect Device

```

jnxProductLineQFXMInterconnect OBJECT IDENTIFIER ::= { jnxProductLine 91 }
jnxProductNameQFXMInterconnect OBJECT IDENTIFIER ::= { jnxProductName 91 }
jnxProductModelQFXMInterconnect OBJECT IDENTIFIER ::= { jnxProductModel 91 }
jnxProductVariationQFXMInterconnect OBJECT IDENTIFIER ::= { jnxProductVariation 91 }
jnxProductQFX3600I OBJECT IDENTIFIER ::= { jnxProductVariationQFXMInterconnect 1 }

jnxChassisQFXMInterconnect OBJECT IDENTIFIER ::= { jnxChassis 91 }

jnxSlotQFXMInterconnect OBJECT IDENTIFIER ::= { jnxSlot 91 }
jnxQFXMInterconnectSlotFPC OBJECT IDENTIFIER ::= { jnxSlotQFXMInterconnect 1 }
jnxQFXMInterconnectSlotHM OBJECT IDENTIFIER ::= { jnxSlotQFXMInterconnect 2 }
jnxQFXMInterconnectSlotPower OBJECT IDENTIFIER ::= { jnxSlotQFXMInterconnect 3 }
jnxQFXMInterconnectSlotFan OBJECT IDENTIFIER ::= { jnxSlotQFXMInterconnect 4 }
jnxQFXMInterconnectSlotFPB OBJECT IDENTIFIER ::= { jnxSlotQFXMInterconnect 5 }

jnxMediaCardSpaceQFXMInterconnect OBJECT IDENTIFIER ::= { jnxMediaCardSpace 91 }
jnxQFXMInterconnectMediaCardSpacePIC OBJECT IDENTIFIER ::= { jnxMediaCardSpaceQFXMInterconnect 1 }

```

QFabric System Node Devices

jnxProductLineQFXNode	OBJECT IDENTIFIER ::= { jnxProductLine 61 }
jnxProductNameQFXNode	OBJECT IDENTIFIER ::= { jnxProductName 61 }
jnxProductModelQFXNode	OBJECT IDENTIFIER ::= { jnxProductModel 61 }
jnxProductVariationQFXNode	OBJECT IDENTIFIER ::= { jnxProductVariation 61 }
jnxProductQFX3500	OBJECT IDENTIFIER ::= { jnxProductVariationQFXNode 1 }
jnxProductQFX360016Q	OBJECT IDENTIFIER ::= { jnxProductVariationQFXNode 3 }
jnxChassisQFXNode	OBJECT IDENTIFIER ::= { jnxChassis 61 }
jnxSlotQFXNode	OBJECT IDENTIFIER ::= { jnxSlot 61 }
jnxQFXNodeSlotFPC	OBJECT IDENTIFIER ::= { jnxSlotQFXNode 1 }
jnxQFXNodeSlotHM	OBJECT IDENTIFIER ::= { jnxSlotQFXNode 2 }
jnxQFXNodeSlotPower	OBJECT IDENTIFIER ::= { jnxSlotQFXNode 3 }
jnxQFXNodeSlotFan	OBJECT IDENTIFIER ::= { jnxSlotQFXNode 4 }
jnxQFXNodeSlotFPB	OBJECT IDENTIFIER ::= { jnxSlotQFXNode 5 }
jnxMediaCardSpaceQFXNode	OBJECT IDENTIFIER ::= { jnxMediaCardSpace 61 }
jnxQFXNodeMediaCardSpacePIC	OBJECT IDENTIFIER ::= { jnxMediaCardSpaceQFXNode 1 }

- Related Documentation**
- *Understanding the Implementation of SNMP on the QFabric System*
 - [Fabric Chassis MIB on page 260](#)

Fabric Chassis MIB

The Juniper Networks enterprise-specific SNMP Fabric Chassis MIB (mib-jnx-fabric-chassis) provides hardware information about the QFabric system and its component devices in a single MIB. The Fabric Chassis MIB is based on the Juniper Networks enterprise-specific Chassis MIB that provides information for individual devices. Unlike the Chassis MIB, the Fabric Chassis MIB represents the QFabric system component devices as part of the QFabric system. Only the information from the Fabric Chassis MIB (and not from individual Chassis MIBs) is available to SNMP management clients of the QFabric system.

The Fabric Chassis MIB uses the basic information structure of the Chassis MIB, but adds another level of indexing that provides detailed information about QFabric system devices. Each physical device in a QFabric system (such as a Node device or an Interconnect device) is represented with its hardware components, including the power supply, fans, and front and rear cards.

As in other SNMP systems, the SNMP manager resides on the network management system (NMS) of the network to which the QFabric system belongs. The SNMP agent (snmpd) resides in the QFabric system Director software and is responsible for receiving and distributing all traps as well as responding to all queries from the SNMP manager. In addition, there is an SNMP subagent running in the Routing Engine of each Node group and Interconnect device. The SNMP subagent manages the information about the component device, and that information is communicated to the SNMP agent in the Director software as needed. Traps that are generated by a Node device are sent to the

SNMP agent in the Director software, which in turn processes and sends them to the target IP addresses that are defined in the SNMP configuration.

Table 25 on page 261 describes the tables and objects in the Fabric Chassis MIB.

Table 25: Fabric Chassis MIB Tables and Objects

Table or Object Name	Root OID	Description
Tables with Counterparts in the Chassis MIB		
jnxFabricContainersTable	1.3.6.1.4.1.2636.3.42.2.2.2	<p>Provides information about different types of containers in QFabric system devices.</p> <ul style="list-style-type: none"> Containers for Interconnect devices include fan trays, power supply units, control boards, and so on. Containers for Node devices include fan trays, power supply units, Flexible PIC Concentrator (FPC), PICs, and so on. Containers for the Director devices include CPU, memory, fan trays, power supply units, and hard disks. The containers have a non-hierarchical or flat structure, and components in them are organized as siblings to each other.
jnxFabricContentsTable	1.3.6.1.4.1.2636.3.42.2.2.3	<p>Contains contents that are present across all devices represented in the jnxFabricDeviceTable object. This table includes all field replaceable units (FRUs) and non-FRUs for QFabric system devices.</p> <ul style="list-style-type: none"> Contents in the Interconnect devices include fan trays and control boards. Contents in the Node devices include fan trays and power supply units. Contents in the Director devices include CPUs, memory, fan trays, power supply units, and hard disks, but do not include network interface cards (NICs).
jnxFabricFilledTable	1.3.6.1.4.1.2636.3.42.2.2.4	<p>Shows the status of containers in QFabric devices. The jnxFabricFilledState object represents the state of the component: (1) unknown, (2) empty, or (3) filled.</p> <p>NOTE: The jnxFabricFilledTable object does not contain information about the Director group.</p>
jnxFabricOperatingTable	1.3.6.1.4.1.2636.3.42.2.2.5	<p>Represents different operating parameters for the contents that are populated in the jnxFabricContentsTable object.</p> <ul style="list-style-type: none"> Contents in each Node device and Interconnect device include fan trays, power supply units, FPC, PIC, and Routing Engine. Contents in the Director device include CPUs, memory, fan trays, power supply units, and hard disks, but do not include network interface cards (NICs). <p>The jnxFabricOperatingState object provides the state of the device: (1) unknown, (2) running, (3) ready, (4) reset, (5) runningAtFullSpeed (for fans only), (6) down, (6) off (for power supply units), or (7) standby.</p>

Table 25: Fabric Chassis MIB Tables and Objects (continued)

Table or Object Name	Root OID	Description
jnxFabricRedundancyTable	1.3.6.1.4.1.2636.3.42.2.2.6	<p>Represents the redundancy information that is available at different subsystem levels across the QFabric system. Information about the Routing Engines in Node devices is included, but there are no corresponding entries for Interconnect devices in this table. The jnxFabricRedundancyState object indicates the state of the subsystem: (1) unknown, (2) master, (3) backup, or (4) disabled.</p> <p>NOTE: Information about redundant Director devices, virtual machines (VMs) within Director groups, and Virtual Chassis devices is not available at this time.</p>
jnxFabricFruTable	1.3.6.1.4.1.2636.3.42.2.2.7	<p>Contains all FRUs for the QFabric system in the jnxFabricDeviceTable table. The FRUs are listed regardless of whether or not they are installed or online. The jnxFabricFruState object represents the state of the FRU, including online, offline, or empty, and so on. This table also contains information about each FRU, such as name, type, temperature, time last powered on, and time last powered off.</p> <p>NOTE: The jnxFabricFruTable table does not include network interface cards (NICs) on Director devices.</p>

Table Specific to the Fabric Chassis MIB

jnxFabricDeviceTable	1.3.6.1.4.1.2636.3.42.2.2.1	<p>Contains information about all devices in the QFabric system. This table organizes scalar variables represented in the Chassis MIB into a table format for the QFabric system component devices. Columns in this table include device information such as model, device alias, and serial number. The jnxFabricDeviceIndex identifies each QFabric system device (Node device, Interconnect device, and Director device).</p> <p>NOTE: At this time, information about the Virtual Chassis is not available.</p> <p>NOTE: The following objects are not supported:</p> <ul style="list-style-type: none"> jnxFabricDeviceEntryRevision jnxFabricDeviceEntryFirmwareRevision jnxFabricDeviceEntryKernelMemoryUsedPercent
----------------------	-----------------------------	---

Scalar Variables

Table 25: Fabric Chassis MIB Tables and Objects (continued)

Table or Object Name	Root OID	Description
<p>The following scalar variables are supported:</p> <ul style="list-style-type: none"> • jnxFabricClass • jnxFabricDescr • jnxFabricSerialNo • jnxFabricRevision • jnxFabricLastInstalled • jnxFabricContentsLastChange • jnxFabricFilledLastChange 	1.3.6.1.4.1.2636.3.42.2.1	<p>Describe the QFabric system as a whole.</p> <p>NOTE: The jnxFabricFirmwareRevision scalar variable is not supported at this time.</p>

Table 26 on page 263 describes the SNMPv2 traps that are defined in the Fabric Chassis MIB.



NOTE: Only SNMPv2 traps are supported on the QFabric system.

Table 26: Fabric Chassis MIB SNMPv2 Traps

Trap Group and Name	Root OID	Description
<p>jnxFabricChassisTraps group—Includes the following traps:</p> <ul style="list-style-type: none"> • jnxFabricPowerSupplyFailure • jnxFabricFanFailure • jnxFabricOverTemperature • jnxFabricRedundancySwitchover • jnxFabricFruRemoval • jnxFabricFruInsertion • jnxFabricFruPowerOff • jnxFabricFruPowerOn • jnxFabricFruFailed • jnxFabricFruOffline • jnxFabricFruOnline • jnxFabricFruCheck • jnxFabricFEBSwitchover • jnxFabricHardDiskFailed • jnxFabricHardDiskMissing • jnxFabricBootFromBackup • jnxFabricHighPower 	1.3.6.1.4.1.2636.4.19	<p>Indicates an alarm condition.</p> <p>NOTE: Hardware events on the Director group are detected by scanning. As a result, a trap may not be generated until up to 30 seconds after the event has occurred.</p> <p>NOTE: The software does not distinguish between the fan removal and fan failure events on the Director group. In each case, both the jnxFabricFanFailure and jnxFabricFruFailed traps are generated.</p>

Table 26: Fabric Chassis MIB SNMPv2 Traps (continued)

Trap Group and Name	Root OID	Description
jnxFabricChassisOKTraps group—Includes the following traps:	1.3.6.1.4.1.2636.4.20	Indicates an alarm cleared condition.
<ul style="list-style-type: none"> jnxFabricPowerSupplyOK jnxFabricFanOK jnxFabricTemperatureOK jnxFabricFruOK jnxFabricHighPowerCleared 		

For more information, see the Fabric Chassis MIB at:

https://www.juniper.net/documentation/en_US/junos13.1/topics/reference/mibs/mib-jnx-fabric-chassis.txt

Related Documentation

- *Understanding the Implementation of SNMP on the QFabric System*

Monitoring RMON MIB Tables

Purpose Monitor remote monitoring (RMON) alarm, event, and log tables.

Action To display the RMON tables:

```
user@switch> show snmp rmon
```

```
Alarm
Index  Variable description                               Value State
      5 monitor
      jnxOperatingCPU.9.1.0.0                        5 falling threshold

Event
Index  Type                               Last Event
      1 log and trap                     2010-07-10 11:34:17 PDT
Event Index: 1
Description: Event 1 triggered by Alarm 5, rising threshold (90) crossed,
(variable: jnxOperatingCPU.9.1.0.0, value: 100)
Time: 2010-07-10 11:34:07 PDT
Description: Event 1 triggered by Alarm 5, falling threshold (75) crossed,
(variable: jnxOperatingCPU.9.1.0.0, value: 5)
Time: 2010-07-10 11:34:17 PDT
```

Meaning The display shows that an alarm has been defined to monitor jnxRmon MIB object jnxOperatingCPU, which represents the CPU utilization of the Routing Engine. The alarm is configured to generate an event that sends an SNMP trap and adds an entry to the logTable in the RMON MIB. The log table shows that two occurrences of the event have been generated—one for rising above a threshold of 90 percent, and one for falling below a threshold of 75 percent.

- Related Documentation**
- [Configuring RMON Alarms and Events on page 276](#)
 - [show snmp rmon on page 2017](#)
 - [show snmp rmon history on page 2022](#)
 - [clear snmp statistics on page 1996](#)
 - [clear snmp history on page 2076](#)

Using the Enterprise-Specific Utility MIB to Enhance SNMP Coverage

Even though the Junos OS has built-in performance metrics and monitoring options, you might need to have customized performance metrics. To make it easier for you to monitor such customized data through a standard monitoring system, the Junos OS provides you with an enterprise-specific Utility MIB that can store such data and thus extend SNMP support for managing and monitoring the data of your choice.

The enterprise-specific Utility MIB provides you with container objects of the following types: **32-bit counters**, **64-bit counters**, **signed integers**, **unsigned integers**, and **octet strings**. You can use these container MIB objects to store the data that are otherwise not supported for SNMP operations. You can populate data for these objects either by using CLI commands or with the help of Op scripts and an RPC API that can invoke the CLI commands.

The following CLI commands enable you to set and clear Utility MIB object values:

- **request snmp utility-mib set instance *name* object-type <counter | counter 64 | integer | string | unsigned integer> object-value *value***
- **request snmp utility-mib clear instance *name* object-type <counter | counter 64 | integer | string | unsigned integer>**

The **instance *name*** option of the **request snmp utility-mib <set | clear>** command specifies the name of the data instance and is the main identifier of the data. The **object-type <counter | counter 64 | integer | string | unsigned integer>** option enables you specify the object type, and the **object-value *value*** option enables you to set the value of the object.

To automate the process of populating Utility MIB data, you can use a combination of an event policy and event script. The following examples show the configuration for an event policy to run **show system buffers** every hour and to store the **show system buffers** data in Utility MIB objects by running an event script (**check-mbufs.slax**).

- Event Policy Configuration**
- To configure an event policy that runs the **show system buffers** command every hour and invokes **check-mbufs.slax** to store the **show system buffers** data into Utility MIB objects, include the following statements at the **[edit]** hierarchy level:

```
event-options {
  generate-event {
    1-HOUR time-interval 3600;
  }
  policy Mbufs {
```

```

events 1-HOUR;
then {
    event-script check-mbufs.slax; # script stored at /var/db/scripts/event/
}
}
event-script {
    file check-mbufs.slax;
}
}

```

check-mbufs.slax Script The following example shows the **check-mbufs.slax** script that is stored under **/var/db/scripts/event/**:

```

----- script START -----
version 1.0;

ns junos = "http://xml.juniper.net/junos/*/junos";
ns xnm = "http://xml.juniper.net/xnm/1.1/xnm";
ns jcs = "http://xml.juniper.net/junos/commit-scripts/1.0";
ns ext = "http://xmlsoft.org/XSLT/namespace";

match / {
    <op-script-results>{
        var $cmd = <command> "show system buffers";
        var $out = jcs:invoke($cmd);

        var $lines = jcs:break_lines($out);
        for-each ($lines) {
            if (contains(., "current/peak/max")) {
                var $pattern = "([0-9]+)/([0-9]+)/([0-9]+) mbufs";
                var $split = jcs:regex($pattern, .);
                var $result = $split[2];

                var $rpc = <request-snmp-utility-mib-set> {
                    <object-type> "integer";
                    <instance> "current-mbufs";
                    <object-value> $result;
                }
                var $res = jcs:invoke($rpc);
            }
        }
    }
}
----- script END -----

```

You can run the following command to check the data stored in the Utility MIB as a result of the event policy and script shown in the preceding examples:

```

user@host> show snmp mib walk jnxUtilData ascii jnxUtilIntegerValue."current-mbufs"
= 0 jnxUtilIntegerTime."current-mbufs" = 07 da 05 0c 03 14 2c 00 2d 07 00
user@caramels>

```




NOTE: The `show snmp mib walk` command is not available on the QFabric system, but you can use external SNMP client applications to perform this operation.

Related Documentation

- [Understanding SNMP Implementation in Junos OS on page 75](#)
- [Best Practices for Configuring SNMP on page 199](#)
- [Monitoring SNMP Activity and Tracking Problems That Affect SNMP Performance on a Device Running Junos OS on page 363](#)
- [Optimizing the Network Management System Configuration for the Best Results on page 196](#)
- [Configuring Options on Managed Devices for Better SNMP Response Time on page 197](#)
- [Managing Traps and Informs on page 111](#)
- [Understanding the Implementation of SNMP on the QFabric System](#)

Using the Enterprise-Specific Utility MIB to Enhance SNMP Coverage

Even though Junos OS includes built-in performance metrics and monitoring options, you might need to have customized performance metrics. To make it easier for you to monitor such customized data through a standard monitoring system, Junos OS provides you with an enterprise-specific Utility MIB that can store such data and thus extend SNMP support for managing and monitoring the data of your choice.

The enterprise-specific Utility MIB provides you with container objects of the following types: **32-bit counters**, **64-bit counters**, **signed integers**, **unsigned integers**, and **octet strings**. You can use these container MIB objects to store the data that are otherwise not supported for SNMP operations. You can populate data for these objects either by using CLI commands or with the help of Op scripts and an RPC API that can invoke the CLI commands.

The following CLI commands enable you to set and clear Utility MIB object values:

- `request snmp utility-mib set instance name object-type <counter | counter 64 | integer | string | unsigned integer> object-value value`
- `request snmp utility-mib clear instance name object-type <counter | counter 64 | integer | string | unsigned integer>`

The `instance name` option of the `request snmp utility-mib <set | clear>` command specifies the name of the data instance and is the main identifier of the data. The `object-type <counter | counter 64 | integer | string | unsigned integer>` option enables you specify the object type, and the `object-value value` option enables you to set the value of the object.

To automate the process of populating Utility MIB data, you can use a combination of an event policy and event script. The following examples show the configuration for an

event policy to run **show system buffers** every hour and to store the **show system buffers** data in Utility MIB objects by running an event script (**check-mbufs.slax**).

Event Policy Configuration To configure an event policy that runs the **show system buffers** command every hour and invokes **check-mbufs.slax** to store the **show system buffers** data into Utility MIB objects, include the following statements at the [edit] hierarchy level:

```
event-options {
  generate-event {
    1-HOUR time-interval 3600;
  }
  policy Mbufs {
    events 1-HOUR;
    then {
      event-script check-mbufs.slax; # script stored at /var/db/scripts/event/
    }
  }
  event-script {
    file check-mbufs.slax;
  }
}
```

check-mbufs.slax Script The following example shows the **check-mbufs.slax** script that is stored under **/var/db/scripts/event/**:

```
----- script START -----
version 1.0;

ns junos = "http://xml.juniper.net/junos/*/junos";
ns xnm = "http://xml.juniper.net/xnm/1.1/xnm";
ns jcs = "http://xml.juniper.net/junos/commit-scripts/1.0";
ns ext = "http://xmlsoft.org/XSLT/namespace";

match / {
  <op-script-results>{
    var $cmd = <command> "show system buffers";
    var $out = jcs:invoke($cmd);

    var $lines = jcs:break_lines($out);
    for-each ($lines) {
      if (contains(., "current/peak/max")) {
        var $pattern = "([0-9]+)/([0-9]+)/([0-9]+) mbufs";
        var $split = jcs:regex($pattern, .);
        var $result = $split[2];

        var $rpc = <request-snmp-utility-mib-set> {
          <object-type> "integer";
          <instance> "current-mbufs";
          <object-value> $result;
        }
        var $res = jcs:invoke($rpc);
      }
    }
  }
}
```

```

    }
}
----- script END -----

```

You can run the following command to check the data stored in the Utility MIB as a result of the event policy and script shown in the preceding examples:

```

user@host> show snmp mib walk jnxUtilData ascii jnxUtilIntegerValue."current-mbufs"
= 0 jnxUtilIntegerTime."current-mbufs" = 07 da 05 0c 03 14 2c 00 2d 07 00
user@host>

```

Related Documentation

- [Managing Traps and Informs on page 111](#)

Example: Configuring SNMP

By default, SNMP is disabled on devices running Junos OS. This example describes the steps for configuring SNMP on the QFabric system.

- [Requirements on page 269](#)
- [Overview on page 269](#)
- [Configuration on page 269](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 12.2
- Network management system (NMS) (running the SNMP manager)
- QFabric system (running the SNMP agent) with multiple Node devices

Overview

Because SNMP is disabled by default on devices running Junos OS, you must enable SNMP on your device by including configuration statements at the **[edit snmp]** hierarchy level. At a minimum, you must configure the **community public** statement. The community defined as public grants read-only access to MIB data to any client.

If no **clients** statement is configured, all clients are allowed. We recommend that you always include the **restrict** option to limit SNMP client access to the switch.

The network topology in this example includes an NMS, a QFabric system with four Node devices, and external SNMP servers that are configured for receiving traps.

Configuration

CLI Quick Configuration To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network

configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

```
set snmp name "snmp qfabric" description "qfabric0 switch"
set snmp location "Lab 4 Row 11" contact "qfabric-admin@qfabric0"
set snmp community public authorization read-only
set snmp client-list list0 192.168.0.0/24
set snmp community public client-list-name list0
set snmp community public clients 192.170.0.0/24 restrict
set snmp trap-group "qf-traps" destination-port 155 targets 192.168.0.100
```

Step-by-Step Procedure

The following example requires that you navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

To configure SNMP on the QFabric system:



NOTE: If the name, description, location, contact, or community name contains spaces, enclose the text in quotation marks (" ").

1. Configure the SNMP system name:

```
[edit snmp]
user@switch# set name "snmp qfabric"
```

2. Specify a description.

```
[edit snmp]
user@switch# set description "qfabric0 system"
```

This string is placed into the MIB II sysDescription object.

3. Specify the physical location of the QFabric system.

```
[edit snmp]
user@switch# set location "Lab 4 Row 11"
```

This string is placed into the MIB II sysLocation object.

4. Specify an administrative contact for the SNMP system.

```
[edit snmp]
user@switch# set contact "qfabric-admin@qfabric0"
```

This name is placed into the MIB II sysContact object.

5. Specify a unique SNMP community name and the read-only authorization level.



NOTE: The read-write option is not supported on the QFabric system.

```
[edit snmp]
user@switch# set community public authorization read-only
```

6. Create a client list with a set of IP addresses that can use the SNMP community.

```
[edit snmp]
user@switch# set client-list list0 192.168.0.0/24
user@switch# set community public client-list-name list0
```

7. Specify IP addresses of clients that are restricted from using the community.

```
[edit snmp]
user@switch# set community public clients 198.51.100.0/24 restrict
```

8. Configure a trap group, destination port, and a target to receive the SNMP traps in the trap group.

```
[edit snmp]
user@switch# set trap-group "qf-traps" destination-port 155 targets 192.168.0.100
```



NOTE: You do not need to include the `destination-port` statement if you use the default port 162.

The trap group `qf-traps` is configured to send traps to 192.168.0.100.

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

```
[edit]
user@switch# show
snmp {
  name "snmp qfabric";
  description "qfabric0 system";
  location "Lab 4 Row 11";
  contact "qfabric-admin@qfabric0";
  client-list list0 {
    192.168.0.0/24;
  }
  community public {
    authorization read-only;
  }
}
```

```
clients {
  198.51.100.0/24 restrict;
}
trap-group qf-traps {
  destination-port 155;
  targets {
    192.168.0.100;
  }
}
```

If you are done configuring the device, enter **commit** from configuration mode.

- Related Documentation**
- *Understanding the Implementation of SNMP on the QFabric System*
 - [snmp on page 1627](#)

Configuring Health Monitoring

This topic describes how to configure the health monitor feature for QFX Series and OCX Series devices.

The health monitor feature extends the SNMP RMON alarm infrastructure to provide predefined monitoring for a selected set of object instances (such as file system usage, CPU usage, and memory usage) and dynamic object instances (such as Junos OS processes).

To configure health monitoring:

1. Configure the health monitor:

```
[edit snmp]
user@switch# set health-monitor
```

2. Configure the falling threshold:

```
[edit snmp]
user@switch# set health-monitor falling-threshold percentage
```

For example:

```
user@switch# set health-monitor falling-threshold 85
```

3. Configure the rising threshold:

```
[edit snmp]
user@switch# set health-monitor rising-threshold percentage
```

For example:

```
user@switch# set health-monitor rising-threshold 75
```

4. Configure the interval:

```
[edit snmp]
user@switch# set health-monitor interval seconds
```

For example:

```
user@switch# set health-monitor interval 600
```

Related Documentation

- [Understanding Health Monitoring](#)
- [falling-threshold on page 1564](#)
- [interval \(Health Monitor\) on page 1578](#)
- [rising-threshold \(Health Monitor\) on page 1609](#)

Configuring Health Monitoring on Devices Running Junos OS

As the number of devices managed by a typical network management system (NMS) grows and the complexity of the devices themselves increases, it becomes increasingly impractical for the NMS to use polling to monitor the devices. A more scalable approach is to rely on network devices to notify the NMS when something requires attention.

On Juniper Networks routers, RMON alarms and events provide much of the infrastructure needed to reduce the polling overhead from the NMS. However, with this approach, you must set up the NMS to configure specific MIB objects into RMON alarms. This often requires device-specific expertise and customizing of the monitoring application. In addition, some MIB object instances that need monitoring are set only at initialization or change at runtime and cannot be configured in advance.

To address these issues, the health monitor extends the RMON alarm infrastructure to provide predefined monitoring for a selected set of object instances (for file system usage, CPU usage, and memory usage) and includes support for unknown or dynamic object instances (such as Junos OS processes).

Health monitoring is designed to minimize user configuration requirements. To configure health monitoring entries, include the **health-monitor** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
health-monitor {
  falling-threshold percentage;
  interval seconds;
  rising-threshold percentage;
  idp {
    falling-threshold percentage;
    interval seconds;
```

```

    rising-threshold percentage;
  }
}

```

Configuring monitoring events at the **[edit snmp health-monitor]** hierarchy level sets polling intervals for the overall system health. If you set these same options at the **[edit snmp health-monitor idp]** hierarchy level, an SNMP event is generated by the device if the percentage of dataplane memory utilized by the intrusion detection and prevention (IDP) system rises above or falls below your settings.

You can use the **show snmp health-monitor** operational command to view information about health monitor alarms and logs.

This topic describes the minimum required configuration and discusses the following tasks for configuring the health monitor:

- [Monitored Objects on page 274](#)
- [Minimum Health Monitoring Configuration on page 275](#)
- [Configuring the Falling Threshold or Rising Threshold on page 275](#)
- [Configuring the Interval on page 276](#)
- [Log Entries and Traps on page 276](#)

Monitored Objects

When you configure the health monitor, monitoring information for certain object instances is available, as shown in [Table 27 on page 274](#).

Table 27: Monitored Object Instances

Object	Description
FileSystem1	Monitors the following file system on the router or switch: /dev/ad0s1a: This is the root file system mounted on /.
FileSystem2	Monitors the following file system on the router or switch: /dev/ad0s1e: This is the configuration file system mounted on /config.
RoutingCPU (RE0)	Monitors CPU usage for Routing Engines (RE0 and RE1). The index values assigned to Routing Engines depend on whether the Chassis MIB uses a zero-based or ones-based indexing scheme. Because the indexing scheme is configurable, the proper index is determined when the router or switch is initialized and when there is a configuration change. If the router or switch has only one Routing Engine, the alarm entry monitoring RE1 is removed after five failed attempts to obtain the CPU value.
RoutingCPU (RE1)	

Table 27: Monitored Object Instances (continued)

Object	Description
jnxOperatingBuffer (RE0)	Monitors the amount of memory available on Routing Engines (RE0 and RE1). Because the indexing of this object is identical to that used for <code>jnxOperatingCPU</code> , index values are adjusted depending on the indexing scheme used in the Chassis MIB. As with <code>jnxOperatingCPU</code> , the alarm entry monitoring RE1 is removed if the router or switch has only one Routing Engine.
jnxOperatingBuffer (RE1)	
systemCPU	Monitors the CPU usage for each Junos OS process (also called daemon). Multiple instances of the same process are monitored and indexed separately.
systemMemory	Monitors the memory usage for each Junos OS process. Multiple instances of the same process are monitored and indexed separately.

Minimum Health Monitoring Configuration

To enable health monitoring on the router or switch, include the **health-monitor** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
health-monitor;
```

Configuring the Falling Threshold or Rising Threshold

The falling threshold is the lower threshold (expressed as a percentage of the maximum possible value) for the monitored variable. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval is greater than this threshold, a single event is generated. A single event is also generated if the first sample after this entry becomes valid is less than or equal to this threshold. After a falling event is generated, another falling event cannot be generated until the sampled value rises above this threshold and reaches the rising threshold. You must specify the falling threshold as a percentage of the maximum possible value. The default is 70 percent.

By default, the rising threshold is 80 percent of the maximum possible value for the monitored object instance. The rising threshold is the upper threshold for the monitored variable. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval is less than this threshold, a single event is generated. A single event is also generated if the first sample after this entry becomes valid is greater than or equal to this threshold. After a rising event is generated, another rising event cannot be generated until the sampled value falls below this threshold and reaches the falling threshold. You must specify the rising threshold as a percentage of the maximum possible value for the monitored variable.

To configure the falling threshold or rising threshold, include the **falling-threshold** or **rising-threshold** statement at the **[edit snmp health-monitor]** hierarchy level:

```
[edit snmp health-monitor]
falling-threshold percentage;
rising-threshold percentage;
```

percentage can be a value from 1 through 100.

The falling and rising thresholds apply to all object instances monitored by the health monitor.

Configuring the Interval

The interval represents the period of time, in seconds, over which the object instance is sampled and compared with the rising and falling thresholds.

To configure the interval, include the **interval** statement and specify the number of seconds at the **[edit snmp health-monitor]** hierarchy level:

```
[edit snmp health-monitor]
interval seconds;
```

seconds can be a value from 1 through 2147483647. The default is 300 seconds (5 minutes).

Log Entries and Traps

The system log entries generated for any health monitor events (thresholds crossed, errors, and so on) have a corresponding **HEALTHMONITOR** tag rather than a generic **SNMPD_RMON_EVENTLOG** tag. However, the health monitor sends generic RMON **risingThreshold** and **fallingThreshold** traps.

Related Documentation

- [Understanding RMON Alarms and Events Configuration on page 381](#)
- [Configuring an RMON Alarm Entry and Its Attributes on page 385](#)
- [Configuring an RMON Event Entry and Its Attributes on page 389](#)
- [Example: Configuring Health Monitoring on page 428](#)
- [Understanding Device Management Functions in Junos OS on page 3](#)
- [health-monitor on page 1457](#)

Configuring RMON Alarms and Events

The Junos OS supports the *Remote Network Monitoring* (RMON) MIB (RFC 2819), which allows a management device to monitor the values of MIB objects, or variables, against configured thresholds. When the value of a variable crosses a threshold, an alarm and its corresponding event are generated. The event can be logged and can generate an SNMP trap.

To configure RMON alarms and events using the CLI, perform these tasks:

1. [Configuring SNMP on page 277](#)
2. [Configuring an Event on page 277](#)
3. [Configuring an Alarm on page 278](#)

Configuring SNMP

To configure SNMP:

1. Grant read-only access to all SNMP clients:

```
[edit snmp]
user@switch# set community community-name authorization authorization
```

For example:

```
[edit snmp]
user@switch# set community public authorization read-only
```

2. Grant read-write access to the RMON and jnx-rmon MIBs:

```
[edit snmp]
user@switch# set view view-name oid object-identifier include
user@switch# set view view-name oid object-identifier include
user@switch# set community community-name authorization authorization view view-name
```

For example:

```
[edit snmp]
user@switch# set view rmon-mib-view oid .1.3.6.1.2.1.16 include
user@switch# set view rmon-mib-view oid .1.3.6.1.4.1.2636.13 include
user@switch# set community private authorization read-write view rmon-mib-view
```

OIDs 1.3.6.1.2.1.16 and 1.3.6.1.4.1.2636.13 correspond to the RMON and jnxRmon MIBs.

3. Configure an SNMP trap group:

```
[edit snmp]
user@switch# set trap-group group-name categories category
user@switch# set trap-group group-name targets address
```

For example:

```
[edit snmp]
user@switch# set trap-group rmon-trap-group categories rmon-alarm
user@switch# set trap-group rmon-trap-group targets 192.168.5.5
```

The trap group rmon-trap-group is configured to send RMON traps to 192.168.5.5.

Configuring an Event

To configure an event:

1. Configure an event index, community name, and type:

```
[edit snmp rmon]
user@switch# set event index community community-name type type
```

For example:

```
[edit snmp rmon]
user@switch# set event 1 community rmon-trap-group type log-and-trap
```

The event community corresponds to the SNMP trap group and is not the same as an SNMP community. This event generates an SNMP trap and adds an entry to the logTable in the RMON MIB.

2. Configure a description for the event:

```
[edit snmp rmon]
user@switch# set event index description description
```

For example:

```
[edit snmp rmon]
user@switch# set event 1 description "rmon event"
```

Configuring an Alarm

To configure an alarm:

1. Configure an alarm index, the variable to monitor, the rising and falling thresholds, and the corresponding rising and falling events:

```
[edit snmp rmon]
user@switch# set alarm index variable oid-variable falling-threshold integer rising-threshold
integer rising-event-index index falling-event-index index
```

For example:

```
[edit snmp rmon]
user@switch# set alarm 5 variable .1.3.6.1.4.1.2636.3.1.13.1.8.9.1.0.0 falling-threshold 75
rising-threshold 90 rising-event-index 1 falling-event-index 1
```

The variable .1.3.6.1.4.1.2636.3.1.13.1.8.9.1.0.0 corresponds to the jnxRmon MIB object jnxOperatingCPU, which represents the CPU utilization of the Routing Engine. The falling and rising threshold integers are 75 and 90. The rising and falling events both generate the same event (event index 1).

2. Configure the sample interval and type and the alarm type:

```
[edit snmp rmon]
user@switch# set alarm index interval seconds sample-type (absolute-value | delta-value)
startup-alarm (falling-alarm | rising-alarm | rising-or-falling-alarm)
```

For example:

```
[edit snmp rmon]
user@switch# set alarm 5 interval 30 sample-type absolute-value
startup-alarm rising-or-falling-alarm
```

The absolute value of the monitored variable is sampled every 30 seconds. The initial alarm can occur because of rising above the rising threshold or falling below the falling threshold.

**Related
Documentation**

- [Configuring SNMP on page 192](#)
- *Juniper Networks Enterprise-Specific MIBs*
- [Monitoring RMON MIB Tables on page 264](#)
- [RMON MIB Event, Alarm, Log, and History Control Tables on page 382](#)
- [Understanding RMON on page 377](#)

CHAPTER 10

Configuring SNMPv3

- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)
- [Example: SNMPv3 Configuration on page 283](#)
- [Creating SNMPv3 Users on page 286](#)
- [Example: Creating SNMPv3 Users on page 287](#)
- [Configuring the SNMPv3 Authentication Type on page 288](#)
- [Configuring the SNMPv3 Encryption Type on page 289](#)
- [Defining Access Privileges for an SNMP Group on page 291](#)
- [Configuring the Access Privileges Granted to a Group on page 293](#)
- [Example: Configuring the Access Privileges Granted to a Group on page 296](#)
- [Assigning Security Model and Security Name to a Group on page 297](#)
- [Example: Security Group Configuration on page 298](#)
- [Configuring SNMPv3 Traps on a Device Running Junos OS on page 299](#)
- [Configuring the SNMPv3 Trap Notification on page 300](#)
- [Example: Configuring SNMPv3 Trap Notification on page 301](#)
- [Configuring the Trap Notification Filter on page 301](#)
- [Configuring the Trap Target Address on page 302](#)
- [Example: Configuring the Tag List on page 305](#)
- [Defining and Configuring the Trap Target Parameters on page 306](#)
- [Configuring SNMP Informs on page 309](#)
- [Configuring the Inform Notification Type and Target Address on page 310](#)
- [Example: Configuring the Inform Notification Type and Target Address on page 312](#)
- [Configuring the Remote Engine and Remote User on page 313](#)
- [Example: Configuring the Remote Engine ID and Remote User on page 314](#)
- [Configuring the Local Engine ID on page 317](#)
- [Configuring the SNMPv3 Community on page 318](#)
- [Example: Configuring an SNMPv3 Community on page 320](#)

Minimum SNMPv3 Configuration on a Device Running Junos OS

To configure the minimum requirements for SNMPv3, include the following statements at the `[edit snmp v3]` and `[edit snmp]` hierarchy levels:



NOTE: You must configure at least one view (notify, read, or write) at the `[edit snmp view-name]` hierarchy level.

```
[edit snmp]
view view-name {
  oid object-identifier (include | exclude);
}
[edit snmp v3]
notify name {
  tag tag-name;
}
notify-filter profile-name {
  oid object-identifier (include | exclude);
}
snmp-community community-index {
  security-name security-name;
}
target-address target-address-name {
  address address;
  target-parameters target-parameters-name;
}
target-parameters target-parameters-name {
  notify-filter profile-name;
  parameters {
    message-processing-model (v1 | v2c | v3);
    security-level (authentication | none | privacy);
    security-model (usm | v1 | v2c);
    security-name security-name;
  }
}
usm {
  local-engine {
    user username {
    }
  }
}
vacm {
  access {
    group group-name {
      (default-context-prefix | context-prefix context-prefix){
        security-model (any | usm | v1 | v2c) {
          security-level (authentication | none | privacy) {
            notify-view view-name;
            read-view view-name;
            write-view view-name;
          }
        }
      }
    }
  }
}
```



```

    }
  }
}
security-to-group {
  security-model (usm | v1 | v2c) {
    security-name security-name {
      group group-name;
    }
  }
}
}
}

```

Related Documentation

- [Creating SNMPv3 Users on page 286](#)
- [Configuring MIB Views on page 241](#)
- [Defining Access Privileges for an SNMP Group on page 291](#)
- [Configuring SNMPv3 Traps on a Device Running Junos OS on page 299](#)
- [Configuring SNMP Informs on page 309](#)
- [Example: SNMPv3 Configuration on page 283](#)

Example: SNMPv3 Configuration

Define an SNMPv3 configuration:

```

[edit snmp]
engine-id {
  use-mac-address;
}
view jnxAlarms {
  oid 1.3.6.1.4.1.2636.3.4 include;
}
view interfaces {
  oid 1.3.6.1.2.1.2 include;
}
view ping-mib {
  oid 1.3.6.1.2.1.80 include;
}
[edit snmp v3]
notify n1 {
  tag router1; # Identifies a set of target addresses
  type trap; # Defines type of notification
}
notify n2 {
  tag host1;
  type trap;
}
notify-filter nf1 {
  oid .1 include; # Defines which traps to send
} # In this case, includes all traps
notify-filter nf2 {

```

```

    oid 1.3.6.1.4.1 include; # Sends enterprise-specific traps only
}
notify-filter nf3 {
    oid 1.3.6.1.2.1.1.5 include; # Sends BGP traps only
}
snmp-community index1 {
    community-name "$9$JOZi.QF/AtOz3"; # SECRET-DATA
    security-name john; # Matches the security name at the target parameters
    tag host1; # Finds the addresses that are allowed to be used with
}
target-address ta1 { # Associates the target address with the group
    # san-francisco.
    address 10.1.1.1;
    address-mask 255.255.255.0; # Defines the range of addresses
    port 162;
    tag-list router1;
    target-parameters tp1; # Applies configured target parameters
}
target-address ta2 {
    address 10.1.1.2;
    address-mask 255.255.255.0;
    port 162;
    tag-list host1;
    target-parameters tp2;
}
target-address ta3 {
    address 10.1.1.3;
    address-mask 255.255.255.0;
    port 162;
    tag-list "router1 host1";
    target-parameters tp3;
}
target-parameters tp1 { # Defines the target parameters
    notify-filter nf1; # Specifies which notify filter to apply
    parameters {
        message-processing-model v1;
        security-model v1;
        security-level none;
        security-name john; # Matches the security name configured at the
    } # [edit snmp v3 snmp-community community-index hierarchy level.
}
target-parameters tp2 {
    notify-filter nf2;
    parameters {
        message-processing-model v1;
        security-model v1;
        security-level none;
        security-name john;
    }
}
target-parameters tp3 {
    notify-filter nf3;
    parameters {
        message-processing-model v1;
        security-model v1;

```

```

    security-level none;
    security-name john;
  }
}
usm {
  local-engine { # Defines authentication and encryption for SNMPv3 users
    user john { # security-name john is defined here
      authentication-md5 {
        authentication-password authentication-password;
      }
      privacy-des {
        privacy-password privacy-password;
      }
    }
    user bob { # security-name bob is defined here
      authentication-sha {
        authentication-password authentication-password;
      }
      privacy-none;
    }
    user julia { # security-name julia is defined here
      authentication-none;
      privacy-none;
    }
    user lauren { # security-name lauren is defined here
      authentication-sha {
        authentication-password authentication-password;
      }
      privacy-aes128 {
        privacy-password privacy-password;
      }
    }
    user richard { # security-name richard is defined here
      authentication-sha {
        authentication-password authentication-password;
      }
      privacy-none;
    }
  }
}
vacm {
  access {
    group san-francisco { #Defines the access privileges for the group
      default-context-prefix { # called san-francisco
        security-model v1 {
          security-level none {
            notify-view ping-mib;
            read-view interfaces;
            write-view jnxAlarms;
          }
        }
      }
    }
  }
}
security-to-group {

```

```

security-model v1 {
  security-name john { # Assigns john to security group san-fancisco
    group san-francisco;
  }
  security-name bob { # Assigns bob to security group new-york
    group new-york;
  }
  security-name julia {# Assigns julia to security group chicago
    group chicago;
  }
  security-name lauren {# Assigns lauren to security group paris
    group paris;
  }
  security-name richard {# Assigns richard to security group geneva
    group geneva;
  }
}
}
}

```

Related Documentation • [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Creating SNMPv3 Users

For each SNMPv3 user, you can specify the username, authentication type, authentication password, privacy type, and privacy password. After a user enters a password, a key based on the engine ID and password is generated and is written to the configuration file. After the generation of the key, the password is deleted from this configuration file.



NOTE: You can configure only one encryption type for each SNMPv3 user.

To create users, include the **user** statement at the **[edit snmp v3 usm local-engine]** hierarchy level:

```

[edit snmp v3 usm local-engine]
  user username;

```

username is the name that identifies the SNMPv3 user.

To configure user authentication and encryption, include the following statements at the **[edit snmp v3 usm local-engine user *username*]** hierarchy level:

```

[edit snmp v3 usm local-engine user username]
  authentication-md5 {
    authentication-password authentication-password;
  }
  authentication-sha {
    authentication-password authentication-password;
  }

```

```

authentication-none;
privacy-aes128 {
    privacy-password privacy-password;
}
privacy-des {
    privacy-password privacy-password;
}
privacy-3des {
    privacy-password privacy-password;
}
privacy-none;

```

Related Documentation

- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)
- [Example: Creating SNMPv3 Users on page 287](#)
- [Example: SNMPv3 Configuration on page 283](#)

Example: Creating SNMPv3 Users

Define SNMPv3 users:

```

[edit]
snmp {
  v3 {
    usm {
      local-engine {
        user user1 {
          authentication-md5 {
            authentication-password authentication-password;
          }
          privacy-des {
            privacy-password password;
          }
        }
        user user2 {
          authentication-sha {
            authentication-password authentication-password;
          }
          privacy-none;
        }
        user user3 {
          authentication-none;
          privacy-none;
        }
        user user4 {
          authentication-md5 {
            authentication-password authentication-password;
          }
          privacy-des {
            privacy-password authentication-password;
          }
        }
      }
    }
  }
}

```

```
user user5 {  
  authentication-sha {  
    authentication-password authentication-password;  
  }  
  privacy-aes128 {  
    privacy-password authentication-password;  
  }  
}  
}  
}  
}
```

**Related
Documentation**

- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Configuring the SNMPv3 Authentication Type

By default, in a Junos OS configuration the SNMPv3 authentication type is set to none.

This topic includes the following sections:

- [Configuring MD5 Authentication on page 288](#)
- [Configuring SHA Authentication on page 289](#)
- [Configuring No Authentication on page 289](#)

Configuring MD5 Authentication

To configure the message digest algorithm (MD5) as the authentication type for an SNMPv3 user, include the **authentication-md5** statement at the **[edit snmp v3 usm local-engine user *username*]** hierarchy level:

```
[edit snmp v3 usm local-engine user username]  
authentication-md5 {  
  authentication-password authentication-password;  
}
```

authentication-password is the password used to generate the key used for authentication.

SNMPv3 has special requirements when you create plain-text passwords on a router or switch:

- The password must be at least eight characters long.
- The password can include alphabetic, numeric, and special characters, but it cannot include control characters.

Configuring SHA Authentication

To configure the secure hash algorithm (SHA) as the authentication type for an SNMPv3 user, include the **authentication-sha** statement at the **[edit snmp v3 usm local-engine user *username*]** hierarchy level:

```
[edit snmp v3 usm local-engine user username]
authentication-sha {
  authentication-password authentication-password;
}
```

authentication-password is the password used to generate the key used for authentication.

SNMPv3 has special requirements when you create plain-text passwords on a router or switch:

- The password must be at least eight characters long.
- The password can include alphabetic, numeric, and special characters, but it cannot include control characters.

Configuring No Authentication

To configure no authentication for an SNMPv3 user, include the **authentication-none** statement at the **[edit snmp v3 usm local-engine user *username*]** hierarchy level:

```
[edit snmp v3 usm local-engine user username]
authentication-none;
```

Related Documentation

- [Configuring the SNMPv3 Encryption Type on page 289](#)
- [Defining Access Privileges for an SNMP Group on page 291](#)
- [Configuring the Access Privileges Granted to a Group on page 293](#)
- [Assigning Security Model and Security Name to a Group on page 297](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Configuring the SNMPv3 Encryption Type

By default, encryption is set to none.



NOTE: Before you configure encryption, you must configure MD5 or SHA authentication.

Before you configure the **privacy-des**, **privacy-3des** and **privacy-aes128** statements, you must install the **jcrypto** package, and either restart the SNMP process or reboot the router.

This topic includes the following sections:

- [Configuring the Advanced Encryption Standard Algorithm on page 290](#)
- [Configuring the Data Encryption Algorithm on page 290](#)
- [Configuring Triple DES on page 291](#)
- [Configuring No Encryption on page 291](#)

Configuring the Advanced Encryption Standard Algorithm

To configure the Advanced Encryption Standard (AES) algorithm for an SNMPv3 user, include the **privacy-aes128** statement at the **[edit snmp v3 usm local-engine user *username*]** hierarchy level:

```
[edit snmp v3 usm local-engine user username]  
privacy-aes128 {  
  privacy-password privacy-password;  
}
```

privacy-password is the password used to generate the key used for encryption.

SNMPv3 has special requirements when you create plain-text passwords on a router or switch:

- The password must be at least eight characters long.
- The password can include alphabetic, numeric, and special characters, but it cannot include control characters.

Configuring the Data Encryption Algorithm

To configure the data encryption algorithm (DES) for an SNMPv3 user, include the **privacy-des** statement at the **[edit snmp v3 usm local-engine user *username*]** hierarchy level:

```
[edit snmp v3 usm local-engine user username]  
privacy-des {  
  privacy-password privacy-password;  
}
```

privacy-password is the password used to generate the key used for encryption.

SNMPv3 has special requirements when you create plain-text passwords on a router or switch:

- The password must be at least eight characters long.
- The password can include alphabetic, numeric, and special characters, but it cannot include control characters.

Configuring Triple DES

To configure triple DES for an SNMPv3 user, include the **privacy-3des** statement at the **[edit snmp v3 usm local-engine user *username*]** hierarchy level:

```
[edit snmp v3 usm local-engine user username]
privacy-3des {
  privacy-password privacy-password;
}
```

privacy-password is the password used to generate the key used for encryption.

SNMPv3 has special requirements when you create plain-text passwords on a router or switch:

- The password must be at least eight characters long.
- The password can include alphabetic, numeric, and special characters, but it cannot include control characters.

Configuring No Encryption

To configure no encryption for an SNMPv3 user, include the **privacy-none** statement at the **[edit snmp v3 usm local-engine user *username*]** hierarchy level:

```
[edit snmp v3 usm local-engine user username]
privacy-none;
```

Related Documentation

- [Configuring the SNMPv3 Authentication Type on page 288](#)
- [Defining Access Privileges for an SNMP Group on page 291](#)
- [Configuring the Access Privileges Granted to a Group on page 293](#)
- [Assigning Security Model and Security Name to a Group on page 297](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Defining Access Privileges for an SNMP Group

The SNMP version 3 (SNMPv3) uses the view-based access control model (VACM), which allows you to configure the access privileges granted to a group. Access is controlled by filtering the MIB objects available for a specific operation through a predefined view. You assign views to determine the objects that are visible for read, write, and notify operations for a particular group, using a particular context, a particular security model (v1, v2c, or usm), and particular security level (authenticated, privacy, or none). For information about how to configure views, see [“Configuring MIB Views” on page 241](#).

You define user access to management information at the **[edit snmp v3 vacm]** hierarchy level. All access control within VACM operates on groups, which are collections of users as defined by USM, or community strings as defined in the SNMPv1 and SNMPv2c security models. The term ***security-name*** refers to these generic end users. The group to which a

specific security name belongs is configured at the **[edit snmp v3 vacm security-to-group]** hierarchy level. That security name can be associated with a group defined at the **[edit snmp v3 vacm security-to-group]** hierarchy level. A group identifies a collection of SNMP users that share the same access policy. You then define the access privileges associated with a group at the **[edit snmp v3 vacm access]** hierarchy level. Access privileges are defined using views. For each group, you can apply different views depending on the SNMP operation; for example, read (**get**, **getNext**, or **getBulk**) write (**set**), notifications, the security level used (authentication, privacy, or none), and the security model (v1, v2c, or usm) used within an SNMP request.

You configure members of a group with the **security-name** statement. For v3 packets using USM, the security name is the same as the username. For SNMPv1 or SNMPv2c packets, the security name is determined based on the community string. Security names are specific to a security model. If you are also configuring VACM access policies for SNMPv1 or SNMPv2c packets, you must assign security names to groups for each security model (SNMPv1 or SNMPv2c) at the **[edit snmp v3 vacm security-to-group]** hierarchy level. You must also associate a security name with an SNMP community at the **[edit snmp v3 snmp-community community-index]** hierarchy level.

To configure the access privileges for an SNMP group, include statements at the **[edit snmp v3 vacm]** hierarchy level:

```
[edit snmp v3 vacm]
access {
  group group-name {
    (default-context-prefix | context-prefix context-prefix){
      security-model (any | usm | v1 | v2c) {
        security-level (authentication | none | privacy) {
          notify-view view-name;
          read-view view-name;
          write-view view-name;
        }
      }
    }
  }
}
security-to-group {
  security-model (usm | v1 | v2c) {
    security-name security-name {
      group group-name;
    }
  }
}
```

Related Documentation

- [Configuring the SNMPv3 Authentication Type on page 288](#)
- [Configuring the Access Privileges Granted to a Group on page 293](#)
- [Assigning Security Model and Security Name to a Group on page 297](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Configuring the Access Privileges Granted to a Group

This topic includes the following sections:

- [Configuring the Group on page 293](#)
- [Configuring the Security Model on page 293](#)
- [Configuring the Security Level on page 293](#)
- [Associating MIB Views with an SNMP User Group on page 294](#)

Configuring the Group

To configure the access privileges granted to a group, include the **group** statement at the **[edit snmp v3 vacm access]** hierarchy level:

```
[edit snmp v3 vacm access]
group group-name;
```

group-name is a collection of SNMP users that belong to a common SNMP list that defines an access policy. Users belonging to a particular SNMP group inherit all access privileges granted to that group.

Configuring the Security Model

To configure the security model, include the **security-model** statement at the **[edit snmp v3 vacm access group group-name (default-context-prefix | context-prefix context-prefix)]** hierarchy level:

```
[edit snmp v3 vacm access group group-name (default-context-prefix | context-prefix
context-prefix)]
security-model (any | usm | v1 | v2c);
```

- **any**—Any security model
- **usm**—SNMPv3 security model
- **v1**—SNMPv1 security model
- **v2c**—SNMPv2c security model

Configuring the Security Level

To configure the access privileges granted to packets with a particular security level, include the **security-level** statement at the **[edit snmp v3 vacm access group group-name (default-context-prefix | context-prefix context-prefix) security-model (any | usm | v1 | v2c)]** hierarchy level:

```
[edit snmp v3 vacm access group group-name default-context-prefix security-model (any
| usm | v1 | v2c)]
security-level (authentication | none | privacy);
```

- **none**—Provides no authentication and no encryption.
- **authentication**—Provides authentication but no encryption.

- **privacy**—Provides authentication and encryption.



NOTE: Access privileges are granted to all packets with a security level equal to or greater than that configured. If you are configuring the SNMPv1 or SNMPv2c security model, use **none** as your security level. If you are configuring the SNMPv3 security model (USM), use the **authentication**, **none**, or **privacy** security level.

- See Also**
- [Configuring the SNMPv3 Authentication Type on page 288](#)
 - [Defining Access Privileges for an SNMP Group on page 291](#)
 - [Assigning Security Model and Security Name to a Group on page 297](#)
 - [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Associating MIB Views with an SNMP User Group

MIB views define access privileges for members of a group. Separate views can be applied for each SNMP operation (read, write, and notify) within each security model (usm, v1, and v2c) and each security level (authentication, none, and privacy) supported by SNMP.

To associate MIB views with an SNMP user group, include the following statements at the `[edit snmp v3 vacm access group group-name (default-context-prefix | context-prefix context-prefix) security-model (any | usm | v1 | v2c) security-level (authentication | none | privacy)]` hierarchy level:

```
[edit snmp v3 vacm access group group-name (default-context-prefix | context-prefix
  context-prefix) security-model (any | usm | v1 | v2c) security-level (authentication | none
  | privacy)]
notify-view view-name;
read-view view-name;
write-view view-name;
```



NOTE: You must associate at least one view (notify, read, or write) at the `[edit snmp v3 vacm access group group-name (default-context-prefix | context-prefix context-prefix) security-model (any | usm | v1 | v2c) security-level (authentication | none | privacy)]` hierarchy level.

You must configure the MIB view at the `[edit snmp view view-name]` hierarchy level. For information about how to configure MIB views, see [“Configuring MIB Views” on page 241](#).

This section describes the following topics related to this configuration:

- [Configuring the Notify View on page 295](#)
- [Configuring the Read View on page 295](#)
- [Configuring the Write View on page 295](#)

Configuring the Notify View

To associate notify access with an SNMP user group, include the **notify-view** statement at the `[edit snmp v3 vacm access group group-name (default-context-prefix | context-prefix context-prefix) security-model (any | usm | v1 | v2c) security-level (authentication | none | privacy)]` hierarchy level:

```
[edit snmp v3 vacm access group group-name (default-context-prefix | context-prefix
  context-prefix) security-model (any | usm | v1 | v2c) security-level (authentication | none
  | privacy)]
  notify-view view-name;
```

view-name specifies the notify access, which is a list of notifications that can be sent to each user in an SNMP group. A view name cannot exceed 32 characters.

Configuring the Read View

To associate a read view with an SNMP group, include the **read-view** statement at the `[edit snmp v3 vacm access group group-name (default-context-prefix | context-prefix context-prefix) security-model (any | usm | v1 | v2c) security-level (authentication | none | privacy)]` hierarchy level:

```
[edit snmp v3 vacm access group group-name (default-context-prefix | context-prefix
  context-prefix) security-model (any | usm | v1 | v2c) security-level (authentication | none
  | privacy)]
  read-view view-name;
```

view-name specifies read access for an SNMP user group. A view name cannot exceed 32 characters.

Configuring the Write View

To associate a write view with an SNMP user group, include the **write-view** statement at the `[edit snmp v3 vacm access group group-name (default-context-prefix | context-prefix context-prefix) security-model (any | usm | v1 | v2c) security-level (authentication | none | privacy)]` hierarchy level:

```
[edit snmp v3 vacm access group group-name (default-context-prefix | context-prefix
  context-prefix) security-model (any | usm | v1 | v2c) security-level (authentication | none
  | privacy)]
  write-view view-name;
```

view-name specifies write access for an SNMP user group. A view name cannot exceed 32 characters.

Related Documentation

- [Configuring the SNMPv3 Authentication Type on page 288](#)
- [Defining Access Privileges for an SNMP Group on page 291](#)
- [Assigning Security Model and Security Name to a Group on page 297](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)
- [Example: Configuring the Access Privileges Granted to a Group on page 296](#)

Example: Configuring the Access Privileges Granted to a Group

Define access privileges:

```
[edit snmp v3 vacm]
access {
  group group1 {
    default-context-prefix {
      security-model usm {      #Define an SNMPv3 security model
        security-level privacy {
          notify-view nv1;
          read-view rv1;
          write-view wv1;
        }
      }
    }
    context-prefix lr1/ri1 { # routing instance ri1 in logical system lr1
      security-model usm {
        security-level privacy {
          notify-view nv1;
          read-view rv1;
          write-view wv1;
        }
      }
    }
  }
  group group2 {
    default-context-prefix {
      security-model usm {      #Define an SNMPv3 security model
        security-level authentication {
          read-view rv2;
          write-view wv2;
        }
      }
    }
  }
  group group3 {
    default-context-prefix {
      security-model v1 {      #Define an SNMPv3 security model
        security-level none {
          read-view rv3;
          write-view wv3;
        }
      }
    }
  }
}
```

Related Documentation

- [Configuring the Access Privileges Granted to a Group on page 293](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Assigning Security Model and Security Name to a Group

To assign security names to groups, include the following statements at the **[edit snmp v3 vacm security-to-group]** hierarchy level:

```
[edit snmp v3 vacm security-to-group]
security-model (usm | v1 | v2c) {
  security-name security-name {
    group group-name;
  }
}
```

This topic includes the following sections:

- [Configuring the Security Model on page 297](#)
- [Assigning Security Names to Groups on page 297](#)
- [Configuring the Group on page 298](#)

Configuring the Security Model

To configure the security model, include the **security-model** statement at the **[edit snmp v3 vacm security-to-group]** hierarchy level:

```
[edit snmp v3 vacm security-to-group]
security-model (usm | v1 | v2c);
```

- **usm**—SNMPv3 security model
- **v1**—SNMPv1 security model
- **v2c**—SNMPv2 security model

Assigning Security Names to Groups

To associate a security name with an SNMPv3 user, or a v1 or v2 community string, include the **security-name** statement at the **[edit snmp v3 vacm security-to-group security-model (usm | v1 | v2c)]** hierarchy level:

```
[edit snmp v3 vacm security-to-group security-model (usm | v1 | v2c)]
security-name security-name;
```

For SNMPv3, the **security-name** is the username configured at the **[edit snmp v3 usm local-engine user username]** hierarchy level. For SNMPv1 and SNMPv2c, the security name is the community string configured at the **[edit snmp v3 snmp-community community-index]** hierarchy level. For information about configuring usernames, see [“Creating SNMPv3 Users” on page 286](#). For information about configuring a community string, see [“Configuring the SNMPv3 Community” on page 318](#).



NOTE: The USM security name is separate from the SNMPv1 and SNMPv2c security name. If you support SNMPv1 and SNMPv2c in addition to SNMPv3, you must configure separate security names within the security-to-group configuration at the `[edit snmp v3 vacm access]` hierarchy level.

Configuring the Group

After you have created SNMPv3 users, or v1 or v2 security names, you associate them with a group. A group is a set of security names belonging to a particular security model. A group defines the access rights for all users belonging to it. Access rights define what SNMP objects can be read, written to, or created. A group also defines what notifications a user is allowed to receive.

If you already have a group that is configured with all of the view and access permissions that you want to give a user, you can add the user to that group. If you want to give a user view and access permissions that no other groups have, or if you do not have any groups configured, create a group and add the user to it.

To configure the access privileges granted to a group, include the **group** statement at the `[edit snmp v3 vacm security-to-group security-model (usm | v1 | v2c) security-name security-name]` hierarchy level:

```
[edit snmp v3 vacm security-to-group security-model (usm | v1 | v2c) security-name security-name]
group group-name;
```

group-name identifies a collection of SNMP security names that share the same access policy. For more information about groups, see “[Defining Access Privileges for an SNMP Group](#)” on page 291.

- See Also**
- [Configuring the SNMPv3 Authentication Type](#) on page 288
 - [Defining Access Privileges for an SNMP Group](#) on page 291
 - [Configuring the Access Privileges Granted to a Group](#) on page 293
 - [Minimum SNMPv3 Configuration on a Device Running Junos OS](#) on page 282
 - [Example: Security Group Configuration](#) on page 298

Example: Security Group Configuration

Assign security names to groups:

```
vacm {
  security-to-group {
    security-model usm {
      security-name user1 {
        group group1;
      }
    }
  }
}
```



```

security-name user2 {
    group group2;
}
security-name user3 {
    group group3;
}
}
}

```

**Related
Documentation**

- [Assigning Security Model and Security Name to a Group on page 297](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Configuring SNMPv3 Traps on a Device Running Junos OS

In SNMPv3, you create traps and informs by configuring the **notify**, **target-address**, and **target-parameters** parameters. Traps are unconfirmed notifications, whereas informs are confirmed notifications. This section describes how to configure SNMP traps. For information about configuring SNMP informs, see [“Configuring SNMP Informs” on page 309](#).

The target address defines a management application's address and parameters to be used in sending notifications. Target parameters define the message processing and security parameters that are used in sending notifications to a particular management target. SNMPv3 also lets you define SNMPv1 and SNMPv2c traps.



NOTE: When you configure SNMP traps, make sure your configured access privileges allow the traps to be sent. Access privileges are configured at the `[edit snmp v3 vacm access]` and `[edit snmp v3 vacm security-to-group]` hierarchy levels.

To configure SNMP traps, include the following statements at the `[edit snmp v3]` hierarchy level:

```

[edit snmp v3]
  notify name {
    tag tag-name;
    type trap;
  }
  notify-filter name {
    oid object-identifier (include | exclude);
  }
  target-address target-address-name {
    address address;
    address-mask address-mask;
    logical-system logical-system;
    port port-number;
    routing-instance instance;
    tag-list tag-list;
  }

```

```
target-parameters target-parameters-name;  
}  
target-parameters target-parameters-name {  
  notify-filter profile-name;  
  parameters {  
    message-processing-model (v1 | v2c | v3);  
    security-level (authentication | none | privacy);  
    security-model (usm | v1 | v2c);  
    security-name security-name;  
  }  
}
```

**Related
Documentation**

- [Configuring the SNMPv3 Trap Notification on page 300](#)
- [Configuring the Trap Notification Filter on page 301](#)
- [Configuring the Trap Target Address on page 302](#)
- [Defining and Configuring the Trap Target Parameters on page 306](#)
- [Configuring SNMP Informs on page 309](#)
- [Configuring the Remote Engine and Remote User on page 313](#)
- [Configuring the Inform Notification Type and Target Address on page 310](#)

Configuring the SNMPv3 Trap Notification

The **notify** statement specifies the type of notification (trap) and contains a single tag. The tag defines a set of target addresses to receive a trap. The tag list contains one or more tags and is configured at the **[edit snmp v3 target-address *target-address-name*]** hierarchy level. If the tag list contains this tag, Junos OS sends a notification to all the target addresses associated with this tag.

To configure the trap notifications, include the **notify** statement at the **[edit snmp v3]** hierarchy level:

```
[edit snmp v3]  
notify name {  
  tag tag-name;  
  type trap;  
}
```

name is the name assigned to the notification.

tag-name defines the target addresses to which this notification is sent. This notification is sent to all the target-addresses that have this tag in their tag list. The ***tag-name*** is not included in the notification.

trap is the type of notification.



NOTE: Each notify entry name must be unique.

Junos OS supports two types of notification: **trap** and **inform**.

For information about how to configure the tag list, see [“Configuring the Trap Target Address”](#) on page 304.

Related Documentation

- [Configuring SNMPv3 Traps on a Device Running Junos OS on page 299](#)
- [Configuring the Trap Notification Filter on page 301](#)
- [Configuring the Trap Target Address on page 302](#)
- [Defining and Configuring the Trap Target Parameters on page 306](#)
- [Configuring SNMP Informs on page 309](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Example: Configuring SNMPv3 Trap Notification

Specify three sets of destinations to send traps:

```
[edit snmp v3]
notify n1 {
  tag router1;
  type trap;
}
notify n2 {
  tag router2;
  type trap;
}
notify n3 {
  tag router3;
  type trap;
}
```

Related Documentation

- [Configuring SNMPv3 Traps on a Device Running Junos OS on page 299](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Configuring the Trap Notification Filter

SNMPv3 uses the notify filter to define which traps (or which objects from which traps) are sent to the network management system (NMS). The trap notification filter limits the type of traps that are sent to the NMS.

Each object identifier represents a subtree of the MIB object hierarchy. The subtree can be represented either by a sequence of dotted integers (such as 1.3.6.1.2.1.2) or by its

subtree name (such as **interfaces**). You can also use the wildcard character asterisk (*) in the object identifier (OID) to specify object identifiers that match a particular pattern.

To configure the trap notifications filter, include the **notify-filter** statement at the **[edit snmp v3]** hierarchy level:

```
[edit snmp v3]
  notify-filter profile-name;
```

profile-name is the name assigned to the notify filter.

By default, the OID is set to **include**. To define access to traps (or objects from traps), include the **oid** statement at the **[edit snmp v3 notify-filter profile-name]** hierarchy level:

```
[edit snmp v3 notify-filter profile-name]
  oid oid (include | exclude);
```

oid is the object identifier. All MIB objects represented by this statement have the specified OID as a prefix. It can be specified either by a sequence of dotted integers or by a subtree name.

- **include**—Include the subtree of MIB objects represented by the specified OID.
- **exclude**—Exclude the subtree of MIB objects represented by the specified OID.

Related Documentation

- [Configuring SNMPv3 Traps on a Device Running Junos OS on page 299](#)
- [Configuring the SNMPv3 Trap Notification on page 300](#)
- [Configuring the Trap Target Address on page 302](#)
- [Defining and Configuring the Trap Target Parameters on page 306](#)
- [Configuring SNMP Informs on page 309](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Configuring the Trap Target Address

The target address defines a management application's address and parameters that are used in sending notifications. It can also identify management stations that are allowed to use specific community strings. When you receive a packet with a recognized community string and a tag is associated with it, Junos OS looks up all the target addresses with this tag and verifies that the source address of this packet matches one of the configured target addresses.



NOTE: You must configure the address mask when you configure the SNMP community.

To specify where you want the traps to be sent and define what SNMPv1 and SNMPv2cc packets are allowed, include the **target-address** statement at the **[edit snmp v3]** hierarchy level:

```
[edit snmp v3]
target-address target-address-name;
```

target-address-name is the string that identifies the target address.

To configure the target address properties, include the following statements at the **[edit snmp v3 target-address target-address-name]** hierarchy level:

```
[edit snmp v3 target-address target-address-name]
address address;
address-mask address-mask;
logical-system logical-system;
port port-number;
routing-instance instance;
tag-list tag-list;
target-parameters target-parameters-name;
```

This section includes the following topics:

- [Configuring the Address on page 303](#)
- [Configuring the Address Mask on page 303](#)
- [Configuring the Port on page 304](#)
- [Configuring the Routing Instance on page 304](#)
- [Configuring the Trap Target Address on page 304](#)
- [Applying Target Parameters on page 305](#)

Configuring the Address

To configure the address, include the **address** statement at the **[edit snmp v3 target-address target-address-name]** hierarchy level:

```
[edit snmp v3 target-address target-address-name]
address address;
```

address is the SNMP target address.

Configuring the Address Mask

The address mask specifies a set of addresses that are allowed to use a community string and verifies the source addresses for a group of target addresses.

To configure the address mask, include the **address-mask** statement at the **[edit snmp v3 target-address target-address-name]** hierarchy level:

```
[edit snmp v3 target-address target-address-name]
address-mask address-mask;
```

address-mask combined with the address defines a range of addresses. For information about how to configure the community string, see [“Configuring the SNMPv3 Community” on page 318](#).

Configuring the Port

By default, the UDP port is set to 162. To configure a different port number, include the **port** statement at the **[edit snmp v3 target-address target-address-name]** hierarchy level:

```
[edit snmp v3 target-address target-address-name]  
port port-number;
```

port-number is the SNMP target port number.

Configuring the Routing Instance

Traps are sent over the default routing instance. To configure the routing instance for sending traps, include the **routing-instance** statement at the **[edit snmp v3 target-address target-address-name]** hierarchy level:

```
[edit snmp v3 target-address target-address-name]  
routing-instance instance;
```

instance is the name of the routing instance. To configure a routing instance within a logical system, specify the logical system name followed by the routing instance name. Use a slash (/) to separate the two names (for example, **test-lr/test-ri**). To configure the default routing instance on a logical system, specify the logical system name followed by **default** (for example, **test-lr/default**).

Configuring the Trap Target Address

Each **target-address** statement can have one or more tags configured in its tag list. Each tag can appear in more than one tag list. When a significant event occurs on the network device, the tag list identifies the targets to which a notification is sent.

To configure the tag list, include the **tag-list** statement at the **[edit snmp v3 target-address target-address-name]** hierarchy level:

```
[edit snmp v3 target-address target-address-name]  
tag-list "tag-list";
```

tag-list specifies one or more tags as a space-separated list enclosed within double quotes.

For an example of tag list configuration, see [“Example: Configuring the Tag List” on page 305](#).

For information about how to specify a tag at the **[edit snmp v3 notify notify-name]** hierarchy level, see [“Configuring the SNMPv3 Trap Notification” on page 300](#).



NOTE: When you configure SNMP traps, make sure your configured access privileges allow the traps to be sent. Configure access privileges at the `[edit snmp v3 vacm access]` hierarchy level.

Applying Target Parameters

The `target-parameters` statement at the `[edit snmp v3]` hierarchy level applies the target parameters configured at the `[edit snmp v3 target-parameters target-parameters-name]` hierarchy level.

To reference configured target parameters, include the `target-parameters` statement at the `[edit snmp v3 target-address target-address-name]` hierarchy level:

```
[edit snmp v3 target-address target-address-name]
target-parameters target-parameters-name;
```

target-parameters-name is the name associated with the message processing and security parameters that are used in sending notifications to a particular management target.

Related Documentation

- [Configuring SNMPv3 Traps on a Device Running Junos OS on page 299](#)
- [Configuring the SNMPv3 Trap Notification on page 300](#)
- [Configuring the Trap Notification Filter on page 301](#)
- [Defining and Configuring the Trap Target Parameters on page 306](#)
- [Configuring SNMP Informs on page 309](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)
- [Example: Configuring the Tag List on page 305](#)

Example: Configuring the Tag List

In the following example, two tag entries (`router1` and `router2`) are defined at the `[edit snmp v3 notify notify-name]` hierarchy level. When an event triggers a notification, Junos OS sends a trap to all target addresses that have `router1` or `router2` configured in their target-address tag list. This results in the first two targets getting one trap each, and the third target getting two traps.

```
[edit snmp v3]
notify n1 {
  tag router1; # Identifies a set of target addresses
  type trap; # Defines the type of notification
}
notify n2 {
  tag router2;
  type trap;
}
target-address ta1 {
  address 10.1.1.1;
```

```

    address-mask 255.255.255.0;
    port 162;
    tag-list router1;
    target-parameters tp1;
  }
  target-address ta2 {
    address 10.1.1.2;
    address-mask 255.255.255.0;
    port 162;
    tag-list router2;
    target-parameters tp2;
  }
  target-address ta3 {
    address 10.1.1.3;
    address-mask 255.255.255.0;
    port 162;
    tag-list "router1 router2"; #Define multiple tags in the target address tag list
    target-parameters tp3;
  }

```

- Related Documentation**
- [Configuring SNMPv3 Traps on a Device Running Junos OS on page 299](#)
 - [Configuring the Trap Target Address on page 302](#)
 - [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Defining and Configuring the Trap Target Parameters

Target parameters define the message processing and security parameters that are used in sending notifications to a particular management target.

To define a set of target parameters, include the **target-parameters** statement at the **[edit snmp v3]** hierarchy level:

```

[edit snmp v3]
target-parameters target-parameters-name;

```

target-parameters-name is the name assigned to the target parameters.

To configure target parameter properties, include the following statements at the **[edit snmp v3 target-parameters target-parameter-name]** hierarchy level:

```

[edit snmp v3 target-parameters target-parameter-name]
notify-filter profile-name;
parameters {
  message-processing-model (v1 | v2c | v3);
  security-level (authentication | none | privacy);
  security-model (usm | v1 | v2c);
  security-name security-name;
}

```




NOTE: When you configure SNMP trap notifications for subscriber secure policy on MX Series routers, you must configure the parameters as follows:

- Message-processing model: v3
- Security level: privacy
- Security model: usm

For more information about configuring subscriber secure policies, see *Subscriber Secure Policy Overview*.

This topic includes the following sections:

- [Applying the Trap Notification Filter on page 307](#)
- [Configuring the Target Parameters on page 307](#)

Applying the Trap Notification Filter

To apply the trap notification filter, include the **notify-filter** statement at the **[edit snmp v3 target-parameters target-parameter-name]** hierarchy level:

```
[edit snmp v3 target-parameters target-parameter-name]
  notify-filter profile-name;
```

profile-name is the name of a configured notify filter. For information about configuring notify filters, see “[Configuring the Trap Notification Filter](#)” on page 301.

Configuring the Target Parameters

To configure target parameter properties, include the following statements at the **[edit snmp v3 target-parameters target-parameter-name parameters]** hierarchy level:

```
[edit snmp v3 target-parameters target-parameter-name parameters]
  message-processing-model (v1 | v2c | v3);
  security-level (authentication | none | privacy);
  security-model (usm | v1 | v2c);
  security-name security-name;
```

This section includes the following topics:

- [Configuring the Message Processing Model on page 308](#)
- [Configuring the Security Model on page 308](#)
- [Configuring the Security Level on page 308](#)
- [Configuring the Security Name on page 309](#)

Configuring the Message Processing Model

The message processing model defines which version of SNMP to use when generating SNMP notifications. To configure the message processing model, include the **message-processing-model** statement at the **[edit snmp v3 target-parameters target-parameter-name parameters]** hierarchy level:

```
[edit snmp v3 target-parameters target-parameter-name parameters]
  message-processing-model (v1 | v2c | v3);
```

- **v1**—SNMPv1 message processing model
- **v2c**—SNMPv2c message processing model
- **v3**—SNMPV3 message processing model



NOTE: The v3 message-processing model is required for subscriber secure policy on MX Series routers. See *Subscriber Secure Policy Overview* for more information.

Configuring the Security Model

To define the security model to use when generating SNMP notifications, include the **security-model** statement at the **[edit snmp v3 target-parameters target-parameter-name parameters]** hierarchy level:

```
[edit snmp v3 target-parameters target-parameter-name parameters]
  security-model (usm | v1 | v2c);
```

- **usm**—SNMPv3 security model
- **v1**—SNMPv1 security model
- **v2c**—SNMPv2c security model



NOTE: The usm security model is required for subscriber secure policy on MX Series routers. See *Subscriber Secure Policy Overview* for more information.

Configuring the Security Level

The **security-level** statement specifies whether the trap is authenticated and encrypted before it is sent.

To configure the security level to use when generating SNMP notifications, include the **security-level** statement at the **[edit snmp v3 target-parameters target-parameter-name parameters]** hierarchy level:

```
[edit snmp v3 target-parameters target-parameter-name parameters]
  security-level (authentication | none | privacy);
```

- **authentication**—Provides authentication but no encryption.
- **none**—No security. Provides no authentication and no encryption.
- **privacy**—Provides authentication and encryption.



NOTE: If you are configuring the SNMPv1 or SNMPv2c security model, use **none** as your security level. If you are configuring the SNMPv3 (USM) security model, use the **authentication** or **privacy** security level.

The **privacy** security level is required for subscriber secure policy on MX Series routers. See *Subscriber Secure Policy Overview* for more information.

Configuring the Security Name

To configure the security name to use when generating SNMP notifications, include the **security-name** statement at the `[edit snmp v3 target-parameters target-parameter-name parameters]` hierarchy level:

```
[edit snmp v3 target-parameters target-parameter-name parameters]
  security-name security-name;
```

If the USM security model is used, the **security-name** identifies the user that is used when the notification is generated. If the v1 or v2c security models are used, **security-name** identifies the SNMP community used when the notification is generated.



NOTE: The access privileges for the group associated with a security name must allow this notification to be sent.

If you are using the v1 or v2 security models, the security name at the `[edit snmp v3 vacm security-to-group]` hierarchy level must match the security name at the `[edit snmp v3 snmp-community community-index]` hierarchy level.

Related Documentation

- [Configuring SNMPv3 Traps on a Device Running Junos OS on page 299](#)
- [Configuring the SNMPv3 Trap Notification on page 300](#)
- [Configuring the Trap Notification Filter on page 301](#)
- [Configuring the Trap Target Address on page 302](#)
- [Configuring SNMP Informs on page 309](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Configuring SNMP Informs

Junos OS supports two types of notifications: traps and informs. With traps, the receiver does not send any acknowledgment when it receives a trap. Therefore, the sender cannot

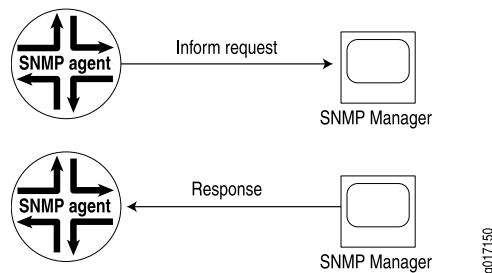
determine if the trap was received. A trap may be lost because a problem occurred during transmission. To increase reliability, an inform is similar to a trap except that the inform is stored and retransmitted at regular intervals until one of these conditions occurs:

- The receiver (target) of the inform returns an acknowledgment to the SNMP agent.
- A specified number of unsuccessful retransmissions have been attempted and the agent discards the inform message.

If the sender never receives a response, the inform can be sent again. Thus, informs are more likely to reach their intended destination than traps are. Informs use the same communications channel as traps (same socket and port) but have different protocol data unit (PDU) types.

Informs are more reliable than traps, but they consume more network, router, and switch resources (see [Figure 4 on page 310](#)). Unlike a trap, an inform is held in memory until a response is received or the timeout is reached. Also, traps are sent only once, whereas an inform may be retried several times. Use informs when it is important that the SNMP manager receive all notifications. However, if you are more concerned about network traffic, or router and switch memory, use traps.

Figure 4: Inform Request and Response



For information about configuring SNMP traps, see [“Configuring SNMPv3 Traps on a Device Running Junos OS” on page 299](#).

Related Documentation

- [Configuring SNMPv3 Traps on a Device Running Junos OS on page 299](#)
- [Configuring the Remote Engine and Remote User on page 313](#)
- [Configuring the Inform Notification Type and Target Address on page 310](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Configuring the Inform Notification Type and Target Address

To configure the inform notification type and target information, include the following statements at the `[edit snmp v3]` hierarchy level:

```

[edit snmp v3]
  notify name {
    tag tag-name;
    type (trap | inform);
  }

```

```

}
target-address target-address-name {
  address address;
  address-mask address-mask;
  logical-system logical-system;
  port port-number;
  retry-count number;
  routing-instance instance;
  tag-list tag-list;
  target-parameters target-parameters-name;
  timeout seconds;
}
target-parameters target-parameters-name {
  notify-filter profile-name;
  parameters {
    message-processing-model (v1 | v2c | v3);
    security-level (authentication | none | privacy);
    security-model (usm | v1 | v2c);
    security-name security-name;
  }
}
}

```

notify *name* is the name assigned to the notification. Each notify entry name must be unique.

tag *tag-name* defines the target addresses that are sent this notification. The notification is sent to all target addresses that have this tag in their tag list. The **tag-name** is not included in the notification. For information about how to configure the tag list, see [“Configuring the Trap Target Address” on page 304](#).

type *inform* is the type of notification.

target-address *target-address-name* identifies the target address. The target address defines a management application's address and parameters that are used to respond to informs.

timeout *seconds* is the number of seconds to wait for an acknowledgment. If no acknowledgment is received within the timeout period, the inform is retransmitted. The default timeout is **15** seconds.

retry-count *number* is the maximum number of times an inform is transmitted if no acknowledgment is received. The default is **3**. If no acknowledgment is received after the inform is transmitted the maximum number of times, the inform message is discarded.

message-processing-model defines which version of SNMP to use when SNMP notifications are generated. Informs require a **v3** message processing model.

security-model defines the security model to use when SNMP notifications are generated. Informs require a **usm** security model.

security-model defines the security model to use when SNMP notifications are generated. Informs require a **usm** security model.

security-level specifies whether the inform is authenticated and encrypted before it is sent. For the **usm** security model, the security level must be one of the following:

- **authentication**—Provides authentication but no encryption.
- **privacy**—Provides authentication and encryption.

security-name identifies the username that is used when generating the inform.

**Related
Documentation**

- [Configuring SNMPv3 Traps on a Device Running Junos OS on page 299](#)
- [Configuring SNMP Informs on page 309](#)
- [Configuring the Remote Engine and Remote User on page 313](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)
- [Example: Configuring the Inform Notification Type and Target Address on page 312](#)

Example: Configuring the Inform Notification Type and Target Address

In the following example, target 172.17.20.184 is configured to respond to informs. The inform timeout is 30 seconds and the maximum retransmit count is 3. The inform is sent to all targets in the **tl1** list. The security model for the remote user is **usm** and the remote engine username is **u10**.

```
[edit snmp v3]
notify n1 {
  type inform;
  tag tl1;
}
notify-filter nf1 {
  oid .1.3 include;
}
target-address ta1 {
  address 172.17.20.184;
  retry-count 3;
  tag-list tl1;
  address-mask 255.255.255.0;
  target-parameters tp1;
  timeout 30;
}
target-parameters tp1 {
  parameters {
    message-processing-model v3;
    security-model usm;
    security-level privacy;
    security-name u10;
  }
  notify-filter nf1;
}
```

**Related
Documentation**

- [Configuring the Inform Notification Type and Target Address on page 310](#)

- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Configuring the Remote Engine and Remote User

To send inform messages to an SNMPv3 user on a remote device, you must first specify the engine identifier for the SNMP agent on the remote device where the user resides. The remote engine ID is used to compute the security digest for authenticating and encrypting packets sent to a user on the remote host. When sending an inform message, the agent uses the credentials of the user configured on the remote engine (inform target).

To configure a remote engine and remote user to receive and respond to SNMP informs, include the following statements at the `[edit snmp v3]` hierarchy level:

```
[edit snmp v3]
usm {
  remote-engine engine-id {
    user username {
      authentication-md5 {
        authentication-key key;
      }
      authentication-none;
      authentication-sha {
        authentication-key key;
      }
      privacy-3des {
        privacy-key key;
      }
      privacy-aes128 {
        privacy-key key;
      }
      privacy-des {
        privacy-key key;
      }
      privacy-none;
    }
  }
}
```

For informs, **remote-engine engine-id** is the identifier for the SNMP agent on the remote device where the user resides.

For informs, **user username** is the user on a remote SNMP engine who receives the informs.

Informs generated can be **unauthenticated**, **authenticated**, or **authenticated_and_encrypted**, depending on the security level of the SNMPv3 user configured on the remote engine (the inform receiver). The authentication key is used for generating message authentication code (MAC). The privacy key is used to encrypt the inform PDU part of the message.

Related Documentation

- [Configuring SNMPv3 Traps on a Device Running Junos OS on page 299](#)
- [Configuring SNMP Informs on page 309](#)

- [Configuring the Inform Notification Type and Target Address on page 310](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)
- [Example: Configuring the Remote Engine ID and Remote User on page 314](#)

Example: Configuring the Remote Engine ID and Remote User

This example shows how to configure a remote engine and remote user so you can receive and respond to SNMP inform notifications. Inform notifications can be authenticated and encrypted. They are also more reliable than traps, another type of notification that Junos OS supports. Unlike traps, inform notifications are stored and retransmitted at regular intervals until one of these conditions occurs:

- The target of the inform notification returns an acknowledgment to the SNMP agent.
- A specified number of unsuccessful retransmissions have been attempted.
- [Requirements on page 314](#)
- [Overview on page 314](#)
- [Configuration on page 315](#)
- [Verification on page 316](#)

Requirements

No special configuration beyond device initialization is required before configuring this example.

This feature requires the use of plain-text passwords valid for SNMPv3. SNMPv3 has the following special requirements when you create plain-text passwords on a router or switch:

- The password must be at least eight characters long.
- The password can include alphabetic, numeric, and special characters, but it cannot include control characters.

Although quotation marks are not always required to enclose passwords, it is best to use them. You need quotation marks if the password contains any spaces or possibly in the case of certain special characters or punctuation.

Overview

Inform notifications are supported in SNMPv3 to increase reliability. For example, an SNMP agent receiving an inform notification acknowledges the receipt.

For inform notifications, the remote engine ID identifies the SNMP agent on the remote device where the user resides, and the username identifies the user on a remote SNMP engine who receives the inform notifications.

Consider a scenario in which you have the values in [Table 28 on page 315](#) to use in configuring the remote engine ID and remote user in this example.

Table 28: Values to Use in Example

Name of Variable	Value
username	u10
remote engine ID	800007E5804089071BC6D10A41
authentication type	authentication-md5
authentication password	qol67R%?
encryption type	privacy-des
privacy password	m*72Jl9v

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands and paste them into a text file, remove any line breaks and change any details necessary to match your network configuration, copy and paste these commands into the CLI at the **[edit snmp v3]** hierarchy level, and then enter **commit** from configuration mode.

```
set usm remote-engine 800007E5804089071BC6D10A41 user u10 authentication-md5
authentication-key "qol67R%?"
set usm remote-engine 800007E5804089071BC6D10A41 user u10 privacy-des privacy-key
"m*72Jl9v"
```

Configuring the Remote Engine and Remote User

Step-by-Step Procedure

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

To configure the remote engine ID and remote user:

1. Configure the remote engine ID, username, and authentication type and password.

```
[edit snmp v3]
user@host# set usm remote-engine 800007E5804089071BC6D10A41 user u10
authentication-md5 authentication-key "qol67R%?"
```

2. Configure the encryption type and privacy password.

You can configure only one encryption type per SNMPv3 user.

```
[edit snmp v3]
user@host# set usm remote-engine 800007E5804089071BC6D10A41 user u10
privacy-des privacy-key "m*72Jl9v"
```

Results

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

```
[edit snmp v3]
user@ host# show
usm {
  remote-engine 800007E5804089071BC6D10A41 {
    user u10 {
      authentication-md5 {
        authentication-key "$9$Tz/teK8NdsLXk.f5n6p0ORev"; ## SECRET-DATA
      }
      privacy-des {
        privacy-key "$9$/gyNCuIKvWdwYMWw2gJHkRhcrWx"; ## SECRET-DATA
      }
    }
  }
}
```

After you have confirmed that the configuration is correct, enter **commit** from configuration mode.

Verification

Verifying the Configuration of the Remote Engine ID and Username

Purpose Verify the status of the engine ID and user information.

Action Display information about the SNMPv3 engine ID and user.

```
user@host> show snmp v3

Local engine ID: 80 00 0a 4c 01 0a ff 03 e3
Engine boots:      3
Engine time:      769187 seconds
Max msg size:     65507 bytes

Engine ID: 80 00 07 e5 80 40 89 07 1b c6 d1 0a 41
  User          Auth/Priv  Storage   Status
  u10           md5/des   nonvolatile active
```

Meaning The output displays the following information:

- Local engine ID and detail about the engine
- Remote engine ID (labeled **Engine ID**)
- Username

- Authentication type and encryption (privacy) type that is configured for the user
- Type of storage for the username, either nonvolatile (configuration saved) or volatile (not saved)
- Status of the new user; only users with an active status can use SNMPv3

Related Documentation

- [show snmp v3 on page 2034](#)
- [Configuring the SNMPv3 Encryption Type on page 289](#)
- [Configuring the SNMPv3 Authentication Type on page 288](#)
- [Configuring SNMP Informs on page 309](#)
- [Configuring the Remote Engine and Remote User on page 313](#)

Configuring the Local Engine ID

By default, the local engine ID uses the default IP address of the router. The local engine ID is the administratively unique identifier for the SNMPv3 engine. This statement is optional. To configure the local engine ID, include the **engine-id** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
engine-id {
  (local engine-id-suffix | use-default-ip-address | use-mac-address);
}
```

- **local engine-id-suffix**—The engine ID suffix is explicitly configured.
- **use-default-ip-address**—The engine ID suffix is generated from the default IP address.
- **use-mac-address**—The SNMP engine identifier is generated from the Media Access Control (MAC) address of the management interface on the router.



NOTE: If you are using SNMPv3 and if the engine ID is based on the MAC address and you upgrade from an earlier release to one of these releases (14.1X53-D50, 16.1R5, 17.1R2, 17.2R1, 15.1X53-D231, 14.1X53-D43, 15.1X53-D232), you must reconfigure SNMPv3 because the engine ID is changed by the upgrade. If you do not reconfigure SNMPv3, you will see authentication error for SNMPv3 polling because the engine ID is changed after the upgrade. You only need to reconfigure SNMPv3 on the first such upgrade. If you then upgrade from one of the mentioned releases to another of these releases, you do not have to upgrade SNMPv3 again.

To reconfigure SNMPv3, use the following procedure. Do not use the **rollback 1** command.

To reconfigure SNMPv3:

1. Check what the SNMPv3 configuration is.

```
user@host# show snmp v3
```

2. Delete the SNMPv3 configuration.

```
user@host# delete snmp v3
```

3. Reconfigure SNMPv3 configuration (see output from Step 1).

The local engine ID is defined as the administratively unique identifier of an SNMPv3 engine, and is used for identification, not for addressing. There are two parts of an engine ID: prefix and suffix. The prefix is formatted according to the specifications defined in RFC 3411, *An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks*. You can configure the suffix here.



NOTE: SNMPv3 authentication and encryption keys are generated based on the associated passwords and the engine ID. If you configure or change the engine ID, you must commit the new engine ID before you configure SNMPv3 users. Otherwise, the keys generated from the configured passwords are based on the previous engine ID. For the engine ID, we recommend using the master IP address of the device if the device has multiple routing engines and has the master IP address configured. Alternatively, you can use the MAC address of the management port if the device has only one Routing Engine.

Related Documentation

- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)
- [Example: SNMPv3 Configuration on page 283](#)

Configuring the SNMPv3 Community

The SNMP community defines the relationship between an SNMP server system and the client systems. This statement is optional.

To configure the SNMP community, include the **snmp-community** statement at the **[edit snmp v3]** hierarchy level:

```
[edit snmp v3]
snmp-community community-index;
```

community-index is the index for the SNMP community.

To configure the SNMP community properties, include the following statements at the **[edit snmp v3 snmp-community community-index]** hierarchy level:

```
[edit snmp v3 snmp-community community-index]
community-name community-name;
context context-name;
```

```
security-name security-name;
tag tag-name;
```

This section includes the following topics:

- [Configuring the Community Name on page 319](#)
- [Configuring the Context on page 319](#)
- [Configuring the Security Names on page 320](#)
- [Configuring the Tag on page 320](#)

Configuring the Community Name

The community name defines the SNMP community. The SNMP community authorizes SNMPv1 or SNMPv2c clients. The access privileges associated with the configured security name define which MIB objects are available and the operations (read, write, or notify) allowed on those objects.

To configure the SNMP community name, include the **community-name** statement at the **[edit snmp v3 snmp-community community-index]** hierarchy level:

```
[edit snmp v3 snmp-community community-index]
community-name community-name;
```

community-name is the community string for an SNMPv1 or SNMPv2c community.

If unconfigured, it is the same as the community index.

If the community name contains spaces, enclose it in quotation marks (" ").



NOTE: Community names must be unique. You cannot configure the same community name at the **[edit snmp community]** and **[edit snmp v3 snmp-community community-index]** hierarchy levels. The configured community name at the **[edit snmp v3 snmp-community community-index]** hierarchy level is encrypted. You cannot view the community name after you have configured it and committed your changes. In the command-line interface (CLI), the community name is concealed.

Configuring the Context

An SNMP context defines a collection of management information that is accessible to an SNMP entity. Typically, an SNMP entity has access to multiple contexts. A context can be a physical or logical system, a collection of multiple systems, or even a subset of a system. Each context in a management domain has a unique identifier.

To configure an SNMP context, include the **context context-name** statement at the **[edit snmp v3 snmp-community community-index]** hierarchy level:

```
[edit snmp v3 snmp-community community-index]
context context-name;
```



NOTE: To query a routing instance or a logical system,

Configuring the Security Names

To assign a community string to a security name, include the **security-name** statement at the **[edit snmp v3 snmp-community *community-index*]** hierarchy level:

```
[edit snmp v3 snmp-community community-index]  
security-name security-name;
```

security-name is used when access control is set up. The **security-to-group** configuration at the **[edit snmp v3 vacm]** hierarchy level identifies the group.



NOTE: This security name must match the security name configured at the **[edit snmp v3 target-parameters *target-parameters-name* parameters]** hierarchy level when you configure traps.

Configuring the Tag

To configure the tag, include the **tag** statement at the **[edit snmp v3 snmp-community *community-index*]** hierarchy level:

```
[edit snmp v3 snmp-community community-index]  
tag tag-name;
```

tag-name identifies the address of managers that are allowed to use a community string.

Related Documentation

- [Creating SNMPv3 Users on page 286](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)
- [Example: Configuring an SNMPv3 Community on page 320](#)

Example: Configuring an SNMPv3 Community

This example shows how to configure an SNMPv3 community.

- [Requirements on page 321](#)
- [Overview on page 321](#)
- [Configuration on page 321](#)
- [Verification on page 323](#)

Requirements

No special configuration beyond device initialization is required before configuring this example.

Overview

This example demonstrates how to create an SNMPv3 community. Define the SNMP community name, specify security name to perform the access control, and define tag name which identifies the address of managers that are allowed to use a community string. The target address defines a management application's address and parameters that are used in sending notifications.

When the device receives a packet with a recognized community string and a tag is associated with that packet, the Junos software looks up all the target addresses with this tag and verifies that the source address of this packet matches one of the configured target addresses.

Specify where you want the traps to be sent and define what SNMPv1 and SNMPv2c packets are allowed. Specify target address name that identifies the target address, define the target address, mask range of address, port number, tag list, and target parameter.

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the **[edit snmp v3]** hierarchy level, and then enter **commit** from configuration mode.

```
set snmp-community index1 community-name "public"
set snmp-community index1 security-name john
set snmp-community index1 tag router1
set target-address ta1 address 10.1.1.1
set target-address ta1 address-mask 255.255.255.0
set target-address ta1 port 162
set target-address ta1 tag-list router1
set target-address ta1 target-parameters tp1
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

1. Configure the SNMP community name.

```
[edit snmp v3]
user@host# set snmp-community index1 community-name "public"
```



NOTE: The SNMP community name must be unique.

2. Configure the security name to perform access control.

```
[edit snmp v3]  
user@host# set snmp-community index1 security-name john
```

3. Define the tag name. The tag name identifies the address of managers that are allowed to use a community string.

```
[edit snmp v3]  
user@host# set snmp-community index1 tag router1
```

4. Configure SNMP target address.

```
[edit snmp v3]  
user@host# set target-address ta1 address 10.1.1.1
```

5. Configure the mask range of the address for the community string access control.

```
[edit snmp v3]  
user@host# set target-address ta1 address-mask 255.255.255.0
```

6. Configure SNMPv3 target port number.

```
[edit snmp v3]  
user@host# set target-address ta1 port 162
```

7. Configure SNMPv3 tag list to select the target addresses.

```
[edit snmp v3]  
user@host# set target-address ta1 tag-list router1
```

8. Configure SNMPv3 target parameter name in the target parameter table.

```
[edit snmp v3]  
user@host# set target-address ta1 target-parameters tp1
```

Results

From configuration mode, confirm your configuration by entering the **show snmp v3** command. If the output does not display the intended configuration, repeat the configuration instructions in this example.

```
[edit]  
user@host# show snmp v3  
target-address ta1 {
```



```

address 10.1.1.1;
port 162;
tag-list router1;
address-mask 255.255.255.0;
target-parameters tp1;
}
snmp-community index1 {
  community-name "$9$JOZl.QF/AtOz3"; ## SECRET-DATA
  security-name john;
  tag router1;
}

```

Verification

Verifying SNMPv3 community

Purpose Verify if SNMPv3 community is enabled.

Action To verify SNMPv3 community configuration, enter **show snmp v3 community** command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

Community	Security	Context	Tag	Storage	Status
index1	john		router1	nonvolatile	active

Meaning The output displays the information about SNMPv3 community being enabled on the system.

Related Documentation

- [Configuring the SNMPv3 Community on page 318](#)
- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

Configuring SNMP for Routing Instances

- [Understanding SNMP Support for Routing Instances on page 325](#)
- [SNMP MIBs Supported for Routing Instances on page 326](#)
- [Support Classes for MIB Objects on page 336](#)
- [SNMP Traps Supported for Routing Instances on page 337](#)
- [Identifying a Routing Instance on page 338](#)
- [Enabling SNMP Access over Routing Instances on page 339](#)
- [Specifying a Routing Instance in an SNMPv1 or SNMPv2c Community on page 339](#)
- [Example: Configuring Interface Settings for a Routing Instance on page 340](#)
- [Configuring Access Lists for SNMP Access over Routing Instances on page 342](#)

Understanding SNMP Support for Routing Instances

Junos OS enables SNMP managers for all routing instances to request and manage SNMP data related to the corresponding routing instances and logical system networks.

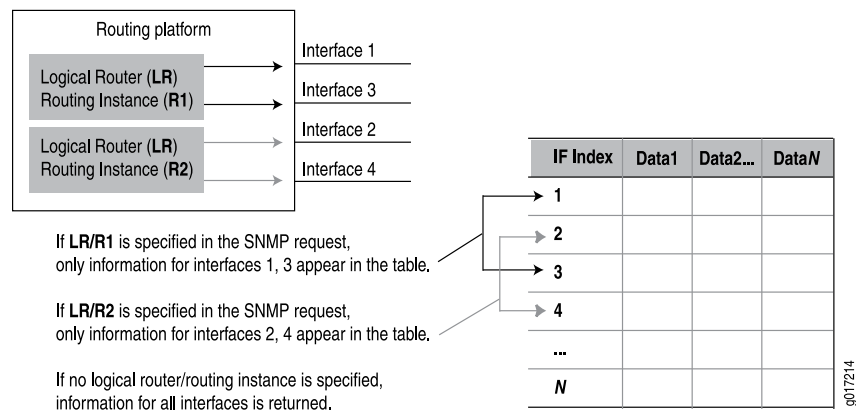
In Junos OS:

- Clients from routing instances other than the default can access MIB objects and perform SNMP operations only on the logical system networks to which they belong.
- Clients from the default routing instance can access information related to all routing instances and logical system networks.

Before Junos OS Release 8.4, only the SNMP manager in the default routing instance (inet.0) had access to the MIB objects

With the increase in virtual private network (VPN) service offerings, this feature is useful particularly for service providers who need to obtain SNMP data for specific routing instances (see [Figure 5 on page 326](#)). Service providers can use this information for their own management needs or export the data for use by their customers.

Figure 5: SNMP Data for Routing Instances



If no routing instance is specified in the request, the SNMP agent operates as before:

- For nonrouting table objects, all instances are exposed.
- For routing table objects, only those associated with the default routing instance are exposed.



NOTE: The actual protocol data units (PDUs) are still exchanged over the default (inet.0) routing instance, but the data contents returned are dictated by the routing instance specified in the request PDUs.

Related Documentation

- [Support Classes for MIB Objects on page 336](#)
- [SNMP Traps Supported for Routing Instances on page 337](#)
- [Identifying a Routing Instance on page 338](#)
- [Enabling SNMP Access over Routing Instances on page 339](#)
- [Specifying a Routing Instance in an SNMPv1 or SNMPv2c Community on page 339](#)
- [Configuring Access Lists for SNMP Access over Routing Instances on page 342](#)

SNMP MIBs Supported for Routing Instances

Table 29 on page 326 shows enterprise-specific MIB objects supported by Junos OS and provides notes detailing how they are handled when a routing instance is specified in an SNMP request. An en dash (–) indicates that the item is not applicable.

Table 29: MIB Support for Routing Instances (Juniper Networks MIBs)

Object	Support Class	Description/Notes
jnxProducts(1)	–	Product Object IDs
jnxServices(2)	–	Services

Table 29: MIB Support for Routing Instances (Juniper Networks MIBs) (continued)

Object	Support Class	Description/Notes
jnxMibs(3) jnxBoxAnatomy(1)	Class 3	Objects are exposed only for the default logical system.
mpls(2)	Class 2	All instances within a logical system are exposed. Data will not be segregated down to the routing instance level.
ifJnx(3)	Class 1	Only those logical interfaces (and their parent physical interfaces) that belong to a specific routing instance are exposed.
jnxAlarms(4)	Class 3	Objects are exposed only for the default logical system.
jnxFirewalls(5)	Class 4	Data is not segregated by routing instance. All instances are exposed.
jnxDCUs(6)	Class 1	Only those logical interfaces (and their parent physical interfaces) that belong to a specific routing instance are exposed.
jnxPingMIB(7)	Class 3	Objects are exposed only for the default logical system.
jnxTraceRouteMIB(8)	Class 3	Objects are exposed only for the default logical system.
jnxATM(10)	Class 1	Only those logical interfaces (and their parent physical interfaces) that belong to a specific routing instance are exposed.
jnxIpv6(11)	Class 4	Data is not segregated by routing instance. All instances are exposed.
jnxIpv4(12)	Class 1	jnxIpv4AddrTable(1). Only those logical interfaces (and their parent physical interfaces) that belong to a specific routing instance are exposed.
jnxRmon(13)	Class 3	jnxRmonAlarmTable(1). Objects are exposed only for the default logical system.
jnxLdp(14)	Class 2	jnxLdpTrapVars(1). All instances within a logical system are exposed. Data will not be segregated down to the routing instance level.

Table 29: MIB Support for Routing Instances (Juniper Networks MIBs) (continued)

Object	Support Class	Description/Notes
jnxCos(15) jnxCosIfqStatsTable(1) jnxCosFcTable(2) jnxCosFcIdTable(3) jnxCosQstatTable(4)	Class 3	Objects are exposed only for the default logical system.
jnxScu(16) jnxScuStatsTable(1)	Class 1	Only those logical interfaces (and their parent physical interfaces) that belong to a specific routing instance are exposed.
jnxRpf(17) jnxRpfStatsTable(1)	Class 1	Only those logical interfaces (and their parent physical interfaces) that belong to a specific routing instance are exposed.
jnxCfgMgmt(18)	Class 3	Objects are exposed only for the default logical system.
jnxPMon(19) jnxPMonFlowTable(1) jnxPMonErrorTable(2) jnxPMonMemoryTable(3)	Class 1	Only those logical interfaces (and their parent physical interfaces) that belong to a specific routing instance are exposed.
jnxSonet(20) jnxSonetAlarmTable(1)	Class 1	Only those logical interfaces (and their parent physical interfaces) that belong to a specific routing instance are exposed.
jnxAtmCos(21) jnxCosAtmVcTable(1) jnxCosAtmScTable(2) jnxCosAtmVcQstatsTable(3) jnxCosAtmTrunkTable(4)	Class 1	Only those logical interfaces (and their parent physical interfaces) that belong to a specific routing instance are exposed.
ipSecFlowMonitorMIB(22)	–	–
jnxMac(23) jnxMacStats(1)	Class 1	Only those logical interfaces (and their parent physical interfaces) that belong to a specific routing instance are exposed.
apsMIB(24)	Class 3	Objects are exposed only for the default logical system.
jnxChassisDefines(25)	Class 3	Objects are exposed only for the default logical system.

Table 29: MIB Support for Routing Instances (Juniper Networks MIBs) (continued)

Object	Support Class	Description/Notes
jnxVpnMIB(26)	Class 2	All instances within a logical system are exposed. Data will not be segregated down to the routing instance level.
jnxSericesInfoMib(27)	Class 1	Only those logical interfaces (and their parent physical interfaces) that belong to a specific routing instance are exposed.
jnxCollectorMIB(28)	Class 1	Only those logical interfaces (and their parent physical interfaces) that belong to a specific routing instance are exposed.
jnxHistory(29)	—	—
jnxSpMIB(32)	Class 3	Objects are exposed only for the default logical system.

[Table 30 on page 330](#) shows Class 1 MIB objects (standard and enterprise-specific MIBs) supported by Junos OS. With Class 1 objects, only those logical interfaces (and their parent physical interfaces) that belong to a specific routing instance are exposed.

Table 30: Class 1 MIB Objects (Standard and Juniper MIBs)

Class	MIB	Objects
Class 1	802.3ad.mib	(dot3adAgg) MIB objects: dot3adAggTable dot3adAggPortListTable (dot3adAggPort) dot3adAggPortTable dot3adAggPortStatsTable dot3adAggPortDebugTable
	rfc2863a.mib	ifTable ifXTable ifStackTable
	rfc2011a.mib	ipAddrTable ipNetToMediaTable
	rtmib.mib	ipForward (ipCidrRouteTable)
	rfc2665a.mib	dot3StatsTable dot3ControlTable dot3PauseTable
	rfc2495a.mib	dsx1ConfigTable dsx1CurrentTable dsx1IntervalTable dsx1TotalTable dsx1FarEndCurrentTable dsx1FarEndIntervalTable dsx1FarEndTotalTable dsx1FracTable ...
	rfc2496a.mib	dsx3 (dsx3ConfigTable)
	rfc2115a.mib	frDlcmiTable (and related MIB objects)
	rfc3592.mib	sonetMediumTable (and related MIB objects)

Table 30: Class 1 MIB Objects (Standard and Juniper MIBs) (continued)

Class	MIB	Objects
	rfc3020.mib	mfrMIB mfrBundleTable mfrMibBundleLinkObjects mfrBundleIfIndexMappingTable (and related MIB objects)
	ospf2mib.mib	All objects
	ospf2trap.mib	All objects
	bgpmib.mib	All objects
	rfc2819a.mib	Example: etherStatsTable

Table 30: Class 1 MIB Objects (Standard and Juniper MIBs) (continued)

Class	MIB	Objects
Class 1	rfc2863a.mib	Examples: ifXtable ifStackTable
	rfc2665a.mib	etherMIB
	rfc2515a.mib	atmMIB objects Examples: atmInterfaceConfTable atmVplTable atmVclTable
	rfc2465.mib	ip-v6mib Examples: ipv6IfTable ipv6AddrPrefixTable ipv6NetToMediaTable ipv6RouteTable
	rfc2787a.mib	vrrp mib
	rfc2932.mib	ipMRouteMIB ipMRouteStdMIB
	mroutemib.mib	ipMRouteIMIBObjects
	isismib.mib	isisMIB
	pimmib.mib	pimMIB
	msdpmib.mib	msdpmib
	jnx-if-extensions.mib	Examples: ifJnxTable ifChassisTable
	jnx-dcu.mib	jnxDCUs
	jnx-atm.mib	

Table 30: Class 1 MIB Objects (Standard and Juniper MIBs) (continued)

Class	MIB	Objects
		Examples: jnxAtmIfTable jnxAtmVcTable jnxAtmVpTable
	jnx-ipv4.mib	jnxipv4 Example: jnxIpv4AddrTable
	jnx-cos.mib	Examples: jnxCosIfqStatsTable jnxCosQstatTable
	jnx-scu.mib	Example: jnxScuStatsTable
	jnx-rpf.mib	Example: jnxRpfStatsTable
	jnx-pmon.mib	Example: jnxPMonFlowTable
	jnx-sonet.mib	Example: jnxSonetAlarmTable
	jnx-atm-cos.mib	Examples: jnxCosAtmVcTable jnxCosAtmVcScTable jnxCosAtmVcQstatsTable jnxCosAtmTrunkTable
	jnx-mac.mib	Example: jnxMacStatsTable
	jnx-services.mib	Example: jnxSvcFlowTableAggStatsTable
Class 1	jnx-coll.mib	jnxCollectorMIB Examples: jnxCollPicIfTable jnxCollFileEntry

Table 31 on page 334 shows Class 2 MIB objects (standard and enterprise-specific MIBs) supported by Junos OS. With Class 2 objects, all instances within a logical system are exposed. Data will not be segregated down to the routing instance level.

Table 31: Class 2 MIB Objects (Standard and Juniper MIBs)

Class	MIB	Objects
Class 2	rfc3813.mib	mplsLsrStdMIB Examples: mplsInterfaceTable mplsInSegmentTable mplsOutSegmentTable mplsLabelStackTable mplsXCTable (and related MIB objects)
	igmpmib.mib	igmpStdMIB NOTE: The igmpmib.mib is the draft version of the IGMP Standard MIB in the experimental tree. Junos OS does not support the original IGMP Standard MIB.
	l3vpn.mib	mplsVpnMIB
	jnx-mpls.mib	Example: mplsLspList
	jnx-ldp.mib	jnxLdp Example: jnxLdpStatsTable
	jnx-vpn.mib	jnxVpnMIB
	jnx-bgpmib2.mib	jnxBgpM2Experiment

[Table 32 on page 335](#) shows Class 3 MIB objects (standard and enterprise-specific MIBs) supported by Junos OS. With Class 3, objects are exposed only for the default logical system.

Table 32: Class 3 MIB Objects (Standard and Juniper MIBs)

Class	MIB	Objects
Class 3	rfc2819a.mib	rmonEvents alarmTable logTable eventTable agentxMIB
	rfc2925a.mib	pingmib
	rfc2925b.mib	tracerouteMIB
	jnxchassis.mib	jnxBoxAnatomy
	jnx-chassis-alarm.mib	jnxAlarms
	jnx-ping.mib	jnxPingMIB
	jnx-traceroute.mib	jnxTraceRouteMIB
	jnx-rmon.mib	jnxRmonAlarmTable
	jnx-cos.mib	Example: jnxCosFcTable
	jnx-cfgmgmt.mib	Example: jnxCfgMgmt
	jnx-sonetaps.mib	apsMIBObjects
	jnx-sp.mib	jnxSpMIB
	ggsn.mib	ejnmobileipABmib
	rfc1907.mib	snmpModules
	snmpModules	Examples: snmpMIB snmpFrameworkMIB

[Table 33 on page 336](#) shows Class 4 MIB objects (standard and enterprise-specific MIBs) supported by Junos OS. With Class 4 objects, data is not segregated by routing instance. All instances are exposed.

Table 33: Class 4 MIB Objects (Standard and Juniper MIBs)

Class	MIB	Objects
Class 4	system	Example: sysORTable
	rfc2011a.mib	ip (ipDefaultTTL, ipInReceives) icmp
	rfc2012a.mib	tcp tcpConnTable ipv6TcpConnTable
	rfc2013a.mib	udp udpTable ipv6UdpTable
	rfc2790a.mib	hrSystem
	rfc2287a.mib	sysApplOBJ
	jnx-firewall.mib	jnxFirewalls
	jnx-ipv6.mib	jnxIpv6

Related Documentation

- [Understanding SNMP Support for Routing Instances on page 325](#)
- [Support Classes for MIB Objects on page 336](#)
- [SNMP Traps Supported for Routing Instances on page 337](#)

Support Classes for MIB Objects

When a routing instance is specified, all routing-related MIB objects return data maintained by the routing instance in the request. For all other MIB objects, the data returned is segregated according to that routing instance. For example, only those interfaces assigned to that routing instance (for example, the logical interfaces [ifls] as well as their corresponding physical interfaces [ifds]) are exposed by the SNMP agent. Similarly, objects with an unambiguous attachment to an interface (for example, **addresses**) are segregated as well.

For those objects where the attachment is ambiguous (for example, objects in **sysApplMIB**), no segregation is done and all instances are visible in all cases.

Another category of objects is visible only when no logical system is specified (only within the default logical system) regardless of the routing instance within the default logical system. Objects in this category are Chassis MIB objects, objects in the SNMP group,

RMON alarm, event and log groups, Ping MIB objects, configuration management objects, and V3 objects.

In summary, to support routing instances, MIB objects fall into one of the following categories:

- Class 1—Data is segregated according to the routing instance in the request. This is the most granular of the segregation classes.
- Class 2—Data is segregated according to the logical system specified in the request. The same data is returned for all routing instances that belong to a particular logical system. Typically, this applies to routing table objects where it is difficult to extract routing instance information or where routing instances do not apply.
- Class 3—Data is exposed only for the default logical system. The same set of data is returned for all routing instances that belong to the default logical system. If you specify another logical system (not the default), no data is returned. Typically this class applies to objects implemented in subagents that do not monitor logical system changes and register their objects using only the default context (for example, Chassis MIB objects).
- Class 4—Data is not segregated by routing instance. The same data is returned for all routing instances. Typically, this applies to objects implemented in subagents that monitor logical system changes and register or deregister all their objects for each logical system change. Objects whose values cannot be segregated by routing instance fall into this class.

See “SNMP MIBs Supported for Routing Instances” on page 326 for a list of the objects associated with each class.

**Related
Documentation**

- [Understanding SNMP Support for Routing Instances on page 325](#)
- [SNMP Traps Supported for Routing Instances on page 337](#)

SNMP Traps Supported for Routing Instances

You can restrict the trap receivers from receiving traps that are not related to the logical system networks to which they belong. To do this, include the **logical-system-trap-filter** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
logical-system-trap-filter;
```

If the **logical-system-trap-filter** statement is not included in the SNMP configuration, all traps are forwarded to the configured routing instance destinations. However, even when this statement is configured, the trap receiver associated with the default routing instance will receive all SNMP traps.

When configured under the trap-group object, all v1 and v2c traps that apply to routing instances (or interfaces belonging to a routing instance) have the routing instance name encoded in the community string. The encoding is identical to that used in request PDUs.

For traps configured under the v3 framework, the routing instance name is carried in the context field when the v3 message processing model has been configured. For other message processing models (v1 or v2c), the routing instance name is not carried in the trap message header (and not encoded in the community string).

- Related Documentation**
- [Understanding SNMP Support for Routing Instances on page 325](#)
 - [Support Classes for MIB Objects on page 336](#)
 - [SNMP MIBs Supported for Routing Instances on page 326](#)

Identifying a Routing Instance

With this feature, routing instances are identified by either the context field in v3 requests or encoded in the community string in v1 or v2c requests.

When encoded in a community string, the routing instance name appears first and is separated from the actual community string by the @ character.

To avoid conflicts with valid community strings that contain the @ character, the community is parsed only if typical community string processing fails. For example, if a routing instance named **RI** is configured, an SNMP request with **RI@public** is processed within the context of the **RI** routing instance. Access control (views, source address restrictions, access privileges, and so on) is applied according to the actual community string (the set of data after the @ character—in this case **public**). However, if the community string **RI@public** is configured, the protocol data unit (PDU) is processed according to that community and the embedded routing instance name is ignored.

Logical systems perform a subset of the actions of a physical router and have their own unique routing tables, interfaces, policies, and routing instances. When a routing instance is defined within a logical system, the logical system name must be encoded along with the routing instance using a slash (/) to separate the two. For example, if the routing instance **RI** is configured within the logical system **LS**, that routing instance must be encoded within a community string as **LS/RI@public**. When a routing instance is configured outside a logical system (within the default logical system), no logical system name (or / character) is needed.

Also, when a logical system is created, a default routing instance (named **default**) is always created within the logical system. This name should be used when querying data for that routing instance (for example, **LS/default@public**). For v3 requests, the name **logical system/routing instance** should be identified directly in the context field.



NOTE: To identify a virtual LAN (VLAN) spanning-tree instance (VSTP on MX Series 5G Universal Routing Platforms), specify the routing instance name followed by a double colon (::) and the VLAN ID. For example, to identify VSTP instance for VLAN 10 in the global default routing instance, include **default::10@public** in the context (SNMPv3) or community (SNMPv1 or v2) string.

- Related Documentation**
- [Understanding SNMP Support for Routing Instances on page 325](#)
 - [Enabling SNMP Access over Routing Instances on page 339](#)
 - [Specifying a Routing Instance in an SNMPv1 or SNMPv2c Community on page 339](#)

Enabling SNMP Access over Routing Instances

To enable SNMP managers in routing instances other than the default routing instance to access SNMP information, include the **routing-instance-access** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
routing-instance-access;
```

If this statement is not included in the SNMP configuration, SNMP managers from routing instances other than the default routing instance cannot access SNMP information. This setting applies to requests for any version of SNMP (SNMP v1, v2, or v3).

- Related Documentation**
- [Understanding SNMP Support for Routing Instances on page 325](#)
 - [Identifying a Routing Instance on page 338](#)
 - [Specifying a Routing Instance in an SNMPv1 or SNMPv2c Community on page 339](#)
 - [Configuring Access Lists for SNMP Access over Routing Instances on page 342](#)

Specifying a Routing Instance in an SNMPv1 or SNMPv2c Community

You can specify the routing instance along with the client information when you add a client to an SNMP community. To specify the routing instance to which a client belongs, include the **routing-instance** statement followed by the routing instance name and client information in the SNMP configuration.

The following example shows the configuration statement to add routing instance **test-ri** to SNMP community **community1**.



NOTE: Routing instances specified at the **[edit snmp community community-name]** hierarchy level are added to the default logical system in the community.

```
[edit snmp]
community community1 {
  clients {
    10.209.152.33/32;
  }
  routing-instance test-ri {
    clients {
      10.19.19.1/32;
    }
  }
}
```

```

    }
  }
}

```

If the routing instance is defined within a logical system, include the **routing-instance** statement at the **[edit snmp community *community-name* logical-system *logical-system-name*]** hierarchy level, as in the following example:

```

[edit snmp]
community community1 {
  clients {
    10.209.152.33/32;
  }
  logical-system test-LS {
    routing-instance test-ri {
      clients {
        10.19.19.1/32;
      }
    }
  }
}

```

Related Documentation

- [Understanding SNMP Support for Routing Instances on page 325](#)
- [Identifying a Routing Instance on page 338](#)
- [Enabling SNMP Access over Routing Instances on page 339](#)
- [Configuring Access Lists for SNMP Access over Routing Instances on page 342](#)
- [Example: Configuring Interface Settings for a Routing Instance on page 340](#)

Example: Configuring Interface Settings for a Routing Instance

This example shows an **802.3ad ae0** interface configuration allocated to a routing instance named **INFrtid**:

```

[edit chassis]
aggregated-devices {
  ethernet {
    device-count 5;
  }
}
[edit interfaces ae0]
vlan-tagging;
aggregated-ether-options {
  minimum-links 2;
  link-speed 100m;
}
unit 0 {
  vlan-id 100;
  family inet {
    address 10.1.0.1/24;
  }
}

```

```

    }
  }
  [edit interfaces fe-1/1/0]
  fastether-options {
    802.3ad ae0;
  }
  [edit interfaces fe-1/1/1]
  fastether-options {
    802.3ad ae0;
  }
  [edit routing-instances]
  INFrtd {
    instance-type virtual-router;
    interface fe-1/1/0.0;
    interface fe-1/1/1.0;
    interface fe-1/1/5.0;
    interface ae0.0;
    protocols {
      ospf {
        area 0.0.0.0 {
          interface all;
        }
      }
    }
  }
}

```

The following **snmpwalk** command shows how to retrieve SNMP-related information from **router1** and the 802.3ae bundle interface belonging to routing instance **INFrtd** with the SNMP community **public**:

```

router# snmpwalk -Os router1 INFrtd@public dot3adAggTable
dot3adAggMACAddress.59 = 0:90:69:92:93:f0
dot3adAggMACAddress.65 = 0:90:69:92:93:f0
dot3adAggActorSystemPriority.59 = 0
dot3adAggActorSystemPriority.65 = 0
dot3adAggActorSystemID.59 = 0:0:0:0:0:0
dot3adAggActorSystemID.65 = 0:0:0:0:0:0
dot3adAggAggregateOrIndividual.59 = true(1)
dot3adAggAggregateOrIndividual.65 = true(1)
dot3adAggActorAdminKey.59 = 0
dot3adAggActorAdminKey.65 = 0
dot3adAggActorOperKey.59 = 0
dot3adAggActorOperKey.65 = 0
dot3adAggPartnerSystemID.59 = 0:0:0:0:0:0
dot3adAggPartnerSystemID.65 = 0:0:0:0:0:0
dot3adAggPartnerSystemPriority.59 = 0
dot3adAggPartnerSystemPriority.65 = 0
dot3adAggPartnerOperKey.59 = 0
dot3adAggPartnerOperKey.65 = 0
dot3adAggCollectorMaxDelay.59 = 0
dot3adAggCollectorMaxDelay.65 = 0

```

Related Documentation

- [Understanding SNMP Support for Routing Instances on page 325](#)

- [Specifying a Routing Instance in an SNMPv1 or SNMPv2c Community on page 339](#)

Configuring Access Lists for SNMP Access over Routing Instances

You can create and maintain access lists to manage access to SNMP information. Access list configuration enables you to allow or deny SNMP access to clients of a specific routing instance, and applies to requests for any version of SNMP.

The following example shows how to create an access list:

```
[edit snmp]
routing-instance-access {
  access-list {
    ri1 restrict;
    ls1/default;
    ls1/ri2;
    ls1*;
  }
}
```

The configuration given in the example:

- Restricts clients in **ri1** from accessing SNMP information.
- Allows clients in **ls1/default**, **ls1/ri2**, and all other routing instances with names starting with **ls1** to access SNMP information.

You can use the wildcard character (*) to represent a string in the routing instance name.



NOTE: You cannot restrict the SNMP manager of the default routing instance from accessing SNMP information.

Related Documentation

- [Understanding SNMP Support for Routing Instances on page 325](#)
- [Enabling SNMP Access over Routing Instances on page 339](#)
- [Specifying a Routing Instance in an SNMPv1 or SNMPv2c Community on page 339](#)

Configuring SNMP Remote Operations

- [SNMP Remote Operations Overview on page 343](#)
- [Using the Ping MIB for Remote Monitoring Devices Running Junos OS on page 346](#)
- [Starting a Ping Test on page 347](#)
- [Monitoring a Running Ping Test on page 348](#)
- [Gathering Ping Test Results on page 351](#)
- [Stopping a Ping Test on page 352](#)
- [Interpreting Ping Variables on page 352](#)
- [Using the Traceroute MIB for Remote Monitoring Devices Running Junos OS on page 353](#)
- [Starting a Traceroute Test on page 354](#)
- [Monitoring a Running Traceroute Test on page 355](#)
- [Monitoring Traceroute Test Completion on page 359](#)
- [Gathering Traceroute Test Results on page 360](#)
- [Stopping a Traceroute Test on page 361](#)
- [Interpreting Traceroute Variables on page 362](#)

SNMP Remote Operations Overview

A SNMP remote operation is any process on the router that can be controlled remotely using SNMP. Junos OS currently provides support for two SNMP remote operations: the Ping MIB and Traceroute MIB, defined in RFC 2925. Using these MIBs, an SNMP client in the network management system (NMS) can:

- Start a series of operations on a router
- Receive notification when the operations are complete
- Gather the results of each operation

Junos OS also provides extended functionality to these MIBs in the Juniper Networks enterprise-specific extensions **jnxPingMIB** and **jnxTraceRouteMIB**. For more information about **jnxPingMIB** and **jnxTraceRouteMIB**, see [PING MIB](#) and [Traceroute MIB](#).

This topic covers the following sections:

- [SNMP Remote Operation Requirements on page 344](#)
- [Setting SNMP Views on page 344](#)
- [Setting Trap Notification for Remote Operations on page 345](#)
- [Using Variable-Length String Indexes on page 345](#)
- [Enabling Logging on page 346](#)

SNMP Remote Operation Requirements

To use SNMP remote operations, you should be experienced with SNMP conventions. You must also configure Junos OS to allow the use of the remote operation MIBs.

Setting SNMP Views

All remote operation MIBs supported by Junos OS require that the SNMP clients have read-write privileges. The default SNMP configuration of Junos OS does not provide clients with a community string with such privileges.

To set read-write privileges for an SNMP community string, include the following statements at the **[edit snmp]** hierarchy level:

```
[edit snmp]
community community-name {
  authorization authorization;
  view view-name;
}
view view-name {
  oid object-identifier (include | exclude);
}
```

Example: Setting SNMP Views

To create a community named **remote-community** that grants SNMP clients read-write access to the Ping MIB, **jnxPing** MIB, Traceroute MIB, and **jnxTraceRoute** MIB, include the following statements at the **[edit snmp]** hierarchy level:

```
snmp {
  view remote-view {
    oid 1.3.6.1.2.1.80 include; # pingMIB
    oid 1.3.6.1.4.1.2636.3.7 include; # jnxPingMIB
    oid 1.3.6.1.2.1.81 include; # traceRouteMIB
    oid 1.3.6.1.4.1.2636.3.8 include; # jnxTraceRouteMIB
  }
  community remote-community {
    view remote-view;
    authorization read-write;
  }
}
```

For more information about the **community** statement, see [“Configuring SNMP Communities” on page 210](#) and [community \(SNMP\)](#).

For more information about the **view** statement, see [“Configuring MIB Views” on page 241](#), [view \(Associating a MIB View with a Community\)](#), and [view \(Configuring a MIB View\)](#).

Setting Trap Notification for Remote Operations

In addition to configuring the remote operations MIB for trap notification, you must also configure Junos OS. You must specify a target host for remote operations traps.

To configure trap notification for SNMP remote operations, include the **categories** and **targets** statements at the **[edit snmp trap-group group-name]** hierarchy level:

```
[edit snmp trap-group group-name]
  categories {
    category;
  }
  targets {
    address;
  }
}
```

Example: Setting Trap Notification for Remote Operations

Specify **172.17.12.213** as a target host for all remote operation traps:

```
snmp {
  trap-group remote-traps {
    categories remote-operations;
    targets {
      172.17.12.213;
    }
  }
}
```

For more information about trap groups, see [“Configuring SNMP Trap Groups” on page 224](#).

Using Variable-Length String Indexes

All tabular objects in the remote operations MIBs supported by Junos OS are indexed by two variables of type **SnmpAdminString**. For more information about **SnmpAdminString**, see RFC 2571.

Junos OS does not handle **SnmpAdminString** any differently from the octet string variable type. However, the indexes are defined as variable length. When a variable length string is used as an index, the length of the string must be included as part of the object identifier (OID).

Example: Set Variable-Length String Indexes

To reference the `pingCtlTargetAddress` variable of a row in `pingCtlTable` where `pingCtlOwnerIndex` is `bob` and `pingCtlTestName` is `test`, use the following object identifier (OID):

```
pingMIB.pingObjects.pingCtlTable.pingCtlEntry.pingCtlTargetAddress."bob"."test"  
1.3.6.1.2.1.80.1.2.1.4.3.98.111.98.4.116.101.115.116
```

For more information about the definition of the Ping MIB, see RFC 2925.

Enabling Logging

The SNMP error code returned in response to SNMP requests can only provide a generic description of the problem. The error descriptions logged by the remote operations process can often provide more detailed information about the problem and help you to solve the problem faster. This logging is not enabled by default. To enable logging, include the **flag general** statement at the `[edit snmp traceoptions]` hierarchy level:

```
[edit]  
snmp {  
  traceoptions {  
    flag general;  
  }  
}
```

For more information about traceoptions, see [“Tracing SNMP Activity on a Device Running Junos OS” on page 369](#).

If the remote operations process receives an SNMP request that it cannot accommodate, the error is logged in the `/var/log/rmopd` file. To monitor this log file, issue the **monitor start rmopd** command in operational mode of the command-line interface (CLI).

- Related Documentation**
- [Using the Ping MIB for Remote Monitoring Devices Running Junos OS on page 346](#)
 - [Using the Traceroute MIB for Remote Monitoring Devices Running Junos OS on page 353](#)

Using the Ping MIB for Remote Monitoring Devices Running Junos OS

A ping test is used to determine whether packets sent from the local host reach the designated host and are returned. If the designated host can be reached, the ping test provides the approximate round-trip time for the packets. Ping test results are stored in `pingResultsTable` and `pingProbeHistoryTable`.

RFC 2925 is the authoritative description of the Ping MIB in detail and provides the ASN.1 MIB definition of the Ping MIB.

- Related Documentation**
- [SNMP Remote Operations Overview on page 343](#)
 - [Starting a Ping Test on page 347](#)

- [Monitoring a Running Ping Test on page 348](#)
- [Gathering Ping Test Results on page 351](#)
- [Stopping a Ping Test on page 352](#)
- [Interpreting Ping Variables on page 352](#)

Starting a Ping Test

Before you start a ping test, configure a Ping MIB view. This allows SNMP **Set** requests on **pingMIB**. To start a ping test, create a row in **pingCtlTable** and set **pingCtlAdminStatus** to **enabled**. The minimum information that must be specified before setting **pingCtlAdminStatus** to **enabled** is:

- **pingCtlOwnerIndexSnmpAdminString**
- **pingCtlTestNameSnmpAdminString**
- **pingCtlTargetAddressInetAddress**
- **pingCtlTargetAddressTypeInetAddressType**
- **pingCtlRowStatusRowStatus**

For all other values, defaults are chosen unless otherwise specified. **pingCtlOwnerIndex** and **pingCtlTestName** are used as the index, so their values are specified as part of the object identifier (OID). To create a row, set **pingCtlRowStatus** to **createAndWait** or **createAndGo** on a row that does not already exist. A value of **active** for **pingCtlRowStatus** indicates that all necessary information has been supplied and the test can begin; **pingCtlAdminStatus** can be set to **enabled**. An SNMP **Set** request that sets **pingCtlRowStatus** to **active** will fail if the necessary information in the row is not specified or is inconsistent. For information about how to configure a view, see [“Setting SNMP Views” on page 344](#).

There are two ways to start a ping test:

- [Using Multiple Set Protocol Data Units \(PDUs\) on page 347](#)
- [Using a Single Set PDU on page 348](#)

Using Multiple Set Protocol Data Units (PDUs)

You can use multiple **Set** request PDUs (multiple PDUs, with one or more varbinds each) and set the following variables in this order to start the test:

- **pingCtlRowStatus** to **createAndWait**
- All appropriate test variables
- **pingCtlRowStatus** to **active**

Junos OS now verifies that all necessary information to run a test has been specified.

- **pingCtlAdminStatus** to **enabled**

Using a Single Set PDU

You can use a single **Set** request PDU (one PDU, with multiple varbinds) to set the following variables to start the test:

- **pingCtlRowStatus** to **createAndGo**
- All appropriate test variables
- **pingCtlAdminStatus** to **enabled**

Monitoring a Running Ping Test

When **pingCtlAdminStatus** is successfully set to **enabled**, the following is done before the acknowledgment of the SNMP **Set** request is sent back to the client:

- **pingResultsEntry** is created if it does not already exist.
- **pingResultsOperStatus** transitions to **enabled**.

For more information, see the following sections:

- [pingResultsTable](#) on page 348
- [pingProbeHistoryTable](#) on page 350
- [Generating Traps](#) on page 350

pingResultsTable

While the test is running, **pingResultsEntry** keeps track of the status of the test. The value of **pingResultsOperStatus** is **enabled** while the test is running and **disabled** when it has stopped.

The value of **pingCtlAdminStatus** remains **enabled** until you set it to **disabled**. Thus, to get the status of the test, you must examine **pingResultsOperStatus**.

The **pingCtlFrequency** variable can be used to schedule many tests for one **pingCtlEntry**. After a test ends normally (you did not stop the test) and the **pingCtlFrequency** number of seconds has elapsed, the test is started again just as if you had set **pingCtlAdminStatus** to **enabled**. If you intervene at any time between repeated tests (you set **pingCtlAdminStatus** to **disabled** or **pingCtlRowStatus** to **notInService**), the repeat feature is disabled until another test is started and ends normally. A value of 0 for **pingCtlFrequency** indicates this repeat feature is not active.

pingResultsIpTgtAddr and **pingResultsIpTgtAddrType** are set to the value of the resolved destination address when the value of **pingCtlTargetAddressType** is **dns**. When a test starts successfully and **pingResultsOperStatus** transitions to **enabled**:

- **pingResultsIpTgtAddr** is set to **null-string**.
- **pingResultsIpTgtAddrType** is set to **unknown**.

pingResultsIpTgtAddr and **pingResultsIpTgtAddrType** are not set until **pingCtlTargetAddress** can be resolved to a numeric address. To retrieve these values, poll **pingResultsIpTgtAddrType** for any value other than **unknown** after successfully setting **pingCtlAdminStatus** to **enabled**.

At the start of a test, **pingResultsSentProbes** is initialized to 1 and the first probe is sent. **pingResultsSentProbes** increases by 1 each time a probe is sent.

As the test runs, every **pingCtlTimeOut** seconds, the following occur:

- **pingProbeHistoryStatus** for the corresponding **pingProbeHistoryEntry** in **pingProbeHistoryTable** is set to **requestTimedOut**.
- A **pingProbeFailed** trap is generated, if necessary.
- An attempt is made to send the next probe.



NOTE: No more than one outstanding probe exists for each test.

For every probe, you can receive one of the following results:

- The target host acknowledges the probe with a response.
- The probe times out; there is no response from the target host acknowledging the probe.
- The probe could not be sent.

Each probe result is recorded in **pingProbeHistoryTable**. For more information about **pingProbeHistoryTable**, see “[pingProbeHistoryTable](#)” on page 350.

When a response is received from the target host acknowledging the current probe:

- **pingResultsProbeResponses** increases by 1.
- The following variables are updated:
 - **pingResultsMinRtt**—Minimum round-trip time
 - **pingResultsMaxRtt**—Maximum round-trip time
 - **pingResultsAverageRtt**—Average round-trip time
 - **pingResultsRttSumOfSquares**—Sum of squares of round-trip times
 - **pingResultsLastGoodProbe**—Timestamp of the last response



NOTE: Only probes that result in a response from the target host contribute to the calculation of the round-trip time (RTT) variables.

When a response to the last probe is received or the last probe has timed out, the test is complete.

pingProbeHistoryTable

An entry in **pingProbeHistoryTable** (**pingProbeHistoryEntry**) represents a probe result and is indexed by three variables:

- The first two variables, **pingCtlOwnerIndex** and **pingCtlTestName**, are the same ones used for **pingCtlTable**, which identifies the test.
- The third variable, **pingProbeHistoryIndex**, is a counter to uniquely identify each probe result.

The maximum number of **pingProbeHistoryTable** entries created for a given test is limited by **pingCtlMaxRows**. If **pingCtlMaxRows** is set to 0, no **pingProbeHistoryTable** entries are created for that test.

Each time a probe result is determined, a **pingProbeHistoryEntry** is created and added to **pingProbeHistoryTable**. **pingProbeHistoryIndex** of the new **pingProbeHistoryEntry** is 1 greater than the last **pingProbeHistoryEntry** added to **pingProbeHistoryTable** for that test. **pingProbeHistoryIndex** is set to 1 if this is the first entry in the table. The same test can be run multiple times, so this index keeps growing.

If **pingProbeHistoryIndex** of the last **pingProbeHistoryEntry** added is 0xFFFFFFFF, the next **pingProbeHistoryEntry** added has **pingProbeHistoryIndex** set to 1.

The following are recorded for each probe result:

- **pingProbeHistoryResponse**—Time to live (TTL)
- **pingProbeHistoryStatus**—What happened and why
- **pingProbeHistoryLastRC**—Return code (RC) value of ICMP packet
- **pingProbeHistoryTime**—Timestamp when probe result was determined

When a probe cannot be sent, **pingProbeHistoryResponse** is set to 0. When a probe times out, **pingProbeHistoryResponse** is set to the difference between the time when the probe was discovered to be timed out and the time when the probe was sent.

Generating Traps

For any trap to be generated, the appropriate bit of **pingCtlTrapGeneration** must be set. You must also configure a trap group to receive remote operations. A trap is generated under the following conditions:

- A **pingProbeFailed** trap is generated every time **pingCtlTrapProbeFailureFilter** number of consecutive probes fail during the test.
- A **pingTestFailed** trap is generated when the test completes and at least **pingCtlTrapTestFailureFilter** number of probes fail.
- A **pingTestCompleted** trap is generated when the test completes and fewer than **pingCtlTrapTestFailureFilter** probes fail.



NOTE: A probe is considered a failure when `pingProbeHistoryStatus` of the probe result is anything besides `responseReceived`.

For information about how to configure a trap group to receive remote operations, see “Configuring SNMP Trap Groups” on page 224 and “Example: Setting Trap Notification for Remote Operations” on page 345.

Gathering Ping Test Results

You can either poll `pingResultsOperStatus` to find out when the test is complete or request that a trap be sent when the test is complete. For more information about `pingResultsOperStatus`, see “`pingResultsTable`” on page 348. For more information about Ping MIB traps, see “Generating Traps” on page 350.

The statistics calculated and then stored in `pingResultsTable` include:

- `pingResultsMinRtt`—Minimum round-trip time
- `pingResultsMaxRtt`—Maximum round-trip time
- `pingResultsAverageRtt`—Average round-trip time
- `pingResultsProbeResponses`—Number of responses received
- `pingResultsSentProbes`—Number of attempts to send probes
- `pingResultsRttSumOfSquares`—Sum of squares of round-trip times
- `pingResultsLastGoodProbe`—Timestamp of the last response

You can also consult `pingProbeHistoryTable` for more detailed information about each probe. The index used for `pingProbeHistoryTable` starts at 1, goes to 0xFFFFFFFF, and wraps to 1 again.

For example, if `pingCtlProbeCount` is 15 and `pingCtlMaxRows` is 5, then upon completion of the first run of this test, `pingProbeHistoryTable` contains probes like those in Table 34 on page 351.

Table 34: Results in `pingProbeHistoryTable`: After the First Ping Test

<code>pingProbeHistoryIndex</code>	Probe Result
11	Result of 11th probe from run 1
12	Result of 12th probe from run 1
13	Result of 13th probe from run 1
14	Result of 14th probe from run 1
15	Result of 15th probe from run 1

Upon completion of the first probe of the second run of this test, **pingProbeHistoryTable** will contain probes like those in [Table 35 on page 352](#).

Table 35: Results in pingProbeHistoryTable: After the First Probe of the Second Test

pingProbeHistoryIndex	Probe Result
12	Result of 12th probe from run 1
13	Result of 13th probe from run 1
14	Result of 14th probe from run 1
15	Result of 15th probe from run 1
16	Result of 1st probe from run 2

Upon completion of the second run of this test, **pingProbeHistoryTable** will contain probes like those in [Table 36 on page 352](#).

Table 36: Results in pingProbeHistoryTable: After the Second Ping Test

pingProbeHistoryIndex	Probe Result
26	Result of 11th probe from run 2
27	Result of 12th probe from run 2
28	Result of 13th probe from run 2
29	Result of 14th probe from run 2
30	Result of 15th probe from run 2

History entries can be deleted from the MIB in two ways:

- More history entries for a given test are added and the number of history entries exceeds **pingCtlMaxRows**. The oldest history entries are deleted to make room for the new ones.
- You delete the entire test by setting **pingCtlRowStatus** to **destroy**.

Stopping a Ping Test

To stop an active test, set **pingCtlAdminStatus** to **disabled**. To stop the test and remove its **pingCtlEntry**, **pingResultsEntry**, and any **pingHistoryEntry** objects from the MIB, set **pingCtlRowStatus** to **destroy**.

Interpreting Ping Variables

This section clarifies the ranges for the following variables that are not explicitly specified in the Ping MIB:

- **pingCtlDataSize**—The value of this variable represents the total size of the payload (in bytes) of an outgoing probe packet. This payload includes the timestamp (8 bytes) that is used to time the probe. This is consistent with the definition of **pingCtlDataSize** (maximum value of 65,507) and the standard ping application.

If the value of **pingCtlDataSize** is between 0 and 8 inclusive, it is ignored and the payload is 8 bytes (the timestamp). The Ping MIB assumes all probes are timed, so the payload must always include the timestamp.

For example, if you wish to add an additional 4 bytes of payload to the packet, you must set **pingCtlDataSize** to 12.

- **pingCtlDataFill**—The first 8 bytes of the data segment of the packet is for the timestamp. After that, the **pingCtlDataFill** pattern is used in repetition. The default pattern (when **pingCtlDataFill** is not specified) is (00, 01, 02, 03 ... FF, 00, 01, 02, 03 ... FF, ...).
- **pingCtlMaxRows**—The maximum value is 255.
- **pingMaxConcurrentRequests**—The maximum value is 500.
- **pingCtlTrapProbeFailureFilter** and **pingCtlTrapTestFailureFilter**—A value of 0 for **pingCtlTrapProbeFailureFilter** or **pingCtlTrapTestFailureFilter** is not well defined by the Ping MIB. If **pingCtlTrapProbeFailureFilter** is 0, **pingProbeFailed** traps will not be generated for the test under any circumstances. If **pingCtlTrapTestFailureFilter** is 0, **pingTestFailed** traps will not be generated for the test under any circumstances.

Using the Traceroute MIB for Remote Monitoring Devices Running Junos OS

A traceroute test approximates the path packets take from the local host to the remote host.

RFC 2925 is the authoritative description of the Traceroute MIB in detail and provides the ASN.1 MIB definition of the Traceroute MIB.

Related Documentation

- [SNMP Remote Operations Overview on page 343](#)
- [Starting a Traceroute Test on page 354](#)
- [Monitoring a Running Traceroute Test on page 355](#)
- [Monitoring Traceroute Test Completion on page 359](#)
- [Gathering Traceroute Test Results on page 360](#)
- [Stopping a Traceroute Test on page 361](#)
- [Interpreting Traceroute Variables on page 362](#)

Starting a Traceroute Test

Before you start a traceroute test, configure a Traceroute MIB view. This allows SNMP **Set** requests on **tracerouteMIB**. To start a test, create a row in **traceRouteCtlTable** and set **traceRouteCtlAdminStatus** to **enabled**. You must specify at least the following before setting **traceRouteCtlAdminStatus** to **enabled**:

- **traceRouteCtlOwnerIndexSnmpAdminString**
- **traceRouteCtlTestNameSnmpAdminString**
- **traceRouteCtlTargetAddressInetAddress**
- **traceRouteCtlRowStatusRowStatus**

For all other values, defaults are chosen unless otherwise specified.

traceRouteCtlOwnerIndex and **traceRouteCtlTestName** are used as the index, so their values are specified as part of the OID. To create a row, set **traceRouteCtlRowStatus** to **createAndWait** or **createAndGo** on a row that does not already exist. A value of **active** for **traceRouteCtlRowStatus** indicates that all necessary information has been specified and the test can begin; **traceRouteCtlAdminStatus** can be set to **enabled**. An SNMP **Set** request that sets **traceRouteCtlRowStatus** to **active** will fail if the necessary information in the row is not specified or is inconsistent. For information about how to configure a view, see [“Setting SNMP Views” on page 344](#).

There are two ways to start a traceroute test:

- [Using Multiple Set PDUs on page 354](#)
- [Using a Single Set PDU on page 354](#)

Using Multiple Set PDUs

You can use multiple **Set** request PDUs (multiple PDUs, with one or more varbinds each) and set the following variables in this order to start the test:

- **traceRouteCtlRowStatus** to **createAndWait**
- All appropriate test variables
- **traceRouteCtlRowStatus** to **active**

The Junos OS now verifies that all necessary information to run a test has been specified.

- **traceRouteCtlAdminStatus** to **enabled**

Using a Single Set PDU

You can use a single **Set** request PDU (one PDU, with multiple varbinds) to set the following variables to start the test:

- **traceRouteCtlRowStatus** to **createAndGo**
- All appropriate test variables

- `traceRouteCtlAdminStatus` to enabled

Related Documentation

- [Using the Traceroute MIB for Remote Monitoring Devices Running Junos OS on page 353](#)
- [Monitoring a Running Traceroute Test on page 355](#)
- [SNMP Remote Operations Overview on page 343](#)
- [Monitoring Traceroute Test Completion on page 359](#)
- [Gathering Traceroute Test Results on page 360](#)
- [Stopping a Traceroute Test on page 361](#)
- [Interpreting Traceroute Variables on page 362](#)

Monitoring a Running Traceroute Test

When `traceRouteCtlAdminStatus` is successfully set to enabled, the following is done before the acknowledgment of the SNMP Set request is sent back to the client:

- `traceRouteResultsEntry` is created if it does not already exist.
- `traceRouteResultsOperStatus` transitions to enabled.

For more information, see the following sections:

- [traceRouteResultsTable on page 355](#)
- [traceRouteProbeResultsTable on page 356](#)
- [traceRouteHopsTable on page 357](#)
- [Generating Traps on page 358](#)

traceRouteResultsTable

While the test is running, this `traceRouteResultsTable` keeps track of the status of the test. The value of `traceRouteResultsOperStatus` is enabled while the test is running and disabled when it has stopped.

The value of `traceRouteCtlAdminStatus` remains enabled until you set it to disabled. Thus, to get the status of the test, you must examine `traceRouteResultsOperStatus`.

The `traceRouteCtlFrequency` variable can be used to schedule many tests for one `traceRouteCtlEntry`. After a test ends normally (you did not stop the test) and `traceRouteCtlFrequency` number of seconds has elapsed, the test is started again just as if you had set `traceRouteCtlAdminStatus` to enabled. If you intervene at any time between repeated tests (you set `traceRouteCtlAdminStatus` to disabled or `traceRouteCtlRowStatus` to `notInService`), the repeat feature is disabled until another test is started and ends normally. A value of 0 for `traceRouteCtlFrequency` indicates this repeat feature is not active.

`traceRouteResultsIpTgtAddr` and `traceRouteResultsIpTgtAddrType` are set to the value of the resolved destination address when the value of `traceRouteCtlTargetAddressType`

is dns. When a test starts successfully and `traceRouteResultsOperStatus` transitions to enabled:

- `traceRouteResultsIpTgtAddr` is set to null-string.
- `traceRouteResultsIpTgtAddrType` is set to unknown.

`traceRouteResultsIpTgtAddr` and `traceRouteResultsIpTgtAddrType` are not set until `traceRouteCtlTargetAddress` can be resolved to a numeric address. To retrieve these values, poll `traceRouteResultsIpTgtAddrType` for any value other than unknown after successfully setting `traceRouteCtlAdminStatus` to enabled.

At the start of a test, `traceRouteResultsCurHopCount` is initialized to `traceRouteCtlInitialTtl`, and `traceRouteResultsCurProbeCount` is initialized to 1. Each time a probe result is determined, `traceRouteResultsCurProbeCount` increases by 1. While the test is running, the value of `traceRouteResultsCurProbeCount` reflects the current outstanding probe for which results have not yet been determined.

The `traceRouteCtlProbesPerHop` number of probes is sent for each time-to-live (TTL) value. When the result of the last probe for the current hop is determined, provided that the current hop is not the destination hop, `traceRouteResultsCurHopCount` increases by 1, and `traceRouteResultsCurProbeCount` resets to 1.

At the start of a test, if this is the first time this test has been run for this `traceRouteCtlEntry`, `traceRouteResultsTestAttempts` and `traceRouteResultsTestSuccesses` are initialized to 0.

At the end of each test execution, `traceRouteResultsOperStatus` transitions to disabled, and `traceRouteResultsTestAttempts` increases by 1. If the test was successful in determining the full path to the target, `traceRouteResultsTestSuccesses` increases by 1, and `traceRouteResultsLastGoodPath` is set to the current time.

traceRouteProbeResultsTable

Each entry in `traceRouteProbeHistoryTable` is indexed by five variables:

- The first two variables, `traceRouteCtlOwnerIndex` and `traceRouteCtlTestName`, are the same ones used for `traceRouteCtlTable` and to identify the test.
- The third variable, `traceRouteProbeHistoryIndex`, is a counter, starting from 1 and wrapping at FFFFFFFF. The maximum number of entries is limited by `traceRouteCtlMaxRows`.
- The fourth variable, `traceRouteProbeHistoryHopIndex`, indicates which hop this probe is for (the actual time-to-live or TTL value). Thus, the first `traceRouteCtlProbesPerHop` number of entries created when a test starts have a value of `traceRouteCtlInitialTtl` for `traceRouteProbeHistoryHopIndex`.
- The fifth variable, `traceRouteProbeHistoryProbeIndex`, is the probe for the current hop. It ranges from 1 to `traceRouteCtlProbesPerHop`.

While a test is running, as soon as a probe result is determined, the next probe is sent. A maximum of `traceRouteCtlTimeOut` seconds elapses before a probe is marked with status `requestTimedOut` and the next probe is sent. There is never more than one

outstanding probe per traceroute test. Any probe result coming back after a probe times out is ignored.

Each probe can:

- Result in a response from a host acknowledging the probe
- Time out with no response from a host acknowledging the probe
- Fail to be sent

Each probe status is recorded in `traceRouteProbeHistoryTable` with `traceRouteProbeHistoryStatus` set accordingly.

Probes that result in a response from a host record the following data:

- `traceRouteProbeHistoryResponse`—Round-trip time (RTT)
- `traceRouteProbeHistoryHAddrType`—The type of HAddr (next argument)
- `traceRouteProbeHistoryHAddr`—The address of the hop

All probes, regardless of whether a response for the probe is received, have the following recorded:

- `traceRouteProbeHistoryStatus`—What happened and why
- `traceRouteProbeHistoryLastRC`—Return code (RC) value of the ICMP packet
- `traceRouteProbeHistoryTime`—Timestamp when the probe result was determined

When a probe cannot be sent, `traceRouteProbeHistoryResponse` is set to 0. When a probe times out, `traceRouteProbeHistoryResponse` is set to the difference between the time when the probe was discovered to be timed out and the time when the probe was sent.

traceRouteHopsTable

Entries in `traceRouteHopsTable` are indexed by three variables:

- The first two, `traceRouteCtlOwnerIndex` and `traceRouteCtlTestName`, are the same ones used for `traceRouteCtlTable` and identify the test.
- The third variable, `traceRouteHopsHopIndex`, indicates the current hop, which starts at 1 (not `traceRouteCtlInitialTtl`).

When a test starts, all entries in `traceRouteHopsTable` with the given `traceRouteCtlOwnerIndex` and `traceRouteCtlTestName` are deleted. Entries in this table are only created if `traceRouteCtlCreateHopsEntries` is set to true.

A new `traceRouteHopsEntry` is created each time the first probe result for a given TTL is determined. The new entry is created whether or not the first probe reaches a host. The value of `traceRouteHopsHopIndex` is increased by 1 for this new entry.



NOTE: Any `traceRouteHopsEntry` can lack a value for `traceRouteHopsIpTgtAddress` if there are no responses to the probes with the given TTL.

Each time a probe reaches a host, the IP address of that host is available in the probe result. If the value of `traceRouteHopsIpTgtAddress` of the current `traceRouteHopsEntry` is not set, then the value of `traceRouteHopsIpTgtAddress` is set to this IP address. If the value of `traceRouteHopsIpTgtAddress` of the current `traceRouteHopsEntry` is the same as the IP address, then the value does not change. If the value of `traceRouteHopsIpTgtAddress` of the current `traceRouteHopsEntry` is different from this IP address, indicating a path change, a new `traceRouteHopsEntry` is created with:

- `traceRouteHopsHopIndex` variable increased by 1
- `traceRouteHopsIpTgtAddress` set to the IP address



NOTE: A new entry for a test is added to `traceRouteHopsTable` each time a new TTL value is used or the path changes. Thus, the number of entries for a test may exceed the number of different TTL values used.

When a probe result is determined, the value `traceRouteHopsSentProbes` of the current `traceRouteHopsEntry` increases by 1. When a probe result is determined, and the probe reaches a host:

- The value `traceRouteHopsProbeResponses` of the current `traceRouteHopsEntry` is increased by 1.
- The following variables are updated:
 - `traceRouteResultsMinRtt`—Minimum round-trip time
 - `traceRouteResultsMaxRtt`—Maximum round-trip time
 - `traceRouteResultsAverageRtt`—Average round-trip time
 - `traceRouteResultsRttSumOfSquares`—Sum of squares of round-trip times
 - `traceRouteResultsLastGoodProbe`—Timestamp of the last response



NOTE: Only probes that reach a host affect the round-trip time values.

Generating Traps

For any trap to be generated, the appropriate bit of `traceRouteCtlTrapGeneration` must be set. You must also configure a trap group to receive remote operations. Traps are generated under the following conditions:

- `traceRouteHopsIpTgtAddress` of the current probe is different from the last probe with the same TTL value (`traceRoutePathChange`).

- A path to the target could not be determined (`traceRouteTestFailed`).

A path to the target was determined (`traceRouteTestCompleted`).

For information about how to configure a trap group to receive remote operations, see “Configuring SNMP Trap Groups” on page 224 and “Example: Setting Trap Notification for Remote Operations” on page 345.

- See Also**
- [Using the Traceroute MIB for Remote Monitoring Devices Running Junos OS on page 353](#)
 - [SNMP Remote Operations Overview on page 343](#)
 - [Starting a Traceroute Test on page 354](#)
 - [Monitoring Traceroute Test Completion on page 359](#)
 - [Gathering Traceroute Test Results on page 360](#)
 - [Stopping a Traceroute Test on page 361](#)
 - [Interpreting Traceroute Variables on page 362](#)

Monitoring Traceroute Test Completion

When a test is complete, `traceRouteResultsOperStatus` transitions from **enabled** to **disabled**. This transition occurs in the following situations:

- The test ends successfully. A probe result indicates that the destination has been reached. In this case, the current hop is the last hop. The rest of the probes for this hop are sent. When the last probe result for the current hop is determined, the test ends.
- `traceRouteCtlMaxTtl` threshold is exceeded. The destination is never reached. The test ends after the number of probes with TTL value equal to `traceRouteCtlMaxttl` have been sent.
- `traceRouteCtlMaxFailures` threshold is exceeded. The number of consecutive probes that end with status `requestTimedOut` exceeds `traceRouteCtlMaxFailures`.
- You end the test. You set `traceRouteCtlAdminStatus` to **disabled** or delete the row by setting `traceRouteCtlRowStatus` to **destroy**.
- You misconfigured the traceroute test. A value or variable you specified in `traceRouteCtlTable` is incorrect and will not allow a single probe to be sent. Because of the nature of the data, this error could not be determined until the test was started; that is, until after `traceRouteResultsOperStatus` transitioned to **enabled**. When this occurs, one entry is added to `traceRouteProbeHistoryTable` with `traceRouteProbeHistoryStatus` set to the appropriate error code.

If `traceRouteCtlTrapGeneration` is set properly, either the `traceRouteTestFailed` or `traceRouteTestCompleted` trap is generated.

- Related Documentation**
- [Using the Traceroute MIB for Remote Monitoring Devices Running Junos OS on page 353](#)
 - [Monitoring a Running Traceroute Test on page 355](#)

- [SNMP Remote Operations Overview on page 343](#)
- [Starting a Traceroute Test on page 354](#)
- [Gathering Traceroute Test Results on page 360](#)
- [Stopping a Traceroute Test on page 361](#)
- [Interpreting Traceroute Variables on page 362](#)

Gathering Traceroute Test Results

You can either poll `traceRouteResultsOperStatus` to find out when the test is complete or request that a trap be sent when the test is complete. For more information about `traceResultsOperStatus`, see [“traceRouteResultsTable” on page 355](#). For more information about Traceroute MIB traps, see the Generating Traps section in [“Monitoring a Running Traceroute Test” on page 355](#).

Statistics are calculated on a per-hop basis and then stored in `traceRouteHopsTable`. They include the following for each hop:

- `traceRouteHopsIpTgtAddressType`—Address type of host at this hop
- `traceRouteHopsIpTgtAddress`—Address of host at this hop
- `traceRouteHopsMinRtt`—Minimum round-trip time
- `traceRouteHopsMaxRtt`—Maximum round-trip time
- `traceRouteHopsAverageRtt`—Average round-trip time
- `traceRouteHopsRttSumOfSquares`—Sum of squares of round-trip times
- `traceRouteHopsSentProbes`—Number of attempts to send probes
- `traceRouteHopsProbeResponses`—Number of responses received
- `traceRouteHopsLastGoodProbe`—Timestamp of last response

You can also consult `traceRouteProbeHistoryTable` for more detailed information about each probe. The index used for `traceRouteProbeHistoryTable` starts at 1, goes to 0xFFFFFFFF, and wraps to 1 again.

For example, assume the following:

- `traceRouteCtlMaxRows` is 10.
- `traceRouteCtlProbesPerHop` is 5.
- There are eight hops to the target (the target being number eight).
- Each probe sent results in a response from a host (the number of probes sent is not limited by `traceRouteCtlMaxFailures`).

In this test, 40 probes are sent. At the end of the test, `traceRouteProbeHistoryTable` would have a history of probes like those in [Table 37 on page 361](#).

Table 37: traceRouteProbeHistoryTable

HistoryIndex	HistoryHopIndex	HistoryProbeIndex
31	7	1
32	7	2
33	7	3
34	7	4
35	7	5
36	8	1
37	8	2
38	8	3
39	8	4
40	8	5

Related Documentation

- [Using the Traceroute MIB for Remote Monitoring Devices Running Junos OS on page 353](#)
- [Monitoring a Running Traceroute Test on page 355](#)
- [SNMP Remote Operations Overview on page 343](#)
- [Starting a Traceroute Test on page 354](#)
- [Monitoring Traceroute Test Completion on page 359](#)
- [Stopping a Traceroute Test on page 361](#)
- [Interpreting Traceroute Variables on page 362](#)

Stopping a Traceroute Test

To stop an active test, set **traceRouteCtlAdminStatus** to **disabled**. To stop a test and remove its **traceRouteCtlEntry**, **traceRouteResultsEntry**, **traceRouteProbeHistoryEntry**, and **traceRouteProbeHistoryEntry** objects from the MIB, set **traceRouteCtlRowStatus** to **destroy**.

Related Documentation

- [Using the Traceroute MIB for Remote Monitoring Devices Running Junos OS on page 353](#)
- [Monitoring a Running Traceroute Test on page 355](#)
- [SNMP Remote Operations Overview on page 343](#)
- [Starting a Traceroute Test on page 354](#)

- [Monitoring Traceroute Test Completion on page 359](#)
- [Gathering Traceroute Test Results on page 360](#)
- [Interpreting Traceroute Variables on page 362](#)

Interpreting Traceroute Variables

This topic contains information about the ranges for the following variables that are not explicitly specified in the Traceroute MIB:

- **traceRouteCtlMaxRows**—The maximum value for **traceRouteCtlMaxRows** is 2550. This represents the maximum TTL (255) multiplied by the maximum for **traceRouteCtlProbesPerHop** (10). Therefore, the **traceRouteProbeHistoryTable** accommodates one complete test at the maximum values for one **traceRouteCtlEntry**. Usually, the maximum values are not used and the **traceRouteProbeHistoryTable** is able to accommodate the complete history for many tests for the same **traceRouteCtlEntry**.
- **traceRouteMaxConcurrentRequests**—The maximum value is 50. If a test is running, it has one outstanding probe. **traceRouteMaxConcurrentRequests** represents the maximum number of traceroute tests that have **traceRouteResultsOperStatus** with a value of **enabled**. Any attempt to start a test with **traceRouteMaxConcurrentRequests** tests running will result in the creation of one probe with **traceRouteProbeHistoryStatus** set to **maxConcurrentLimitReached** and that test will end immediately.
- **traceRouteCtlTable**—The maximum number of entries allowed in this table is 100. Any attempt to create a 101st entry will result in a **BAD_VALUE** message for SNMPv1 and a **RESOURCE_UNAVAILABLE** message for SNMPv2.

Related Documentation

- [Using the Traceroute MIB for Remote Monitoring Devices Running Junos OS on page 353](#)
- [Monitoring a Running Traceroute Test on page 355](#)
- [SNMP Remote Operations Overview on page 343](#)
- [Starting a Traceroute Test on page 354](#)
- [Monitoring Traceroute Test Completion on page 359](#)
- [Gathering Traceroute Test Results on page 360](#)
- [Stopping a Traceroute Test on page 361](#)

Tracing SNMP Activity

- [Monitoring SNMP Activity and Tracking Problems That Affect SNMP Performance on a Device Running Junos OS on page 363](#)
- [Tracing SNMP Activity on a Device Running Junos OS on page 369](#)
- [Example: Tracing SNMP Activity on page 373](#)

Monitoring SNMP Activity and Tracking Problems That Affect SNMP Performance on a Device Running Junos OS

The following sections contain information about monitoring the SNMP activity on devices running the Junos OS and identifying problems that might impact the SNMP performance on devices running Junos OS:

- [Checking for MIB Objects Registered with the snmpd on page 363](#)
- [Tracking SNMP Activity on page 365](#)
- [Monitoring SNMP Statistics on page 367](#)
- [Checking CPU Utilization on page 367](#)
- [Checking Kernel and Packet Forwarding Engine Response on page 368](#)

Checking for MIB Objects Registered with the snmpd

For the SNMP process to be able to access data related to a MIB object, the MIB object must be registered with the snmpd. When an SNMP subagent comes online, it tries to register the associated MIB objects with the snmpd. The snmpd maintains a mapping of the objects and the subagents with which the objects are associated. However, the registration attempt fails occasionally, and the objects remain unregistered with the snmpd until the next time the subagent restarts and successfully registers the objects.

When a network management system polls for data related to objects that are not registered with the snmpd, the snmpd returns either a **noSuchName** error (for SNMPv1 objects) or a **noSuchObject** error (for SNMPv2 objects).

You can use the following commands to check for MIB objects that are registered with the snmpd:

- **show snmp registered-objects**—Creates a `/var/log/snmp_reg_objs` file that contains the list of registered objects and their mapping to various subagents.

- **file show /var/log/snmp_reg_objs**—Displays the contents of the `/var/log/snmp_reg_objs` file.

The following example shows the steps for creating and displaying the `/var/log/snmp_reg_objs` file:

```
user@host> show snmp registered-objects
user@host> file show /var/log/snmp_reg_objs
```

```
-----
Registered MIB Objects
root_name =
-----
.1.2.840.10006.300.43.1.1.1.1.2 (dot3adAggMACAddress) (/var/run/mib2d-11)
.1.2.840.10006.300.43.1.1.1.1.3 (dot3adAggActorSystemPriority) (/var/run/mib2d-11)
.1.2.840.10006.300.43.1.1.1.1.4 (dot3adAggActorSystemID) (/var/run/mib2d-11)
.1.2.840.10006.300.43.1.1.1.1.5 (dot3adAggAggregateOrIndividual)
(/var/run/mib2d-11)
.1.2.840.10006.300.43.1.1.1.1.6 (dot3adAggActorAdminKey) (/var/run/mib2d-11)
.1.2.840.10006.300.43.1.1.1.1.7 (dot3adAggActorOperKey) (/var/run/mib2d-11)
.1.2.840.10006.300.43.1.1.1.1.8 (dot3adAggPartnerSystemID) (/var/run/mib2d-11)
.1.2.840.10006.300.43.1.1.1.1.9 (dot3adAggPartnerSystemPriority)
(/var/run/mib2d-11)
.1.2.840.10006.300.43.1.1.1.1.10 (dot3adAggPartnerOperKey) (/var/run/mib2d-11)
.1.2.840.10006.300.43.1.1.1.1.11 (dot3adAggCollectorMaxDelay) (/var/run/mib2d-11)
.1.2.840.10006.300.43.1.1.2.1.1 (dot3adAggPortListPorts) (/var/run/mib2d-11)
.1.2.840.10006.300.43.1.2.1.1.2 (dot3adAggPortActorSystemPriority)
(/var/run/mib2d-11)
.1.2.840.10006.300.43.1.2.1.1.3 (dot3adAggPortActorSystemID) (/var/run/mib2d-11)
.1.2.840.10006.300.43.1.2.1.1.4 (dot3adAggPortActorAdminKey) (/var/run/mib2d-11)
.1.2.840.10006.300.43.1.2.1.1.5 (dot3adAggPortActorOperKey) (/var/run/mib2d-11)
.1.2.840.10006.300.43.1.2.1.1.6 (dot3adAggPortPartnerAdminSystemPriority)
(/var/run/mib2d-11)
.1.2.840.10006.300.43.1.2.1.1.7 (dot3adAggPortPartnerOperSystemPriority)
(/var/run/mib2d-11)
.1.2.840.10006.300.43.1.2.1.1.8 (dot3adAggPortPartnerAdminSystemID)
(/var/run/mib2d-11)
.1.2.840.10006.300.43.1.2.1.1.9 (dot3adAggPortPartnerOperSystemID)
(/var/run/mib2d-11)
.1.2.840.10006.300.43.1.2.1.1.10 (dot3adAggPortPartnerAdminKey) (/var/run/mib2d-11)
.1.2.840.10006.300.43.1.2.1.1.11 (dot3adAggPortPartnerOperKey) (/var/run/mib2d-11)
.1.2.840.10006.300.43.1.2.1.1.12 (dot3adAggPortSelectedAggID) (/var/run/mib2d-11)
---(more)---
```



NOTE: The `/var/log/snmp_reg_objs` file contains only those objects that are associated with the Junos OS processes that are up and running and registered with the `snmpd`, at the time of executing the `show snmp registered-objects` command. If a MIB object related to a Junos OS process that is up and running is not shown in the list of registered objects, you might want to restart the software process to retry object registration with the `snmpd`.

A sample **traceoptions** configuration might look like:

When the **traceoptions** flag all statement is included at the **[edit snmp]** hierarchy level, the following log files are created:

- You can use the **show log log-filename** operational mode command to view the contents of the log file. In the snmpd log file (see the following example), a sequence of >>> represents an incoming packet, whereas a sequence of <<< represents an outgoing packet. Note that the request response pair might not follow any sequence if there are multiple network management systems polling the device at the same time. You can use the source and request ID combinations to match requests and responses. However, note that no response log is created in the log file if the SNMP master agent or the SNMP subagent has not responded to a request.

Reviewing a Log File

The following example shows the output for the **show log snmpd** command:

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Monitoring SNMP Statistics

The **show snmp statistics extensive** operational mode command provides you with an option to review SNMP traffic, including traps, on a device. Output for the **show snmp statistics extensive** command shows real-time values and can be used to monitor values such as throttle drops, currently active, max active, not found, time out, max latency, current queued, total queued, and overflows. You can identify slowness in SNMP responses by monitoring the currently active count, because a constant increase in the currently active count is directly linked to slow or no response to SNMP requests.

Sample Output for the show snmp statistics extensive Command

```
user@host> show snmp statistics extensive
```

```
SNMP statistics:
Input:
  Packets: 226656, Bad versions: 0, Bad community names: 0,
  Bad community uses: 0, ASN parse errors: 0,
  Too big: 0, No such names: 0, Bad values: 0,
  Read only: 0, General errors: 0,
  Total request varbinds: 1967606, Total set varbinds: 0,
  Get requests: 18478, Get nexts: 75794, Set requests: 0,
  Get responses: 0, Traps: 0,
  Silent drops: 0, Proxy drops: 0, Commit pending drops: 0,
  Throttle drops: 27084, Duplicate request drops: 0
V3 Input:
  Unknown security models: 0, Invalid messages: 0
  Unknown pdu handlers: 0, Unavailable contexts: 0
  Unknown contexts: 0, Unsupported security levels: 0
  Not in time windows: 0, Unknown user names: 0
  Unknown engine ids: 0, Wrong digests: 0, Decryption errors: 0
Output:
  Packets: 226537, Too big: 0, No such names: 0,
  Bad values: 0, General errors: 0,
  Get requests: 0, Get nexts: 0, Set requests: 0,
  Get responses: 226155, Traps: 382
SA Control Blocks:
  Total: 222984, Currently Active: 501, Max Active: 501,
  Not found: 0, Timed Out: 0, Max Latency: 25
SA Registration:
  Registers: 0, Deregisters: 0, Removes: 0
Trap Queue Stats:
  Current queued: 0, Total queued: 0, Discards: 0, Overflows: 0
Trap Throttle Stats:
  Current throttled: 0, Throttles needed: 0
Snmp Set Stats:
  Commit pending failures: 0, Config lock failures: 0
  Rpc failures: 0, Journal write failures: 0
  Mgd connect failures: 0, General commit failures: 0
```

Checking CPU Utilization

High CPU usage of the software processes that are being queried, such as `snmpd` or `mib2d`, is another factor that can lead to slow response or no response. You can use the **show system processes extensive** operational mode command to check the CPU usage levels of the Junos OS processes.

Sample Output of show system processes extensive Command

```
user@host> show system processes extensive
```

```
last pid: 1415; load averages: 0.00, 0.00, 0.00 up 0+02:20:54 10:26:25
117 processes: 2 running, 98 sleeping, 17 waiting
```

```
Mem: 180M Active, 54M Inact, 39M Wired, 195M Cache, 69M Buf, 272M Free
```

```
Swap: 1536M Total, 1536M Free
```

PID	USERNAME	THR	PRI	NICE	SIZE	RES	STATE	TIME	WCPU	COMMAND
11	root	1	171	52	OK	12K	RUN	132:09	95.21%	idle
1184	root	1	97	0	35580K	9324K	select	4:16	1.61%	chassisd
177	root	1	-8	0	OK	12K	mdwait	0:51	0.00%	md7
119	root	1	-8	0	OK	12K	mdwait	0:20	0.00%	md4
13	root	1	-20	-139	OK	12K	WAIT	0:16	0.00%	swi7: clock sio
1373	root	1	96	0	15008K	12712K	select	0:09	0.00%	snmpd
1371	root	1	96	0	9520K	5032K	select	0:08	0.00%	jdiameterd
12	root	1	-40	-159	OK	12K	WAIT	0:07	0.00%	swi2: net
1375	root	2	96	0	15016K	5812K	select	0:06	0.00%	pfed
49	root	1	-8	0	OK	12K	mdwait	0:05	0.00%	md0
1345	root	1	96	0	10088K	4480K	select	0:05	0.00%	l2ald
1181	root	1	96	0	1608K	908K	select	0:05	0.00%	bslockd
23	root	1	-68	-187	OK	12K	WAIT	0:04	0.00%	irq10: fxp1
30	root	1	171	52	OK	12K	pgzero	0:04	0.00%	pagezero
1344	root	1	4	0	39704K	11444K	kqread	0:03	0.00%	rpd
1205	root	1	96	0	3152K	912K	select	0:03	0.00%	license-check
1372	root	1	96	0	28364K	6696K	select	0:03	0.00%	dcd
1374	root	1	96	0	11764K	7632K	select	0:02	0.00%	mib2d
1405	user	1	96	0	15892K	11132K	select	0:02	0.00%	cli
139	root	1	-8	0	OK	12K	mdwait	0:02	0.00%	md5
22	root	1	-80	-199	OK	12K	WAIT	0:02	0.00%	irq9: cbb1 fxp0
1185	root	1	96	0	4472K	2036K	select	0:02	0.00%	alarmd
4	root	1	-8	0	OK	12K	-	0:02	0.00%	g_down
3	root	1	-8	0	OK	12K	-	0:02	0.00%	g_up
43	root	1	-16	0	OK	12K	psleep	0:02	0.00%	vmkmemdaemon
1377	root	1	96	0	3776K	2256K	select	0:01	0.00%	irsd
48	root	1	-16	0	OK	12K	-	0:01	0.00%	schedcpu
99	root	1	-8	0	OK	12K	mdwait	0:01	0.00%	md3
953	root	1	96	0	4168K	2428K	select	0:01	0.00%	eventd
1364	root	1	96	0	4872K	2808K	select	0:01	0.00%	cfmd
15	root	1	-16	0	OK	12K	-	0:01	0.00%	yarrow
1350	root	1	96	0	31580K	7248K	select	0:01	0.00%	cosd
1378	root	1	96	0	19776K	6292K	select	0:01	0.00%	lpdfd

```
...
```

Checking Kernel and Packet Forwarding Engine Response

As mentioned in [“Understanding SNMP Implementation in Junos OS” on page 75](#), some SNMP MIB data are maintained by the kernel or Packet Forwarding Engine. For such data to be available for the network management system, the kernel has to provide the required information to the SNMP subagent in mib2d. A slow response from the kernel can cause a delay in mib2d returning the data to the network management system. Junos OS adds an entry in the mib2d log file every time that an interface takes more than 10,000 microseconds to respond to a request for interface statistics. You can use the **show log**

log-filename | grep "kernel response time" command to find out the response time taken by the kernel.

Checking the Kernel Response Time

```
user@host> show log mib2d | grep "kernel response time"

Aug 17 22:39:37 == kernel response time for
COS_IPVPN_DEFAULT_OUTPUT-t1-7/3/0:10:27.0-o: 9.126471 sec, range
(0.000007, 11.000806)

Aug 17 22:39:53 == kernel response time for
COS_IPVPN_DEFAULT_INPUT-t1-7/2/0:5:15.0-i: 5.387321 sec, range
(0.000007, 11.000806)

Aug 17 22:39:53 == kernel response time for ct1-6/1/0:9:15: 0.695406
sec, range (0.000007, 11.000806)

Aug 17 22:40:04 == kernel response time for t1-6/3/0:6:19: 1.878542
sec, range (0.000007, 11.000806)

Aug 17 22:40:22 == kernel response time for lsq-7/0/0: 2.556592 sec,
range (0.000007, 11.000806)
```

Related Documentation

- [Understanding SNMP Implementation in Junos OS on page 75](#)
- [Best Practices for Configuring SNMP on page 199](#)
- [Optimizing the Network Management System Configuration for the Best Results on page 196](#)
- [Configuring Options on Managed Devices for Better SNMP Response Time on page 197](#)
- [Managing Traps and Informs on page 111](#)
- [Using the Enterprise-Specific Utility MIB to Enhance SNMP Coverage on page 265](#)

Tracing SNMP Activity on a Device Running Junos OS

SNMP tracing operations track activity for SNMP agents and record the information in log files. The logged error descriptions provide detailed information to help you solve problems faster.

By default, Junos OS does not trace any SNMP activity. If you include the **traceoptions** statement at the **[edit snmp]** hierarchy level, the default tracing behavior is:

- Important activities are logged in files located in the **/var/log** directory. Each log is named after the SNMP agent that generates it. Currently, the following log files are created in the **/var/log** directory when the **traceoptions** statement is used:
 - chassisd
 - craftd
 - ilmid
 - mib2d

- `rmopd`
- `serviced`
- `snmpd`
- When a trace file named *filename* reaches its maximum size, it is renamed *filename.0*, then *filename.1*, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten. (For more information about how log files are created, see the [System Log Explorer](#).)
- Log files can be accessed only by the user who configured the tracing operation.

You cannot change the directory (`/var/log`) in which trace files are located. However, you can customize the other trace file settings by including the following statements at the `[edit snmp]` hierarchy level:

```
[edit snmp]
traceoptions {
  file <files number> <match regular-expression> <size size> <world-readable |
    no-world-readable>;
  flag flag;
  memory-trace;
  no-remote-trace;
  no-default-memory-trace;
}
```

These statements are described in the following sections:

- [Configuring the Number and Size of SNMP Log Files on page 370](#)
- [Configuring Access to the Log File on page 371](#)
- [Configuring a Regular Expression for Lines to Be Logged on page 371](#)
- [Configuring the Trace Operations on page 371](#)

Configuring the Number and Size of SNMP Log Files

By default, when the trace file reaches 128 kilobytes (KB) in size, it is renamed *filename.0*, then *filename.1*, and so on, until there are three trace files. Then the oldest trace file (*filename.2*) is overwritten.

You can configure the limits on the number and size of trace files by including the following statements at the `[edit snmp traceoptions]` hierarchy level:

```
[edit snmp traceoptions]
file files number size size;
```

For example, set the maximum file size to 2 MB, and the maximum number of files to 20. When the file that receives the output of the tracing operation (*filename*) reaches 2 MB, *filename* is renamed *filename.0*, and a new file called *filename* is created. When the new *filename* reaches 2 MB, *filename.0* is renamed *filename.1* and *filename* is renamed *filename.0*. This process repeats until there are 20 trace files. Then the oldest file (*filename.19*) is overwritten by the newest file (*filename.0*).

The number of files can be from 2 through 1000 files. The file size of each file can be from 10 KB through 1 gigabyte (GB).

Configuring Access to the Log File

By default, log files can be accessed only by the user who configured the tracing operation.

To specify that any user can read all log files, include the **file world-readable** statement at the **[edit snmp traceoptions]** hierarchy level:

```
[edit snmp traceoptions]
file world-readable;
```

To explicitly set the default behavior, include the **file no-world-readable** statement at the **[edit snmp traceoptions]** hierarchy level:

```
[edit snmp traceoptions]
file no-world-readable;
```

Configuring a Regular Expression for Lines to Be Logged

By default, the trace operation output includes all lines relevant to the logged activities.

You can refine the output by including the **match** statement at the **[edit snmp traceoptions file filename]** hierarchy level and specifying a regular expression (regex) to be matched:

```
[edit snmp traceoptions]
file filename match regular-expression;
```

Configuring the Trace Operations

By default, only important activities are logged. You can specify which trace operations are to be logged by including the following **flag** statement (with one or more tracing flags) at the **[edit snmp traceoptions]** hierarchy level:

```
[edit snmp traceoptions]
flag {
  all;
  configuration;
  database;
  events;
  general;
  interface-stats;
  nonvolatile-sets;
  pdu;
  policy;
  protocol-timeouts;
  routing-socket;
  server;
  subagent;
  timer;
  varbind-error;
}
```

Table 38 on page 372 describes the meaning of the SNMP tracing flags.

Table 38: SNMP Tracing Flags

Flag	Description	Default Setting
all	Log all operations.	Off
configuration	Log reading of the configuration at the [edit snmp] hierarchy level.	Off
database	Log events involving storage and retrieval in the events database.	Off
events	Log important events.	Off
general	Log general events.	Off
interface-stats	Log physical and logical interface statistics.	Off
nonvolatile-set	Log nonvolatile SNMP set request handling.	Off
pdu	Log SNMP request and response packets.	Off
policy	Log policy processing.	Off
protocol-timeouts	Log SNMP response timeouts.	Off
routing-socket	Log routing socket calls.	Off
server	Log communication with processes that are generating events.	Off
subagent	Log subagent restarts.	Off
timer	Log internal timer events.	Off
varbind-error	Log variable binding errors.	Off

To display the end of the log for an agent, issue the **show log agentd | last** operational mode command:

```
[edit]
user@host# run show log agentd | last
```

where **agent** is the name of an SNMP agent.

Related Documentation

- [Example: Tracing SNMP Activity on page 373](#)
- [Configuring SNMP on page 192](#)

Example: Tracing SNMP Activity

Trace information about SNMP packets:

```
[edit]
snmp {
  traceoptions {
    file size 10k files 5;
    flag pdu;
    flag protocol-timeouts;
    flag varbind-error;
  }
}
```

**Related
Documentation**

- [Tracing SNMP Activity on a Device Running Junos OS on page 369](#)
- [Configuration Statements at the \[edit snmp\] Hierarchy Level on page 188](#)

PART 5

Remote Monitoring (RMON) with SNMP Alarms and Events

- [RMON Overview on page 377](#)
- [Using RMON to Monitor Network Service Quality on page 399](#)
- [Health Monitoring with SNMP on page 425](#)

CHAPTER 14

RMON Overview

- [Understanding RMON on page 377](#)
- [Understanding RMON Alarms on page 379](#)
- [Understanding RMON Events on page 380](#)
- [Understanding RMON Alarms and Events Configuration on page 381](#)
- [RMON MIB Event, Alarm, Log, and History Control Tables on page 382](#)
- [Minimum RMON Alarm and Event Entry Configuration on page 384](#)
- [Configuring an RMON Alarm Entry and Its Attributes on page 385](#)
- [Configuring an RMON Event Entry and Its Attributes on page 389](#)
- [Example: Configuring an RMON Alarm and Event Entry on page 390](#)
- [Configuring RMON History Sampling on page 391](#)
- [Using alarmTable to Monitor MIB Objects on page 392](#)
- [Using eventTable to Log Alarms on page 396](#)

Understanding RMON

- [RMON Overview on page 377](#)
- [Alarm Thresholds and Events on page 378](#)

RMON Overview

The Junos OS supports the *Remote Network Monitoring* (RMON) MIB (RFC 2819), which allows a management device to monitor the values of MIB objects, or variables, against configured thresholds. When the value of a variable crosses a threshold, an alarm and its corresponding event are generated. The event can be logged and can generate an SNMP trap.

An operational support system (OSS) or a fault-monitoring system can be used to automatically monitor events that track many different metrics, including performance, availability, faults, and environmental data. For example, an administrator might want to know when the internal temperature of a chassis has risen above a configured threshold, which might indicate that a chassis fan tray is faulty, the chassis air flow is impeded, or the facility cooling system in the vicinity of the chassis is not operating normally.

The RMON MIB also defines tables that store various statistics for Ethernet interfaces, including the **etherStatsTable** and the **etherHistoryTable**. The **etherStatsTable** contains cumulative real-time statistics for Ethernet interfaces, such as the number of unicast, multicast, and broadcast packets received on an interface. The **etherHistoryTable** maintains a historical sample of statistics for Ethernet interfaces. The control of the **etherHistoryTable**, including the interfaces to track and the sampling interval, is defined by the RMON **historyControlTable**.

To enable RMON alarms, you perform the following steps:

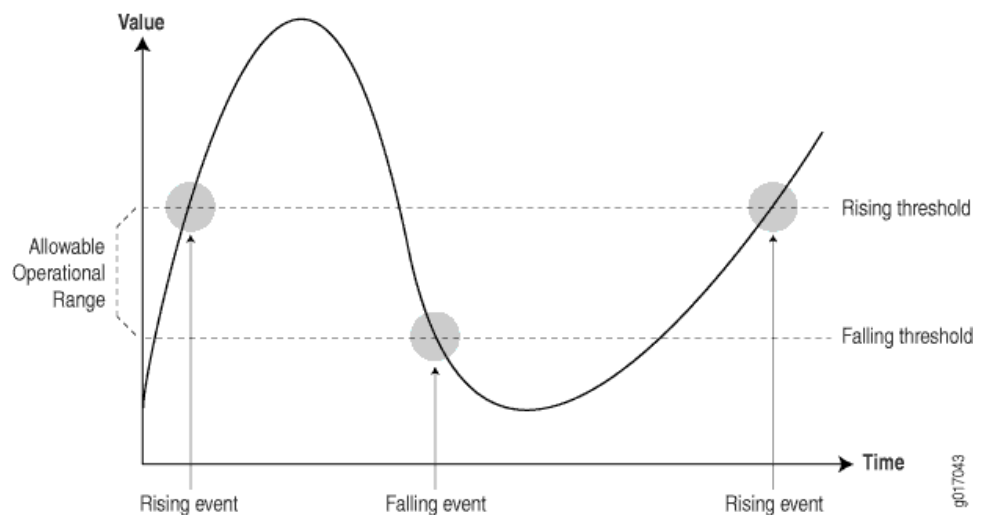
1. Configure SNMP, including trap groups. You configure SNMP at the **[edit snmp]** hierarchy level.
2. Configure rising and falling events in the **eventTable**, including the event types and trap groups. You can also configure events using the CLI at the **[edit snmp rmon event]** hierarchy level.
3. Configure alarms in the **alarmTable**, including the variables to monitor, rising and falling thresholds, the sampling types and intervals, and the corresponding events to generate when alarms occur. You can also configure alarms using the CLI at the **[edit snmp rmon alarm]** hierarchy level.

Extensions to the **alarmTable** are defined in the Juniper Networks enterprise-specific MIB **jnxRmon** (mib-jnx-rmon.txt).

Alarm Thresholds and Events

By setting a rising and a falling threshold for a monitored variable, you can be alerted whenever the value of the variable falls outside the allowable operational range (see [Figure 6 on page 378](#)).

Figure 6: Setting Thresholds



Events are only generated when the alarm threshold is first crossed in any one direction rather than after each sample interval. For example, if a rising threshold alarm, along with its corresponding event, is raised, no more threshold crossing events occur until a

corresponding falling alarm occurs. This considerably reduces the quantity of events that are produced by the system, making it easier for operations staff to react when events do occur.

Before you configure remote monitoring, you should identify what variables need to be monitored and their allowable operational range. This requires some period of baselining to determine the allowable operational ranges. An initial baseline period of at least 3 months is not unusual when you first identify the operational ranges and define thresholds, but baseline monitoring should continue over the life span of each monitored variable.

- Related Documentation**
- [Configuring RMON Alarms and Events on page 276](#)
 - [Juniper Networks Enterprise-Specific MIBs](#)
 - [RMON MIB Event, Alarm, Log, and History Control Tables on page 382](#)

Understanding RMON Alarms

An RMON alarm identifies:

- A specific MIB object that is monitored.
- The frequency of sampling.
- The method of sampling.
- The thresholds against which the monitored values are compared.

An RMON alarm can also identify a specific **eventTable** entry to be triggered when a threshold is crossed.

Configuration and operational values are defined in **alarmTable** in RFC 2819. Additional operational values are defined in Juniper Networks enterprise-specific extensions to **alarmTable** (**jnxRmonAlarmTable**).

This topic covers the following sections:

- [alarmTable on page 379](#)
- [jnxRmonAlarmTable on page 380](#)

alarmTable

alarmTable in the RMON MIB allows you to monitor and poll the following:

- **alarmIndex**—The index value for **alarmTable** that identifies a specific entry.
- **alarmInterval**—The interval, in seconds, over which data is sampled and compared with the rising and falling thresholds.
- **alarmVariable**—The MIB variable that is monitored by the alarm entry.
- **alarmSampleType**—The method of sampling the selected variable and calculating the value to be compared against the thresholds.

- **alarmValue**—The value of the variable during the last sampling period. This value is compared with the rising and falling thresholds.
- **alarmStartupAlarm**—The alarm sent when the entry is first activated.
- **alarmRisingThreshold**—The upper threshold for the sampled variable.
- **alarmFallingThreshold**—The lower threshold for the sampled variable.
- **alarmRisingEventIndex**—The **eventTable** entry used when a rising threshold is crossed.
- **alarmFallingEventIndex**—The **eventTable** entry used when a falling threshold is crossed.
- **alarmStatus**—Method for adding and removing entries from the table. It can also be used to change the state of an entry to allow modifications.



NOTE: If this object is not set to valid, the associated event alarm does not take any action.

jnxRmonAlarmTable

The **jnxRmonAlarmTable** is a Juniper Networks enterprise-specific extension to **alarmTable**. It provides additional operational information and includes the following objects:

- **jnxRmonAlarmGetFailCnt**—The number of times the internal **Get** request for the variable monitored by this entry has failed.
- **jnxRmonAlarmGetFailTime**—The value of **sysUpTime** when an internal **Get** request for the variable monitored by this entry last failed.
- **jnxRmonAlarmGetFailReason**—The reason an internal **Get** request for the variable monitored by this entry last failed.
- **jnxRmonAlarmGetOkTime**—The value of **sysUpTime** when an internal **Get** request for the variable monitored by this entry succeeded and the entry left the **getFailure** state.
- **jnxRmonAlarmState**—The current state of this RMON alarm entry.

To view the Juniper Networks enterprise-specific extensions to the RMON Events and Alarms and Event MIB, see
https://www.juniper.net/documentation/en_US/junos16.1/topics/reference/mibs/mib-jnx-rmon.txt.

Related Documentation

- [Understanding RMON Events on page 380](#)
- [Configuring an RMON Alarm Entry and Its Attributes on page 385](#)
- [Using alarmTable to Monitor MIB Objects on page 392](#)

Understanding RMON Events

An RMON event allows you to log the crossing of thresholds of other MIB objects. It is defined in **eventTable** for the RMON MIB.

This section covers the following topics:

- [eventTable on page 381](#)

eventTable

eventTable contains the following objects:

- **eventIndex**—An index that uniquely identifies an entry in **eventTable**. Each entry defines one event that is generated when the appropriate conditions occur.
- **eventDescription**—A comment describing the event entry.
- **eventType**—Type of notification that the probe makes about this event.
- **eventCommunity**—Trap group used if an SNMP trap is to be sent. If **eventCommunity** is not configured, a trap is sent to each trap group configured with the **rmon-alarm** category.
- **eventLastTimeSent**—Value of **sysUpTime** when this event entry last generated an event.
- **eventOwner**—Any text string specified by the creating management application or the command-line interface (CLI). Typically, it is used to identify a network manager (or application) and can be used for fine access control between participating management applications.
- **eventStatus**—Status of this event entry.



NOTE: If this object is not set to valid, no action is taken by the associated event entry. When this object is set to valid, all previous log entries associated with this entry (if any) are deleted.

Related Documentation

- [Understanding RMON Alarms on page 379](#)
- [Configuring an RMON Event Entry and Its Attributes on page 389](#)

Understanding RMON Alarms and Events Configuration

Junos OS supports monitoring routers from remote devices. These values are measured against thresholds and trigger events when the thresholds are crossed. You configure remote monitoring (RMON) alarm and event entries to monitor the value of a MIB object.

To configure RMON alarm and event entries, you include statements at the **[edit snmp]** hierarchy level of the configuration:

```
[edit snmp]
rmon {
  alarm index {
    description text-description;
    falling-event-index index;
```

```

    falling-threshold integer;
    falling-threshold-interval seconds;
    interval seconds;
    rising-event-index index;
    rising-threshold integer;
    request-type (get-next-request | get-request | walk-request);
    sample-type (absolute-value | delta-value);
    startup-alarm (falling-alarm | rising-alarm | rising-or-falling-alarm);
    syslog-subtag syslog-subtag;
    variable oid-variable;
}
event index {
    community community-name;
    description description;
    type type;
}
}

```

Related Documentation

- [Understanding RMON Alarms on page 379](#)
- [Understanding RMON Events on page 380](#)
- [Configuring an RMON Alarm Entry and Its Attributes on page 385](#)
- [Configuring an RMON Event Entry and Its Attributes on page 389](#)

RMON MIB Event, Alarm, Log, and History Control Tables

The Junos OS supports the *Remote Network Monitoring* (RMON) MIB (RFC 2819), which allows a management device to monitor the values of MIB objects, or variables, against configured thresholds. When the value of a variable crosses a threshold, an alarm and its corresponding event are generated. The event can be logged and can generate an SNMP trap.

[Table 39 on page 382](#) provides each field in the RMON eventTable, the description of the field, and the corresponding Junos OS statement that you can use to configure the field. The Junos OS statements reside at the `[edit snmp rmon]` hierarchy level.

Table 39: RMON Event Table

Field	Description	Statement [edit snmp rmon]
eventDescription	Text description of this event.	description
eventType	Type of event (for example, log, trap, or log and trap).	type
eventCommunity	Trap group to which to send this event, as defined in the Junos OS configuration. (This is not the same as the SNMP community.)	community
eventOwner	Entity (for example, manager) that created this event.	—

Table 39: RMON Event Table (continued)

Field	Description	Statement [edit snmp rmon]
eventStatus	Status of this row (for example, valid, invalid, or createRequest).	—

Table 40 on page 383 provides each field in the RMON alarmTable, the description of the field, and the corresponding Junos OS statement that you can use to configure the field. The Junos OS statements reside at the **[edit snmp rmon]** hierarchy level.

Table 40: RMON Alarm Table

Field	Description	Statement [edit snmp rmon]
alarmStatus	Status of this row (for example, valid, invalid, or createRequest)	—
alarmInterval	Sampling period (in seconds) of the monitored variable	interval
alarmVariable	Object identifier (OID) and instance of the variable to be monitored	—
alarmValue	Actual value of the sampled variable	—
alarmSampleType	Sample type (absolute or delta changes)	sample-type
alarmStartupAlarm	Initial alarm (rising, falling, or either)	startup-alarm
alarmRisingThreshold	Rising threshold against which to compare the value	rising-threshold
alarmFallingThreshold	Falling threshold against which to compare the value	falling-threshold
alarmRisingEventIndex	Index (row) of the rising event in the event table	rising-event-index
alarmFallingEventIndex	Index (row) of the falling event in the event table	falling-event-index

Table 41 on page 383 provides each field in the jnxRmon jnxRmonAlarmTable, which is an extension to the RMON alarmTable. You can troubleshoot the RMON agent, rmopd, that runs on a switch by inspecting the contents of the jnxRmonAlarmTable object.

Table 41: jnxRmon Alarm Table

Field	Description
jnxRmonAlarmGetFailCnt	Number of times the internal Get request for the variable failed
jnxRmonAlarmGetFailTime	Value of the sysUpTime object when the last failure occurred
jnxRmonAlarmGetFailReason	Reason why the Get request failed

Table 41: jnxRmon Alarm Table (continued)

Field	Description
jnxRmonAlarmGetOkTime	Value of the sysUpTime object when the variable moved out of failure state
jnxRmonAlarmState	Status of this alarm entry

Table 42 on page 384 provides each field in the RMON historyControlTable, the description of the field, and the corresponding Junos OS statement that you can use to configure the field. The Junos OS statements reside at the **[edit snmp rmon history]** hierarchy level. The historyControlTable controls the RMON etherHistoryTable.

Table 42: RMON History Control Table

Field	Description	Statement [edit snmp rmon history]
historyControlDataSource	Identifies the source of the data for which historical data was collected.	interface
historyControlBucketsRequested	Requested number of discrete time intervals over which data is to be saved.	bucket-size
historyControlBucketsGranted	Number of discrete sampling intervals over which data is to be saved.	—
historyControlInterval	Interval, in seconds, over which the data is sampled for each bucket.	interval
historyControlOwner	Entity that configured this entry.	owner
historyControlStatus	Status of this entry.	—

Related Documentation

- [Configuring RMON Alarms and Events on page 276](#)
- [Juniper Networks Enterprise-Specific MIBs](#)
- [Understanding RMON on page 377](#)

Minimum RMON Alarm and Event Entry Configuration

To enable RMON on the router, you must configure an alarm entry and an event entry. To do this, include the following statements at the **[edit snmp rmon]** hierarchy level:

```
[edit snmp rmon]
alarm index {
  rising-event-index index;
  rising-threshold integer;
  sample-type type;
  variable oid-variable;
```

```
}
event index;
```

**Related
Documentation**

- [Understanding RMON Alarms and Events Configuration on page 381](#)
- [Configuring an RMON Alarm Entry and Its Attributes on page 385](#)
- [Configuring an RMON Event Entry and Its Attributes on page 389](#)

Configuring an RMON Alarm Entry and Its Attributes

An alarm entry monitors the value of a MIB variable. You can configure how often the value is sampled, the type of sampling to perform, and what event to trigger if a threshold is crossed.

This section discusses the following topics:

- [Configuring the Alarm Entry on page 385](#)
- [Configuring the Description on page 386](#)
- [Configuring the Falling Event Index or Rising Event Index on page 386](#)
- [Configuring the Falling Threshold or Rising Threshold on page 386](#)
- [Configuring the Interval on page 387](#)
- [Configuring the Falling Threshold Interval on page 387](#)
- [Configuring the Request Type on page 387](#)
- [Configuring the Sample Type on page 388](#)
- [Configuring the Startup Alarm on page 388](#)
- [Configuring the System Log Tag on page 389](#)
- [Configuring the Variable on page 389](#)

Configuring the Alarm Entry

An alarm entry monitors the value of a MIB variable. The **rising-event-index**, **rising-threshold**, **sample-type**, and **variable** statements are mandatory. All other statements are optional.

To configure the alarm entry, include the **alarm** statement and specify an index at the **[edit snmp rmon]** hierarchy level:

```
[edit snmp rmon]
alarm index {
  description description;
  falling-event-index index;
  falling-threshold integer;
  falling-threshold-interval seconds;
  interval seconds;
  rising-event-index index;
  rising-threshold integer;
  sample-type (absolute-value | delta-value);
```

```
startup-alarm (falling-alarm | rising alarm | rising-or-falling-alarm);  
variable oid-variable;  
}
```

index is an integer that identifies an alarm or event entry.

Configuring the Description

The description is a text string that identifies the alarm entry.

To configure the description, include the **description** statement and a description of the alarm entry at the **[edit snmp rmon alarm *index*]** hierarchy level:

```
[edit snmp rmon alarm index]  
description description;
```

Configuring the Falling Event Index or Rising Event Index

The falling event index identifies the event entry that is triggered when a falling threshold is crossed. The rising event index identifies the event entry that is triggered when a rising threshold is crossed.

To configure the falling event index or rising event index, include the **falling-event-index** or **rising-event-index** statement and specify an index at the **[edit snmp rmon alarm *index*]** hierarchy level:

```
[edit snmp rmon alarm index]  
falling-event-index index;  
rising-event-index index;
```

index can be from 0 through 65,535. The default for both the falling and rising event index is 0.

Configuring the Falling Threshold or Rising Threshold

The falling threshold is the lower threshold for the monitored variable. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval is greater than this threshold, a single event is generated. A single event is also generated if the first sample after this entry becomes valid is less than or equal to this threshold, and the associated startup alarm is equal to **falling-alarm** or **rising-or-falling-alarm**. After a falling event is generated, another falling event cannot be generated until the sampled value rises above this threshold and reaches the rising threshold. You must specify the falling threshold as an integer. Its default is 20 percent less than the rising threshold.

By default, the rising threshold is 0. The rising threshold is the upper threshold for the monitored variable. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval is less than this threshold, a single event is generated. A single event is also generated if the first sample after this entry becomes valid is greater than or equal to this threshold, and the associated **startup-alarm** is equal to **rising-alarm** or **rising-or-falling-alarm**. After a rising event is generated, another

rising event cannot be generated until the sampled value falls below this threshold and reaches the falling threshold. You must specify the rising threshold as an integer.

To configure the falling threshold or rising threshold, include the **falling-threshold** or **rising-threshold** statement at the **[edit snmp rmon alarm index]** hierarchy level:

```
[edit snmp rmon alarm index]
falling-threshold integer;
rising-threshold integer;
```

integer can be a value from -2,147,483,647 through 2,147,483,647.

Configuring the Interval

The interval represents the period of time, in seconds, over which the monitored variable is sampled and compared with the rising and falling thresholds.

To configure the interval, include the **interval** statement and specify the number of seconds at the **[edit snmp rmon alarm index]** hierarchy level:

```
[edit snmp rmon alarm index]
interval seconds;
```

seconds can be a value from 1 through 2,147,483,647. The default is 60 seconds.

Configuring the Falling Threshold Interval

The falling threshold interval represents the interval between samples when the rising threshold is crossed. Once the alarm crosses the falling threshold, the regular sampling interval is used.



NOTE: You cannot configure the falling threshold interval for alarms that have the request type set to **walk-request**.

To configure the falling threshold interval, include the **falling-threshold-interval** statement at the **[edit snmp rmon alarm index]** hierarchy level and specify the number of seconds:

```
[edit snmp rmon alarm index]
falling-threshold-interval seconds;
```

seconds can be a value from 1 through 2,147,483,647. The default is 60 seconds.

Configuring the Request Type

By default an RMON alarm can monitor only one object instance (as specified in the configuration). You can configure a **request-type** statement to extend the scope of the RMON alarm to include all object instances belonging to a MIB branch or to include the next object instance after the instance specified in the configuration.

To configure the request type, include the **request-type** statement at the **[edit snmp rmon alarm index]** hierarchy level and specify **get-next-request**, **get-request**, or **walk-request**:

```
[edit snmp rmon alarm index]
request-type (get-next-request | get-request | walk-request);
```

walk extends the RMON alarm configuration to all object instances belonging to a MIB branch. **next** extends the RMON alarm configuration to include the next object instance after the instance specified in the configuration.

Configuring the Sample Type

The sample type identifies the method of sampling the selected variable and calculating the value to be compared against the thresholds. If the value of this object is **absolute-value**, the value of the selected variable is compared directly with the thresholds at the end of the sampling interval. If the value of this object is **delta-value**, the value of the selected variable at the last sample is subtracted from the current value, and the difference is compared with the thresholds.

To configure the sample type, include the **sample-type** statement and specify the type of sample at the **[edit snmp rmon alarm index]** hierarchy level:

```
[edit snmp rmon alarm index]
sample-type (absolute-value | delta-value);
```

- **absolute-value**—Actual value of the selected variable is compared against the thresholds.
- **delta-value**—Difference between samples of the selected variable is compared against the thresholds.

Configuring the Startup Alarm

The startup alarm identifies the type of alarm that can be sent when this entry is first activated. You can specify it as **falling-alarm**, **rising-alarm**, or **rising-or-falling-alarm**.

To configure the startup alarm, include the **startup-alarm** statement and specify the type of alarm at the **[edit snmp rmon alarm index]** hierarchy level:

```
[edit snmp rmon alarm index]
startup-alarm (falling-alarm | rising-alarm | rising-or-falling-alarm);
```

- **falling-alarm**—Generated if the first sample after the alarm entry becomes active is less than or equal to the falling threshold.
- **rising-alarm**—Generated if the first sample after the alarm entry becomes active is greater than or equal to the rising threshold.
- **rising-or-falling-alarm**—Generated if the first sample after the alarm entry becomes active satisfies either of the corresponding thresholds.

The default is **rising-or-falling-alarm**.

Configuring the System Log Tag

The **syslog-subtag** statement specifies the tag to be added to the system log message. You can specify a string of not more than 80 uppercase characters as the system log tag.

To configure the system log tag, include the **syslog-subtag** statement at the **[edit snmp rmon alarm index]** hierarchy level:

```
[edit snmp rmon alarm index]
syslog-subtag syslog-subtag;
```

Configuring the Variable

The variable identifies the MIB object that is being monitored.

To configure the variable, include the **variable** statement and specify the object identifier or object name at the **[edit snmp rmon alarm index]** hierarchy level:

```
[edit snmp rmon alarm index]
variable oid-variable;
```

oid-variable is a dotted decimal (for example, 1.3.6.1.2.1.2.1.2.1.10.1) or MIB object name (for example, ifInOctets.1).

- See Also**
- [Understanding RMON Alarms and Events Configuration on page 381](#)
 - [Understanding RMON Alarms on page 379](#)
 - [Understanding RMON Events on page 380](#)
 - [Configuring an RMON Event Entry and Its Attributes on page 389](#)
 - [Example: Configuring an RMON Alarm and Event Entry on page 390](#)

Configuring an RMON Event Entry and Its Attributes

An event entry generates a notification for an alarm entry when its rising or falling threshold is crossed. You can configure the type of notification that is generated. To configure the event entry, include the **event** statement at the **[edit snmp rmon]** hierarchy level. All statements except the **event** statement are optional.

```
[edit snmp rmon]
event index {
  community community-name;
  description description;
  type type;
}
```

index identifies an entry event.

community-name is the trap group that is used when generating a trap. If that trap group has the **rmon-alarm** trap category configured, a trap is sent to all the targets configured

for that trap group. The community string in the trap matches the name of the trap group. If nothing is configured, all the trap groups are examined, and traps are sent using each group with the **rmon-alarm** category set.

description is a text string that identifies the entry.

The **type** variable of an event entry specifies where the event is to be logged. You can specify the type as one of the following:

- **log**—Adds the event entry to the **logTable**.
- **log-and-trap**—Sends an SNMP trap and creates a log entry.
- **none**—Sends no notification.
- **snmptrap**—Sends an SNMP trap.

The default for the event entry type is **log-and-trap**.

**Related
Documentation**

- [Understanding RMON Alarms and Events Configuration on page 381](#)
- [Understanding RMON Alarms on page 379](#)
- [Understanding RMON Events on page 380](#)
- [Configuring an RMON Alarm Entry and Its Attributes on page 385](#)
- [Example: Configuring an RMON Alarm and Event Entry on page 390](#)

Example: Configuring an RMON Alarm and Event Entry

Configure an RMON alarm and event entry:

```
[edit snmp]
rmon {
  alarm 100 {
    description "input traffic on fxp0";
    falling-event-index 100;
    falling-threshold 10000;
    interval 60;
    rising-event-index 100;
    rising-threshold 100000;
    sample-type delta-value;
    startup-alarm rising-or-falling-alarm;
    variable ifInOctets.1;
  }
  event 100 {
    community bedrock;
    description "emergency events";
    type log-and-trap;
  }
}
```

- Related Documentation**
- [Understanding RMON Alarms and Events Configuration on page 381](#)
 - [Configuring an RMON Alarm Entry and Its Attributes on page 385](#)
 - [Configuring an RMON Event Entry and Its Attributes on page 389](#)

Configuring RMON History Sampling

The Junos OS supports the history control group (**etherHistoryTable**) of the *Remote Network Monitoring* (RMON) MIB (RFC 2819). The history control tables record statistical samples from an Ethernet network and store them for later retrieval.

To configure RMON history sampling and view or clear collected statistics using the Junos OS CLI, perform the following tasks:

- [Configuring RMON History Sampling Collection on page 391](#)
- [Viewing and Clearing RMON History Statistics on page 391](#)

Configuring RMON History Sampling Collection

Use the **history** statement at the **[edit snmp rmon]** hierarchy level to configure RMON history sampling collection parameters. The following parameters are required:

- **History index:** The history entry is identified by an integer history index value (**historyControlIndex** MIB field) specified when you configure this statement, which is used to display or clear collected results later.
- **Interface:** The interface to monitor for the specified history index. Only one interface can be associated with a particular RMON history index.

In addition to the required parameters, you can specify a custom sampling **interval** (in seconds) and the sampling **bucket-size** (number of discrete samples to be collected in a given interval).

```
[edit snmp]
user@switch# set rmon history history-index interface interface-name
user@switch# set rmon history history-index interval seconds
user@switch# set rmon history history-index bucket-size number
```

An optional tag (**owner**) associated with the history index can also be assigned to the collection.

Viewing and Clearing RMON History Statistics

Use the **show snmp rmon history** command to display collected RMON history table entries. You can also use the **show snmp mib walk** command to view RMON history table field samples.

The following sample RMON configuration sets up a history table sampling for interface xe-0/0/20.0 using a history index value of 1:

```
user@switch# show snmp | display set
```

```
set snmp rmon history 1 interface xe-0/0/20.0
set snmp rmon history 1 bucket-size 1000
set snmp rmon history 1 interval 5
set snmp rmon history 1 owner test
```

Using the **show snmp mib walk** command, you can see **etherHistoryPkts** field statistics collected for history index 1:

```
user@switch> show snmp mib walk etherHistoryPkts
etherHistoryPkts.1.1 = 0
<...>
etherHistoryPkts.1.148 = 10
etherHistoryPkts.1.149 = 14
```

To clear collected RMON history statistics, use the **clear snmp history** command. After clearing samples collected up to that point, collection continues again at the configured interval, and new samples are recorded. This command has options to clear collected samples of a particular configured history index or to clear all samples from all configured indices.

For example, the following command clears collected RMON history samples for history control index 1 configured above:

```
user@switch> clear snmp history 1
Samples collected are cleared.

user@switch> show snmp mib walk etherHistoryPkts | no-more

user@switch> show snmp mib walk etherHistoryPkts | no-more
etherHistoryPkts.1.1 = 0
```

Related Documentation

- [RMON MIB Event, Alarm, Log, and History Control Tables on page 382](#)

Using alarmTable to Monitor MIB Objects

To use **alarmTable** to monitor a MIB object, perform the following tasks:

- [Creating an Alarm Entry on page 393](#)
- [Configuring the Alarm MIB Objects on page 393](#)
- [Activating a New Row in alarmTable on page 395](#)
- [Modifying an Active Row in alarmTable on page 395](#)
- [Deactivating a Row in alarmTable on page 396](#)

Creating an Alarm Entry

To create an alarm entry, first create a new row in **alarmTable** using the **alarmStatus** object. For example, create alarm #1 using the UCD command-line utilities:

```
snmpset -Os -v2c router community alarmStatus.1 i createRequest
```

Configuring the Alarm MIB Objects

Once you have created the new row in **alarmTable**, configure the following Alarm MIB objects:



NOTE: Other than **alarmStatus**, you cannot modify any of the objects in the entry if the associated **alarmStatus** object is set to valid.

- [alarmInterval](#) on page 393
- [alarmVariable](#) on page 393
- [alarmSampleType](#) on page 394
- [alarmValue](#) on page 394
- [alarmStartupAlarm](#) on page 394
- [alarmRisingThreshold](#) on page 394
- [alarmFallingThreshold](#) on page 394
- [alarmOwner](#) on page 395
- [alarmRisingEventIndex](#) on page 395
- [alarmFallingEventIndex](#) on page 395

alarmInterval

The interval, in seconds, over which data is sampled and compared with the rising and falling thresholds. For example, to set **alarmInterval** for alarm #1 to 30 seconds, use the following SNMP **Set** request:

```
snmpset -Os -v2c router community alarmInterval.1 i 30
```

alarmVariable

The object identifier of the variable to be sampled. During a **Set** request, if the supplied variable name is not available in the selected MIB view, a **badValue** error is returned. If at any time the variable name of an established **alarmEntry** is no longer available in the selected MIB view, the probe changes the status of **alarmVariable** to invalid. For example, to identify **ifInOctets.61** as the variable to be monitored, use the following SNMP **Set** request:

```
snmpset -Os -v2c router community alarmVariable.1 o .1.3.6.1.2.1.2.2.1.10.61
```

alarmSampleType

The method of sampling the selected variable and calculating the value to be compared against the thresholds. If the value of this object is **absoluteValue**, the value of the selected variable is compared directly with the thresholds at the end of the sampling interval. If the value of this object is **deltaValue**, the value of the selected variable at the last sample is subtracted from the current value, and the difference is compared with the thresholds. For example, to set **alarmSampleType** for alarm #1 to **deltaValue**, use the following SNMP **Set** request:

```
snmpset -Os -v2c router community alarmSampleType.1 i deltaValue
```

alarmValue

The value of the variable during the last sampling period. This value is compared with the rising and falling thresholds. If the sample type is **deltaValue**, this value equals the difference between the samples at the beginning and end of the period. If the sample type is **absoluteValue**, this value equals the sampled value at the end of the period.

alarmStartupAlarm

An alarm that is sent when this entry is first set to valid. If the first sample after this entry becomes valid is greater than or equal to **risingThreshold**, and **alarmStartupAlarm** is equal to **risingAlarm** or **risingOrFallingAlarm**, then a single rising alarm is generated. If the first sample after this entry becomes valid is less than or equal to **fallingThreshold** and **alarmStartupAlarm** is equal to **fallingAlarm** or **risingOrFallingAlarm**, then a single falling alarm is generated. For example, to set **alarmStartupAlarm** for alarm #1 to **risingOrFallingAlarm**, use the following SNMP **Set** request:

```
snmpset -Os -v2c router community alarmStartupAlarm.1 i risingOrFallingAlarm
```

alarmRisingThreshold

A threshold for the sampled variable. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval is less than this threshold, a single event is generated. A single event is also generated if the first sample after this entry becomes valid is greater than or equal to this threshold, and the associated **alarmStartupAlarm** is equal to **risingAlarm** or **risingOrFallingAlarm**. After a rising event is generated, another rising event cannot be generated until the sampled value falls below this threshold and reaches **alarmFallingThreshold**. For example, to set **alarmRisingThreshold** for alarm #1 to 100000, use the following SNMP **Set** request:

```
snmpset -Os -v2c router community alarmRisingThreshold.1 i 100000
```

alarmFallingThreshold

A threshold for the sampled variable. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval is greater than this

threshold, a single event is generated. A single event is also generated if the first sample after this entry becomes valid is less than or equal to this threshold, and the associated **alarmStartupAlarm** is equal to **fallingAlarm** or **risingOrFallingAlarm**. After a falling event is generated, another falling event cannot be generated until the sampled value rises above this threshold and reaches **alarmRisingThreshold**. For example, to set **alarmFallingThreshold** for alarm #1 to 10000, use the following SNMP **Set** request:

```
snmpset -Os -v2c router community alarmFallingThreshold.1 i 10000
```

alarmOwner

Any text string specified by the creating management application or the command-line interface (CLI). Typically, it is used to identify a network manager (or application) and can be used for fine access control between participating management applications.

alarmRisingEventIndex

The index of the **eventEntry** object that is used when a rising threshold is crossed. If there is no corresponding entry in **eventTable**, then no association exists. If this value is zero, no associated event is generated because zero is not a valid event index. For example, to set **alarmRisingEventIndex** for alarm #1 to 10, use the following SNMP **Set** request:

```
snmpset -Os -v2c router community alarmRisingEventIndex.1 i 10
```

alarmFallingEventIndex

The index of the **eventEntry** object that is used when a falling threshold is crossed. If there is no corresponding entry in **eventTable**, then no association exists. If this value is zero, no associated event is generated because zero is not a valid event index. For example, to set **alarmFallingEventIndex** for alarm #1 to 10, use the following SNMP **Set** request:

```
snmpset -Os -v2c router community alarmFallingEventIndex.1 i 10
```

Activating a New Row in alarmTable

To activate a new row in **alarmTable**, set **alarmStatus** to **valid** using an SNMP **Set** request:

```
snmpset -Os -v2c router community alarmStatus.1 i valid
```

Modifying an Active Row in alarmTable

To modify an active row, first set **alarmStatus** to **underCreation** using an SNMP **Set** request:

```
snmpset -Os -v2c router community alarmStatus.1 i underCreation
```

Then change the row contents using an SNMP **Set** request:

```
snmpset -Os -v2c router community alarmFallingThreshold.1 i 1000
```

Finally, activate the row by setting **alarmStatus** to **valid** using an SNMP **Set** request:

```
snmpset -Os -v2c router community alarmStatus.1 i valid
```

Deactivating a Row in alarmTable

To deactivate a row in **alarmTable**, set **alarmStatus** to **invalid** using an SNMP **Set** request:

```
snmpset -Os -v2c router community alarmStatus.1 i invalid
```

Related Documentation

- [Understanding RMON Alarms on page 379](#)
- [Understanding RMON Events on page 380](#)
- [Configuring an RMON Alarm Entry and Its Attributes on page 385](#)

Using eventTable to Log Alarms

To use **eventTable** to log alarms, perform the following tasks:

- [Creating an Event Entry on page 396](#)
- [Configuring the MIB Objects on page 396](#)
- [Activating a New Row in eventTable on page 398](#)
- [Deactivating a Row in eventTable on page 398](#)

Creating an Event Entry

The RMON **eventTable** controls the generation of notifications from the router. Notifications can be logs (entries to **logTable** and **syslogs**) or SNMP traps. Each event entry can be configured to generate any combination of these notifications (or no notification). When an event specifies that an SNMP trap is to be generated, the trap group that is used when sending the trap is specified by the value of the associated **eventCommunity** object. Consequently, the community in the trap message will match the value specified by **eventCommunity**. If nothing is configured for **eventCommunity**, a trap is sent using each trap group that has the **rmon-alarm** category configured.

Configuring the MIB Objects

Once you have created the new row in **eventTable**, set the following objects:



NOTE: The `eventType` object is required. All other objects are optional.

- [eventType on page 397](#)
- [eventCommunity on page 397](#)
- [eventOwner on page 397](#)
- [eventDescription on page 398](#)

eventType

The type of notification that the router generates when the event is triggered.

This object can be set to the following values:

- **log**—Adds the event entry to `logTable`.
- **log-and-trap**—Sends an SNMP trap and creates a log entry.
- **none**—Sends no notification.
- **snmptrap**—Sends an SNMP trap.

For example, to set `eventType` for event #1 to **log-and-trap**, use the following SNMP Set request:

```
snmpset -Os -v2c router community eventType.1 i log-and-trap
```

eventCommunity

The trap group that is used when generating a trap (if `eventType` is configured to send traps). If that trap group has the **rmon-alarm** trap category configured, a trap is sent to all the targets configured for that trap group. The community string in the trap matches the name of the trap group (and hence, the value of `eventCommunity`). If nothing is configured, traps are sent to each group with the **rmon-alarm** category set. For example, to set `eventCommunity` for event #1 to **boy-elroy**, use the following SNMP Set request:

```
snmpset -Os -v2c router community eventCommunity.1 s "boy-elroy"
```



NOTE: The `eventCommunity` object is optional. If you do not set this object, then the field is left blank.

eventOwner

Any text string specified by the creating management application or the command-line interface (CLI). Typically, it is used to identify a network manager (or application) and can be used for fine access control between participating management applications.

For example, to set **eventOwner** for event #1 to **george jetson**, use the following SNMP **Set** request:

```
snmpset -Os -v2c router community eventOwner.1 s "george jetson"
```



NOTE: The **eventOwner** object is optional. If you do not set this object, then the field is left blank.

eventDescription

Any text string specified by the creating management application or the command-line interface (CLI). The use of this string is application dependent.

For example, to set **eventDescription** for event #1 to **spacelys sprockets**, use the following SNMP **Set** request:

```
snmpset -Os -v2c router community eventDescription.1 s "spacelys sprockets"
```



NOTE: The **eventDescription** object is optional. If you do not set this object, then the field is left blank.

Activating a New Row in eventTable

To activate the new row in **eventTable**, set **eventStatus** to **valid** using an SNMP **Set** request such as:

```
snmpset -Os -v2c router community eventStatus.1 i valid
```

Deactivating a Row in eventTable

To deactivate a row in **eventTable**, set **eventStatus** to **invalid** using an SNMP **Set** request such as:

```
snmpset -Os -v2c router community eventStatus.1 i invalid
```

Related Documentation

- [Understanding RMON Alarms on page 379](#)
- [Understanding RMON Events on page 380](#)
- [Configuring an RMON Event Entry and Its Attributes on page 389](#)

Using RMON to Monitor Network Service Quality

- [Understanding RMON for Monitoring Service Quality on page 399](#)
- [Understanding Measurement Points, Key Performance Indicators, and Baseline Values on page 403](#)
- [Defining and Measuring Network Availability on page 405](#)
- [Measuring Health on page 410](#)
- [Measuring Performance on page 417](#)

Understanding RMON for Monitoring Service Quality

Health and performance monitoring can benefit from the remote monitoring of SNMP variables by the local SNMP agents running on each router. The SNMP agents compare MIB values against predefined thresholds and generate exception alarms without the need for polling by a central SNMP management platform. This is an effective mechanism for proactive management, as long as the thresholds have baselines determined and set correctly. For more information, see RFC 2819, *Remote Network Monitoring MIB*.

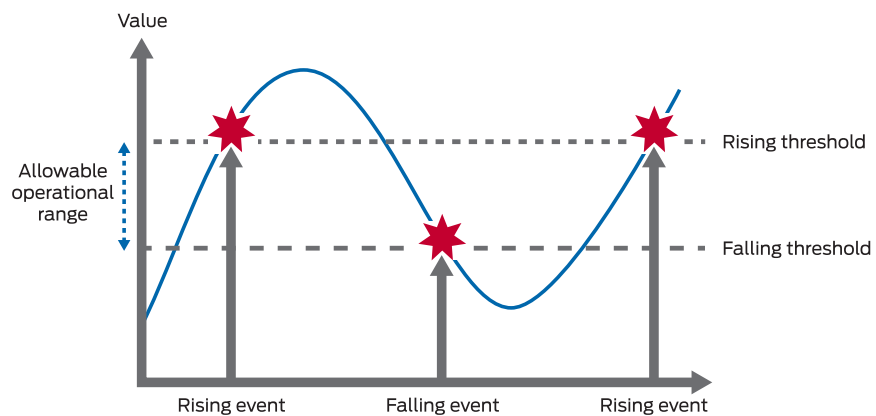
This topic includes the following sections:

- [Setting Thresholds on page 399](#)
- [RMON Command-Line Interface on page 400](#)
- [RMON Event Table on page 401](#)
- [RMON Alarm Table on page 401](#)
- [Troubleshooting RMON on page 402](#)

Setting Thresholds

By setting a rising and a falling threshold for a monitored variable, you can be alerted whenever the value of the variable falls outside of the allowable operational range. (See [Figure 7 on page 400](#).)

Figure 7: Setting Thresholds



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Events are only generated when the threshold is first crossed in any one direction rather than after each sample period. For example, if a rising threshold crossing event is raised, no more threshold crossing events will occur until a corresponding falling event. This considerably reduces the quantity of alarms that are produced by the system, making it easier for operations staff to react when alarms do occur.

To configure remote monitoring, specify the following pieces of information:

- The variable to be monitored (by its SNMP object identifier)
- The length of time between each inspection
- A rising threshold
- A falling threshold
- A rising event
- A falling event

Before you can successfully configure remote monitoring, you should identify what variables need to be monitored and their allowable operational range. This requires some period of baselining to determine the allowable operational ranges. An initial baseline period of at least three months is not unusual when first identifying the operational ranges and defining thresholds, but baseline monitoring should continue over the life span of each monitored variable.

RMON Command-Line Interface

Junos OS provides two mechanisms you use to control the Remote Monitoring agent on the router: command-line interface (CLI) and SNMP. To configure an RMON entry using the CLI, include the following statements at the **[edit snmp]** hierarchy level:

```
rmon {
  alarm index {
    description;
    falling-event-index;
    falling-threshold;
    intervals;
```

```

    rising-event-index;
    rising-threshold;
    sample-type (absolute-value | delta-value);
    startup-alarm (falling | rising | rising-or-falling);
    variable;
  }
  event index {
    community;
    description;
    type (log | trap | log-and-trap | none);
  }
}

```

If you do not have CLI access, you can configure remote monitoring using the SNMP Manager or management application, assuming SNMP access has been granted. (See [Table 43 on page 401](#).) To configure RMON using SNMP, perform SNMP **Set** requests to the RMON event and alarm tables.

RMON Event Table

Set up an event for each type that you want to generate. For example, you could have two generic events, *rising* and *falling*, or many different events for each variable that is being monitored (for example, *temperature rising* event, *temperature falling* event, *firewall hit* event, *interface utilization* event, and so on). Once the events have been configured, you do not need to update them.

Table 43: RMON Event Table

Field	Description
eventDescription	Text description of this event
eventType	Type of event (for example, log , trap , or log and trap)
eventCommunity	Trap group to which to send this event (as defined in the Junos OS configuration, which is not the same as the community)
eventOwner	Entity (for example, manager) that created this event
eventStatus	Status of this row (for example, valid , invalid , or createRequest)

RMON Alarm Table

The RMON alarm table stores the SNMP object identifiers (including their instances) of the variables that are being monitored, together with any rising and falling thresholds and their corresponding event indexes. To create an RMON request, specify the fields shown in [Table 44 on page 402](#).

Table 44: RMON Alarm Table

Field	Description
alarmStatus	Status of this row (for example, valid , invalid , or createRequest)
alarmInterval	Sampling period (in seconds) of the monitored variable
alarmVariable	OID (and instance) of the variable to be monitored
alarmValue	Actual value of the sampled variable
alarmSampleType	Sample type (absolute or delta changes)
alarmStartupAlarm	Initial alarm (rising , falling , or either)
alarmRisingThreshold	Rising threshold against which to compare the value
alarmFallingThreshold	Falling threshold against which to compare the value
alarmRisingEventIndex	Index (row) of the rising event in the event table
alarmFallingEventIndex	Index (row) of the falling event in the event table

Both the **alarmStatus** and **eventStatus** fields are **entryStatus** primitives, as defined in RFC 2579, *Textual Conventions for SMIV2*.

Troubleshooting RMON

You troubleshoot the RMON agent, **rmopd**, that runs on the router by inspecting the contents of the Juniper Networks enterprise RMON MIB, **jnxRmon**, which provides the extensions listed in [Table 45 on page 402](#) to the RFC 2819 **alarmTable**.

Table 45: jnxRmon Alarm Extensions

Field	Description
jnxRmonAlarmGetFailCnt	Number of times the internal Get request for the variable failed
jnxRmonAlarmGetFailTime	Value of sysUpTime when the last failure occurred
jnxRmonAlarmGetFailReason	Reason why the Get request failed
jnxRmonAlarmGetOkTime	Value of sysUpTime when the variable moved out of failure state
jnxRmonAlarmState	Status of this alarm entry

Monitoring the extensions in this table provides clues as to why remote alarms may not behave as expected.

- Related Documentation**
- [Understanding Measurement Points, Key Performance Indicators, and Baseline Values on page 403](#)

Understanding Measurement Points, Key Performance Indicators, and Baseline Values

This chapter topic provides guidelines for monitoring the service quality of an IP network. It describes how service providers and network administrators can use information provided by Juniper Networks routers to monitor network performance and capacity. You should have a thorough understanding of the SNMP and the associated MIB supported by Junos OS.



NOTE: For a good introduction to the process of monitoring an IP network, see RFC 2330, *Framework for IP Performance Metrics*.

This topic contains the following sections:

- [Measurement Points on page 403](#)
- [Basic Key Performance Indicators on page 404](#)
- [Setting Baselines on page 404](#)

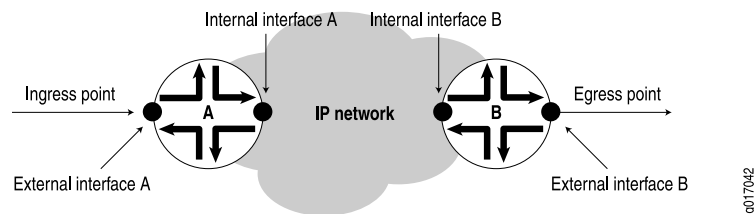
Measurement Points

Defining the measurement points where metrics are measured is equally as important as defining the metrics themselves. This section describes measurement points within the context of this chapter and helps identify where measurements can be taken from a service provider network. It is important to understand exactly where a measurement point is. Measurement points are vital to understanding the implication of what the actual measurement means.

An IP network consists of a collection of routers connected by physical links that are all running the Internet Protocol. You can view the network as a collection of routers with an ingress (entry) point and an egress (exit) point. See [Figure 8 on page 404](#).

- Network-centric measurements are taken at measurement points that most closely map to the ingress and egress points for the network itself. For example, to measure delay across the provider network from Site A to Site B, the measurement points should be the ingress point to the provider network at Site A and the egress point at Site B.
- Router-centric measurements are taken directly from the routers themselves, but be careful to ensure that the correct router subcomponents have been identified in advance.

Figure 8: Network Entry Points



NOTE: Figure 8 on page 404 does not show the client networks at customer premises, but they would be located on either side of the ingress and egress points. Although this chapter does not discuss how to measure network services as perceived by these client networks, you can use measurements taken for the service provider network as input into such calculations.

Basic Key Performance Indicators

For example, you could monitor a service provider network for three basic key performance indicators (KPIs):

- *Availability* measures the “reachability” of one measurement point from another measurement point at the network layer (for example, using ICMP ping). The underlying routing and transport infrastructure of the provider network will support the availability measurements, with failures highlighted as unavailability.
- *Health* measures the number and type of errors that are occurring on the provider network, and can consist of both router-centric and network-centric measurements, such as hardware failures or packet loss.
- *Performance* of the provider network measures how well it can support IP services (for example, in terms of delay or utilization).

Setting Baselines

How well is the provider network performing? We recommend an initial three-month period of monitoring to identify a network’s normal operational parameters. With this information, you can recognize exceptions and identify abnormal behavior. You should continue baseline monitoring for the lifetime of each measured metric. Over time, you must be able to recognize performance trends and growth patterns.

Within the context of this chapter, many of the metrics identified do not have an allowable operational range associated with them. In most cases, you cannot identify the allowable operational range until you have determined a baseline for the actual variable on a specific network.

Related Documentation

- [Understanding RMON for Monitoring Service Quality on page 399](#)
- [Defining and Measuring Network Availability on page 405](#)
- [Measuring Health on page 410](#)

- [Measuring Performance on page 417](#)

Defining and Measuring Network Availability

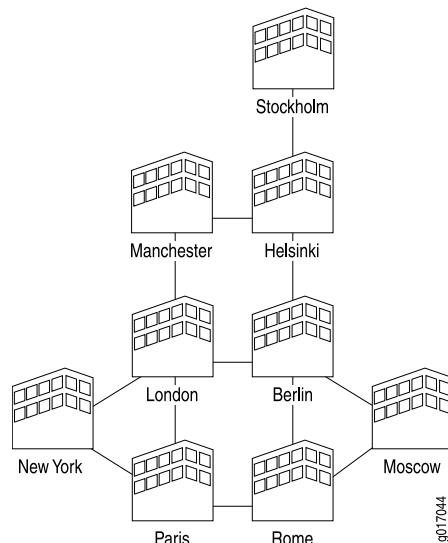
This topic includes the following sections:

- [Defining Network Availability on page 405](#)
- [Measuring Availability on page 407](#)

Defining Network Availability

Availability of a service provider's IP network can be thought of as the reachability between the regional points of presence (POP), as shown in [Figure 9 on page 405](#).

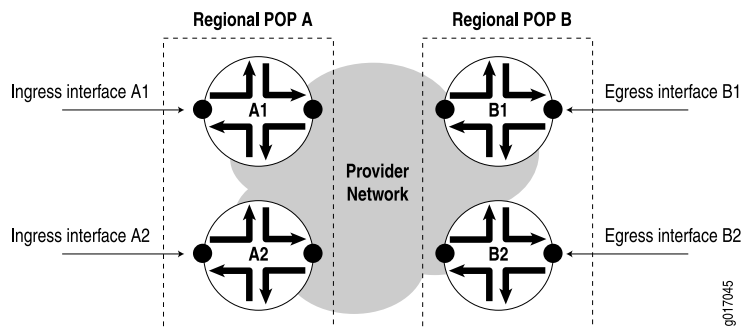
Figure 9: Regional Points of Presence



With the example above, when you use a full mesh of measurement points, where every POP measures the availability to every other POP, you can calculate the total availability of the service provider's network. This KPI can also be used to help monitor the service level of the network, and can be used by the service provider and its customers to determine if they are operating within the terms of their service-level agreement (SLA).

Where a POP may consist of multiple routers, take measurements to each router as shown in [Figure 10 on page 406](#).

Figure 10: Measurements to Each Router



Measurements include:

- Path availability—Availability of an egress interface **B1** as seen from an ingress interface **A1**.
- Router availability—Percentage of path availability of all measured paths terminating on the router.
- POP availability—Percentage of router availability between any two regional POPs, **A** and **B**.
- Network availability—Percentage of POP availability for all regional POPs in the service provider's network.

To measure POP availability of **POP A** to **POP B** in [Figure 10 on page 406](#), you must measure the following four paths:

```
Path A1 => B1
Path A1 => B2
Path A2 => B1
Path A2 => B2
```

Measuring availability from **POP B** to **POP A** would require a further four measurements, and so on.

A full mesh of availability measurements can generate significant management traffic. From the sample diagram above:

- Each POP has two co-located provider edge (PE) routers, each with 2xSTM1 interfaces, for a total of 18 PE routers and 36xSTM1 interfaces.
- There are six core provider (P) routers, four with 2xSTM4 and 3xSTM1 interfaces each, and two with 3xSTM4 and 3xSTM1 interfaces each.

This makes a total of 68 interfaces. A full mesh of paths between every interface is:

$$[n \times (n-1)] / 2 \text{ gives } [68 \times (68-1)] / 2 = 2278 \text{ paths}$$

To reduce management traffic on the service provider's network, instead of generating a full mesh of interface availability tests (for example, from each interface to every other interface), you can measure from each router's loopback address. This reduces the number of availability measurements required to a total of one for each router, or:

$[n \times (n-1)] / 2$ gives $[24 \times (24-1)] / 2 = 276$ measurements

This measures availability from each router to every other router.

Monitoring the SLA and the Required Bandwidth

A typical SLA between a service provider and a customer might state:

A Point of Presence is the connection of two back-to-back provider edge routers to separate core provider routers using different links for resilience. The system is considered to be unavailable when either an entire POP becomes unavailable or for the duration of a Priority 1 fault.

An SLA availability figure of 99.999 percent for a provider's network would relate to a down time of approximately 5 minutes per year. Therefore, to measure this proactively, you would have to take availability measurements at a granularity of less than one every five minutes. With a standard size of 64 bytes per ICMP ping request, one ping test per minute would generate 7680 bytes of traffic per hour per destination, including ping responses. A full mesh of ping tests to 276 destinations would generate 2,119,680 bytes per hour, which represents the following:

- On an OC3/STM1 link of 155.52 Mbps, a utilization of 1.362 percent
- On an OC12/STM4 link of 622.08 Mbps, a utilization of 0.340 percent

With a size of 1500 bytes per ICMP ping request, one ping test per minute would generate 180,000 bytes per hour per destination, including ping responses. A full mesh of ping tests to 276 destinations would generate 49,680,000 bytes per hour, which represents the following:

- On an OC3/STM1 link, 31.94 percent utilization
- On an OC12/STM4 link, 7.986 percent utilization

Each router can record the results for every destination tested. With one test per minute to each destination, a total of $1 \times 60 \times 24 \times 276 = 397,440$ tests per day would be performed and recorded by each router. All ping results are stored in the **pingProbeHistoryTable** (see RFC 2925) and can be retrieved by an SNMP performance reporting application (for example, service performance management software from InfoVista, Inc., or Concord Communications, Inc.) for post processing. This table has a maximum size of 4,294,967,295 rows, which is more than adequate.

Measuring Availability

There are two methods you can use to measure availability:

- Proactive—Availability is automatically measured as often as possible by an operational support system.
- Reactive—Availability is recorded by a Help desk when a fault is first reported by a user or a fault monitoring system.

This section discusses real-time performance monitoring as a proactive monitoring solution.

Real-Time Performance Monitoring

Juniper Networks provides a real-time performance monitoring (RPM) service to monitor real-time network performance. Use the J-Web Quick Configuration feature to configure real-time performance monitoring parameters used in real-time performance monitoring tests. (J-Web Quick Configuration is a browser-based GUI that runs on Juniper Networks routers. For more information, see the *J-Web Interface User Guide*.)

Configuring Real-Time Performance Monitoring

Some of the most common options you can configure for real-time performance monitoring tests are shown in [Table 46 on page 408](#).

Table 46: Real-Time Performance Monitoring Configuration Options

Field	Description
Request Information	
Probe Type	Type of probe to send as part of the test. Probe types can be: <ul style="list-style-type: none"> • http-get • http-get-metadata • icmp-ping • icmp-ping-timestamp • tcp-ping • udp-ping
Interval	Wait time (in seconds) between each probe transmission. The range is 1 to 255 seconds.
Test Interval	Wait time (in seconds) between tests. The range is 0 to 86400 seconds.
Probe Count	Total number of probes sent for each test. The range is 1 to 15 probes.
Destination Port	TCP or UDP port to which probes are sent. Use number 7—a standard TCP or UDP port number—or select a port number from 49152 through 65535.
DSCP Bits	Differentiated Services code point (DSCP) bits. This value must be a valid 6-bit pattern. The default is 000000.
Data Size	Size (in bytes) of the data portion of the ICMP probes. The range is 0 to 65507 bytes.
Data Fill	Contents of the data portion of the ICMP probes. Contents must be a hexadecimal value. The range is 1 to 800h.
Maximum Probe Thresholds	
Successive Lost Probes	Total number of probes that must be lost successively to trigger a probe failure and generate a system log message. The range is 0 to 15 probes.

Table 46: Real-Time Performance Monitoring Configuration Options (continued)

Field	Description
Lost Probes	Total number of probes that must be lost to trigger a probe failure and generate a system log message. The range is 0 to 15 probes.
Round Trip Time	Total round-trip time (in microseconds) from the Services Router to the remote server, which, if exceeded, triggers a probe failure and generates a system log message. The range is 0 to 60,000,000 microseconds.
Jitter	Total jitter (in microseconds) for a test, which, if exceeded, triggers a probe failure and generates a system log message. The range is 0 to 60,000,000 microseconds.
Standard Deviation	Maximum allowable standard deviation (in microseconds) for a test, which, if exceeded, triggers a probe failure and generates a system log message. The range is 0 to 60,000,000 microseconds.
Egress Time	Total one-way time (in microseconds) from the router to the remote server, which, if exceeded, triggers a probe failure and generates a system log message. The range is 0 to 60,000,000 microseconds.
Ingress Time	Total one-way time (in microseconds) from the remote server to the router, which, if exceeded, triggers a probe failure and generates a system log message. The range is 0 to 60,000,000 microseconds.
Jitter Egress Time	Total outbound-time jitter (in microseconds) for a test, which, if exceeded, triggers a probe failure and generates a system log message. The range is 0 to 60,000,000 microseconds.
Jitter Ingress Time	Total inbound-time jitter (in microseconds) for a test, which, if exceeded, triggers a probe failure and generates a system log message. The range is 0 to 60,000,000 microseconds.
Egress Standard Deviation	Maximum allowable standard deviation of outbound times (in microseconds) for a test, which, if exceeded, triggers a probe failure and generates a system log message. The range is 0 to 60,000,000 microseconds.
Ingress Standard Deviation	Maximum allowable standard deviation of inbound times (in microseconds) for a test, which, if exceeded, triggers a probe failure and generates a system log message. The range is 0 to 60,000,000 microseconds.

Displaying Real-Time Performance Monitoring Information

For each real-time performance monitoring test configured on the router, monitoring information includes the round-trip time, jitter, and standard deviation. To view this information, select **Monitor > RPM** in the J-Web interface, or enter the **show services rpm** command-line interface (CLI) command.

To display the results of the most recent real-time performance monitoring probes, enter the **show services rpm probe-results** CLI command:

```
user@host> show services rpm probe-results
```

```
Owner: p1, Test: t1
Target address: 10.8.4.1, Source address: 10.8.4.2, Probe type: icmp-ping
Destination interface name: lt-0/0/0.0
Test size: 10 probes
Probe results:
  Response received, Sun Jul 10 19:07:34 2005
  Rtt: 50302 usec
Results over current test:
  Probes sent: 2, Probes received: 1, Loss percentage: 50
  Measurement: Round trip time
    Minimum: 50302 usec, Maximum: 50302 usec, Average: 50302 usec,
    Jitter: 0 usec, Stddev: 0 usec
Results over all tests:
  Probes sent: 2, Probes received: 1, Loss percentage: 50
  Measurement: Round trip time
    Minimum: 50302 usec, Maximum: 50302 usec, Average: 50302 usec,
    Jitter: 0 usec, Stddev: 0 usec
```

Related Documentation

- [Understanding Measurement Points, Key Performance Indicators, and Baseline Values on page 403](#)
- [Understanding RMON for Monitoring Service Quality on page 399](#)
- [Measuring Health on page 410](#)
- [Measuring Performance on page 417](#)

Measuring Health

You can monitor health metrics reactively by using fault management software such as SMARTS InCharge, Micromuse Netcool Omnibus, or Concord Live Exceptions. We recommend that you monitor the health metrics shown in [Table 47 on page 410](#).

Table 47: Health Metrics

Metric:	Errors in
Description	Number of inbound packets that contained errors, preventing them from being delivered
MIB name	IF-MIB (RFC 2233)
Variable name	ifInErrors
Variable OID	.1.3.6.1.31.2.2.1.14
Frequency (mins)	60
Allowable range	To be baselined

Table 47: Health Metrics (continued)

Managed objects	Logical interfaces
Metric:	Errors out
Description	Number of outbound packets that contained errors, preventing them from being transmitted
MIB name	IF-MIB (RFC 2233)
Variable name	ifOutErrors
Variable OID	.1.3.6.1.31.2.2.1.20
Frequency (mins)	60
Allowable range	To be baselined
Managed objects	Logical interfaces
Metric:	Discards in
Description	Number of inbound packets discarded, even though no errors were detected
MIB name	IF-MIB (RFC 2233)
Variable name	ifInDiscards
Variable OID	.1.3.6.1.31.2.2.1.13
Frequency (mins)	60
Allowable range	To be baselined
Managed objects	Logical interfaces
Metric:	Unknown protocols
Description	Number of inbound packets discarded because they were of an unknown protocol
MIB name	IF-MIB (RFC 2233)
Variable name	ifInUnknownProtos
Variable OID	.1.3.6.1.31.2.2.1.15
Frequency (mins)	60

Table 47: Health Metrics (continued)

Allowable range	To be baselined
Managed objects	Logical interfaces
Metric:	Interface operating status
Description	Operational status of an interface
MIB name	IF-MIB (RFC 2233)
Variable name	ifOperStatus
Variable OID	.1.3.6.1.31.2.2.1.8
Frequency (mins)	15
Allowable range	1 (up)
Managed objects	Logical interfaces
Metric:	Label Switched Path (LSP) state
Description	Operational state of an MPLS label-switched path
MIB name	MPLS-MIB
Variable name	mplsLspState
Variable OID	mplsLspEntry.2
Frequency (mins)	60
Allowable range	2 (up)
Managed objects	All label-switched paths in the network
Metric:	Component operating status
Description	Operational status of a router hardware component
MIB name	JUNIPER-MIB
Variable name	jnxOperatingState
Variable OID	.1.3.6.1.4.1.2636.1.13.1.6
Frequency (mins)	60
Allowable range	2 (running) or 3 (ready)

Table 47: Health Metrics (continued)

Managed objects	All components in each Juniper Networks router
Metric:	Component operating temperature
Description	Operational temperature of a hardware component, in Celsius
MIB name	JUNIPER-MIB
Variable name	jnxOperatingTemp
Variable OID	.1.3.6.1.4.1.2636.1.13.1.7
Frequency (mins)	60
Allowable range	To be baselined
Managed objects	All components in a chassis
Metric:	System up time
Description	Time, in milliseconds, that the system has been operational.
MIB name	MIB-2 (RFC 1213)
Variable name	sysUpTime
Variable OID	.1.3.6.1.1.3
Frequency (mins)	60
Allowable range	Increasing only (decrement indicates a restart)
Managed objects	All routers
Metric:	No IP route errors
Description	Number of packets that could not be delivered because there was no IP route to their destination.
MIB name	MIB-2 (RFC 1213)
Variable name	ipOutNoRoutes
Variable OID	ip.12
Frequency (mins)	60
Allowable range	To be baselined

Table 47: Health Metrics (continued)

Managed objects	Each router
Metric:	Wrong SNMP community names
Description	Number of incorrect SNMP community names received
MIB name	MIB-2 (RFC 1213)
Variable name	snmpInBadCommunityNames
Variable OID	snmp.4
Frequency (hours)	24
Allowable range	To be baselined
Managed objects	Each router
Metric:	SNMP community violations
Description	Number of valid SNMP communities used to attempt invalid operations (for example, attempting to perform SNMP Set requests)
MIB name	MIB-2 (RFC 1213)
Variable name	snmpInBadCommunityUses
Variable OID	snmp.5
Frequency (hours)	24
Allowable range	To be baselined
Managed objects	Each router
Metric:	Redundancy switchover
Description	Total number of redundancy switchovers reported by this entity
MIB name	JUNIPER-MIB
Variable name	jnxRedundancySwitchoverCount
Variable OID	jnxRedundancyEntry.8
Frequency (mins)	60
Allowable range	To be baselined

Table 47: Health Metrics (continued)

Managed objects	All Juniper Networks routers with redundant Routing Engines
Metric:	FRU state
Description	Operational status of each field-replaceable unit (FRU)
MIB name	JUNIPER-MIB
Variable name	jnxFruState
Variable OID	jnxFruEntry.8
Frequency (mins)	15
Allowable range	2 through 6 for ready/online states. See jnxFruOfflineReason in the event of a FRU failure.
Managed objects	All FRUs in all Juniper Networks routers.
Metric:	Rate of tail-dropped packets
Description	Rate of tail-dropped packets per output queue, per forwarding class, per interface.
MIB name	JUNIPER-COS-MIB
Variable name	jnxCosIfqTailDropPktRate
Variable OID	jnxCosIfqStatsEntry.12
Frequency (mins)	60
Allowable range	To be baselined
Managed objects	For each forwarding class per interface in the provider network, when CoS is enabled.
Metric:	Interface utilization: octets received
Description	Total number of octets received on the interface, including framing characters.
MIB name	IF-MIB
Variable name	ifInOctets
Variable OID	.1.3.6.1.2.1.2.2.1.10.x
Frequency (mins)	60

Table 47: Health Metrics (continued)

Allowable range	To be baselined
Managed objects	All operational interfaces in the network
Metric:	Interface utilization: octets transmitted
Description	Total number of octets transmitted out of the interface, including framing characters.
MIB name	IF-MIB
Variable name	ifOutOctets
Variable OID	.1.3.6.1.2.1.2.2.1.16.x
Frequency (mins)	60
Allowable range	To be baselined
Managed objects	All operational interfaces in the network



NOTE: Byte counts vary depending on interface type, encapsulation used and PIC supported. For example, with vlan-ccc encapsulation on a 4xFE, GE, or GE IQ PIC, the byte count includes framing and control word overhead. (See [Table 48 on page 416](#).)

Table 48: Counter Values for vlan-ccc Encapsulation

PIC Type	Encapsulation	Input (Unit Level)	Output (Unit Level)	SNMP
4xFE	vlan-ccc	Frame (no frame check sequence [FCS])	Frame (including FCS and control word)	ifInOctets, ifOutOctets
GE	vlan-ccc	Frame (no FCS)	Frame (including FCS and control word)	ifInOctets, ifOutOctets
GE IQ	vlan-ccc	Frame (no FCS)	Frame (including FCS and control word)	ifInOctets, ifOutOctets

SNMP traps are also a good mechanism to use for health management. For more information, see “[Standard SNMP Traps Supported by Junos OS](#)” on page 146” and “[Enterprise-Specific SNMP Traps Supported by Junos OS](#)” on page 154.”

Related Documentation

- [Understanding Measurement Points, Key Performance Indicators, and Baseline Values on page 403](#)

- [Understanding RMON for Monitoring Service Quality on page 399](#)
- [Defining and Measuring Network Availability on page 405](#)
- [Measuring Performance on page 417](#)
- [SNMB MIB Explorer](#)

Measuring Performance

The performance of a service provider's network is usually defined as how well it can support services, and is measured with metrics such as delay and utilization. We suggest that you monitor the following performance metrics using applications such as InfoVista Service Performance Management or Concord Network Health (see [Table 49 on page 417](#)).

Table 49: Performance Metrics

Metric:	Average delay
Description	Average round-trip time (in milliseconds) between two measurement points.
MIB name	DISMAN-PING-MIB (RFC 2925)
Variable name	pingResultsAverageRtt
Variable OID	pingResultsEntry.6
Frequency (mins)	15 (or depending upon ping test frequency)
Allowable range	To be baselined
Managed objects	Each measured path in the network
Metric:	Interface utilization
Description	Utilization percentage of a logical connection.
MIB name	IF-MIB
Variable name	(ifInOctets & ifOutOctets) * 8 / ifSpeed
Variable OID	ifTable entries
Frequency (mins)	60
Allowable range	To be baselined
Managed objects	All operational interfaces in the network
Metric:	Disk utilization

Table 49: Performance Metrics (continued)

Description	Utilization of disk space within the Juniper Networks router
MIB name	HOST-RESOURCES-MIB (RFC 2790)
Variable name	hrStorageSize – hrStorageUsed
Variable OID	hrStorageEntry.5 – hrStorageEntry.6
Frequency (mins)	1440
Allowable range	To be baselined
Managed objects	All Routing Engine hard disks
Metric:	Memory utilization
Description	Utilization of memory on the Routing Engine and FPC.
MIB name	JUNIPER-MIB (Juniper Networks enterprise Chassis MIB)
Variable name	jnxOperatingHeap
Variable OID	Table for each component
Frequency (mins)	60
Allowable range	To be baselined
Managed objects	All Juniper Networks routers
Metric:	CPU load
Description	Average utilization over the past minute of a CPU.
MIB name	JUNIPER-MIB (Juniper Networks enterprise Chassis MIB)
Variable name	jnxOperatingCPU
Variable OID	Table for each component
Frequency (mins)	60
Allowable range	To be baselined
Managed objects	All Juniper Networks routers
Metric:	LSP utilization
Description	Utilization of the MPLS label-switched path.

Table 49: Performance Metrics (continued)

MIB name	MPLS-MIB
Variable name	mplsPathBandwidth / (mplsLspOctets * 8)
Variable OID	mplsLspEntry.21 and mplsLspEntry.3
Frequency (mins)	60
Allowable range	To be baselined
Managed objects	All label-switched paths in the network
Metric:	Output queue size
Description	Size, in packets, of each output queue per forwarding class, per interface.
MIB name	JUNIPER-COS-MIB
Variable name	jnxCosIfqQedPkts
Variable OID	jnxCosIfqStatsEntry.3
Frequency (mins)	60
Allowable range	To be baselined
Managed objects	For each forwarding class per interface in the network, once CoS is enabled.

This section includes the following topics:

- [Measuring Class of Service on page 419](#)
- [Inbound Firewall Filter Counters per Class on page 420](#)
- [Monitoring Output Bytes per Queue on page 421](#)
- [Dropped Traffic on page 422](#)

Measuring Class of Service

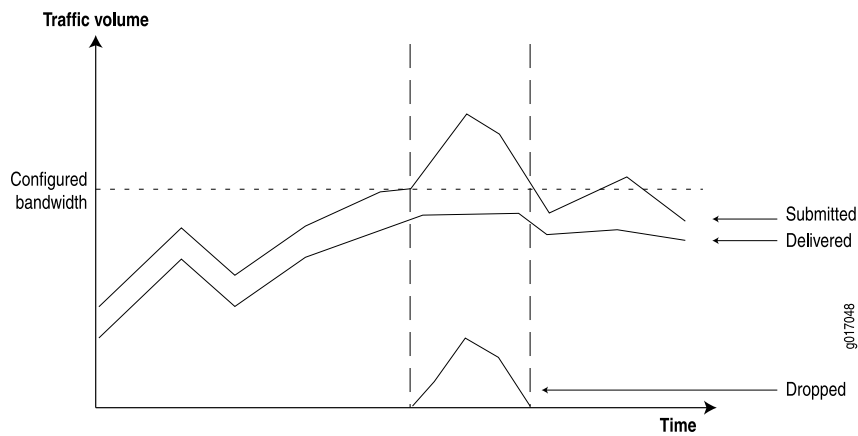
You can use class-of-service (CoS) mechanisms to regulate how certain classes of packets are handled within your network during times of peak congestion. Typically you must perform the following steps when implementing a CoS mechanism:

- Identify the type of packets that is applied to this class. For example, include all customer traffic from a specific ingress edge interface within one class, or include all packets of a particular protocol such as voice over IP (VoIP).
- Identify the required deterministic behavior for each class. For example, if VoIP is important, give VoIP traffic the highest priority during times of network congestion.

Conversely, you can downgrade the importance of Web traffic during congestion, as it may not impact customers too much.

With this information, you can configure mechanisms at the network ingress to monitor, mark, and police traffic classes. Marked traffic can then be handled in a more deterministic way at egress interfaces, typically by applying different queuing mechanisms for each class during times of network congestion. You can collect information from the network to provide customers with reports showing how the network is behaving during times of congestion. (See [Figure 11 on page 420](#).)

Figure 11: Network Behavior During Congestion



To generate these reports, routers must provide the following information:

- Submitted traffic—Amount of traffic received per class.
- Delivered traffic—Amount of traffic transmitted per class.
- Dropped traffic—Amount of traffic dropped because of CoS limits.

The following section outlines how this information is provided by Juniper Networks routers.

Inbound Firewall Filter Counters per Class

Firewall filter counters are a very flexible mechanism you can use to match and count inbound traffic per class, per interface. For example:

```
firewall {
  filter f1 {
    term t1 {
      from {
        dscp af11;
      }
      then {
        # Assured forwarding class 1 drop profile 1 count inbound-af11;
        accept;
      }
    }
  }
}
```

```
}

```

For example, [Table 50 on page 421](#) shows additional filters used to match the other classes.

Table 50: Inbound Traffic Per Class

DSCP Value	Firewall Match Condition	Description
10	af11	Assured forwarding class 1 drop profile 1
12	af12	Assured forwarding class 1 drop profile 2
18	af21	Best effort class 2 drop profile 1
20	af22	Best effort class 2 drop profile 2
26	af31	Best effort class 3 drop profile 1

Any packet with a CoS DiffServ code point (DSCP) conforming to RFC 2474 can be counted in this way. The Juniper Networks enterprise-specific Firewall Filter MIB presents the counter information in the variables shown in [Table 51 on page 421](#).

Table 51: Inbound Counters

Indicator Name	Inbound Counters
MIB	jnxFirewalls
Table	jnxFirewallCounterTable
Index	jnxFWFilter.jnxFWCounter
Variables	jnxFWCounterPacketCount jnxFWCounterByteCount
Description	Number of bytes being counted pertaining to the specified firewall filter counter
SNMP version	SNMPv2

This information can be collected by any SNMP management application that supports SNMPv2. Products from vendors such as Concord Communications, Inc., and InfoVista, Inc., provide support for the Juniper Networks Firewall MIB with their native Juniper Networks device drivers.

Monitoring Output Bytes per Queue

You can use the Juniper Networks enterprise ATM CoS MIB to monitor outbound traffic, per virtual circuit forwarding class, per interface. (See [Table 52 on page 422](#).)

Table 52: Outbound Counters for ATM Interfaces

Indicator Name	Outbound Counters
MIB	JUNIPER-ATM-COS-MIB
Variable	jnxCosAtmVcQstatsOutBytes
Index	ifIndex.atmVclVpi.atmVclVci.jnxCosFcid
Description	Number of bytes belonging to the specified forwarding class that were transmitted on the specified virtual circuit.
SNMP version	SNMPv2

Non-ATM interface counters are provided by the Juniper Networks enterprise-specific CoS MIB, which provides information shown in [Table 53 on page 422](#).

Table 53: Outbound Counters for Non-ATM Interfaces

Indicator Name	Outbound Counters
MIB	JUNIPER-COS-MIB
Table	jnxCosIfqStatsTable
Index	jnxCosIfqIfIndex.jnxCosIfqFc
Variables	jnxCosIfqTxedBytes jnxCosIfqTxedPkts
Description	Number of transmitted bytes or packets per interface per forwarding class
SNMP version	SNMPv2

Dropped Traffic

You can calculate the amount of dropped traffic by subtracting the outbound traffic from the incoming traffic:

$$\text{Dropped} = \text{Inbound Counter} - \text{Outbound Counter}$$

You can also select counters from the CoS MIB, as shown in [Table 54 on page 422](#).

Table 54: Dropped Traffic Counters

Indicator Name	Dropped Traffic
MIB	JUNIPER-COS-MIB

Table 54: Dropped Traffic Counters (continued)

Indicator Name	Dropped Traffic
Table	<code>jnxCosIfqStatsTable</code>
Index	<code>jnxCosIfqIfIndex.jnxCosIfqFc</code>
Variables	<code>jnxCosIfqTailDropPkts</code> <code>jnxCosIfqTotalRedDropPkts</code>
Description	The number of tail-dropped or RED-dropped packets per interface per forwarding class
SNMP version	SNMPv2

Related Documentation

- [Understanding Measurement Points, Key Performance Indicators, and Baseline Values on page 403](#)
- [Understanding RMON for Monitoring Service Quality on page 399](#)
- [Defining and Measuring Network Availability on page 405](#)
- [Measuring Health on page 410](#)

Health Monitoring with SNMP

- [Configuring Health Monitoring on Devices Running Junos OS on page 425](#)
- [Example: Configuring Health Monitoring on page 428](#)

Configuring Health Monitoring on Devices Running Junos OS

As the number of devices managed by a typical network management system (NMS) grows and the complexity of the devices themselves increases, it becomes increasingly impractical for the NMS to use polling to monitor the devices. A more scalable approach is to rely on network devices to notify the NMS when something requires attention.

On Juniper Networks routers, RMON alarms and events provide much of the infrastructure needed to reduce the polling overhead from the NMS. However, with this approach, you must set up the NMS to configure specific MIB objects into RMON alarms. This often requires device-specific expertise and customizing of the monitoring application. In addition, some MIB object instances that need monitoring are set only at initialization or change at runtime and cannot be configured in advance.

To address these issues, the health monitor extends the RMON alarm infrastructure to provide predefined monitoring for a selected set of object instances (for file system usage, CPU usage, and memory usage) and includes support for unknown or dynamic object instances (such as Junos OS processes).

Health monitoring is designed to minimize user configuration requirements. To configure health monitoring entries, include the **health-monitor** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
health-monitor {
  falling-threshold percentage;
  interval seconds;
  rising-threshold percentage;
  idp {
    falling-threshold percentage;
    interval seconds;
    rising-threshold percentage;
  }
}
```

Configuring monitoring events at the **[edit snmp health-monitor]** hierarchy level sets polling intervals for the overall system health. If you set these same options at the **[edit snmp health-monitor idp]** hierarchy level, an SNMP event is generated by the device if the percentage of dataplane memory utilized by the intrusion detection and prevention (IDP) system rises above or falls below your settings.

You can use the **show snmp health-monitor** operational command to view information about health monitor alarms and logs.

This topic describes the minimum required configuration and discusses the following tasks for configuring the health monitor:

- [Monitored Objects on page 426](#)
- [Minimum Health Monitoring Configuration on page 427](#)
- [Configuring the Falling Threshold or Rising Threshold on page 427](#)
- [Configuring the Interval on page 428](#)
- [Log Entries and Traps on page 428](#)

Monitored Objects

When you configure the health monitor, monitoring information for certain object instances is available, as shown in [Table 27 on page 274](#).

Table 55: Monitored Object Instances

Object	Description
jnxFileUsed jnxFileUsed	Monitors the following file system on the router or switch: /dev/ad0s1a: This is the root file system mounted on /.
jnxFileUsed2 jnxFileUsed2	Monitors the following file system on the router or switch: /dev/ad0s1e: This is the configuration file system mounted on /config.
jnxOperatingCPU jnxOperatingCPU (RE0)	Monitors CPU usage for Routing Engines (RE0 and RE1). The index values assigned to Routing Engines depend on whether the Chassis MIB uses a zero-based or ones-based indexing scheme. Because the indexing scheme is configurable, the proper index is determined when the router or switch is initialized and when there is a configuration change. If the router or switch has only one Routing Engine, the alarm entry monitoring RE1 is removed after five failed attempts to obtain the CPU value.
jnxOperatingCPU jnxOperatingCPU (RE1)	
jnxOperatingBuffer jnxOperatingBuffer (RE0)	Monitors the amount of memory available on Routing Engines (RE0 and RE1). Because the indexing of this object is identical to that used for jnxOperatingCPU , index values are adjusted depending on the indexing scheme used in the Chassis MIB. As with jnxOperatingCPU , the alarm entry monitoring RE1 is removed if the router or switch has only one Routing Engine.
jnxOperatingBuffer jnxOperatingBuffer (RE1)	

Table 55: Monitored Object Instances (continued)

Object	Description
sysUpTime sysUpTimeCPU	Monitors the CPU usage for each Junos OS process (also called daemon). Multiple instances of the same process are monitored and indexed separately.
sysUpTime sysUpTimeMemory	Monitors the memory usage for each Junos OS process. Multiple instances of the same process are monitored and indexed separately.

Minimum Health Monitoring Configuration

To enable health monitoring on the router or switch, include the **health-monitor** statement at the **[edit snmp]** hierarchy level:

```
[edit snmp]
health-monitor;
```

Configuring the Falling Threshold or Rising Threshold

The falling threshold is the lower threshold (expressed as a percentage of the maximum possible value) for the monitored variable. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval is greater than this threshold, a single event is generated. A single event is also generated if the first sample after this entry becomes valid is less than or equal to this threshold. After a falling event is generated, another falling event cannot be generated until the sampled value rises above this threshold and reaches the rising threshold. You must specify the falling threshold as a percentage of the maximum possible value. The default is **70** percent.

By default, the rising threshold is **80** percent of the maximum possible value for the monitored object instance. The rising threshold is the upper threshold for the monitored variable. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval is less than this threshold, a single event is generated. A single event is also generated if the first sample after this entry becomes valid is greater than or equal to this threshold. After a rising event is generated, another rising event cannot be generated until the sampled value falls below this threshold and reaches the falling threshold. You must specify the rising threshold as a percentage of the maximum possible value for the monitored variable.

To configure the falling threshold or rising threshold, include the **falling-threshold** or **rising-threshold** statement at the **[edit snmp health-monitor]** hierarchy level:

```
[edit snmp health-monitor]
falling-threshold percentage;
rising-threshold percentage;
```

percentage can be a value from 1 through 100.

The falling and rising thresholds apply to all object instances monitored by the health monitor.

Configuring the Interval

The interval represents the period of time, in seconds, over which the object instance is sampled and compared with the rising and falling thresholds.

To configure the interval, include the **interval** statement and specify the number of seconds at the **[edit snmp health-monitor]** hierarchy level:

```
[edit snmp health-monitor]
interval seconds;
```

seconds can be a value from 1 through 2147483647. The default is 300 seconds (5 minutes).

Log Entries and Traps

The system log entries generated for any health monitor events (thresholds crossed, errors, and so on) have a corresponding **HEALTHMONITOR** tag rather than a generic **SNMPD_RMON_EVENTLOG** tag. However, the health monitor sends generic RMON **risingThreshold** and **fallingThreshold** traps.

Related Documentation

- [Understanding RMON Alarms and Events Configuration on page 381](#)
- [Configuring an RMON Alarm Entry and Its Attributes on page 385](#)
- [Configuring an RMON Event Entry and Its Attributes on page 389](#)
- [Example: Configuring Health Monitoring on page 428](#)
- [Understanding Device Management Functions in Junos OS on page 3](#)
- [health-monitor on page 1457](#)

Example: Configuring Health Monitoring

Configure the health monitor:

```
[edit snmp]
health-monitor {
  falling-threshold 85;
  interval 600;
  rising-threshold 75;
}
```

In this example, the sampling interval is every 600 seconds (10 minutes), the falling threshold is 85 percent of the maximum possible value for each object instance monitored, and the rising threshold is 75 percent of the maximum possible value for each object instance monitored.

Related Documentation

- [Configuring Health Monitoring on Devices Running Junos OS on page 273](#)

PART 6

Accounting Options, Source Class Usage, and Destination Class Usage Options

- [Accounting Options, Source Class Usage and Destination Class Usage Options Overview on page 431](#)
- [Configuring Accounting Options, Source Class Usage and Destination Class Usage Options on page 435](#)

Accounting Options, Source Class Usage and Destination Class Usage Options Overview

- [Accounting Options Overview on page 431](#)
- [Understanding Source Class Usage and Destination Class Usage Options on page 432](#)

Accounting Options Overview

An accounting profile represents common characteristics of collected accounting data, including the following:

- Collection interval
- File to contain accounting data
- Specific fields and counter names on which to collect statistics

You can configure multiple accounting profiles, as described in [Table 56 on page 431](#).

Table 56: Types of Accounting Profiles

Type of Profile	Description
Interface profile	Collects the specified error and statistic information.
Filter profile	Collects the byte and packet counts for the counter names specified in the filter profile.
MIB profile	Collects selected MIB statistics and logs them to a specified file.
Routing Engine profile	Collects selected Routing Engine statistics and logs them to a specified file.
Class usage profile	Collects class usage statistics and logs them to a specified file.

Related Documentation

- [Understanding Device Management Functions in Junos OS on page 3](#)
- [Accounting Options Configuration](#)
- [Configuring Accounting-Data Log Files on page 444](#)
- [Configuring the Interface Profile](#)
- [Configuring the Filter Profile on page 453](#)
- [Configuration Statements at the \[edit accounting-options\] Hierarchy Level on page 435](#)

Understanding Source Class Usage and Destination Class Usage Options

You can maintain packet counts based on the entry and exit points for traffic passing through your network. Entry and exit points are identified by source and destination prefixes grouped into disjoint sets defined as source classes and *destination classes*. You can define classes based on a variety of parameters, such as routing neighbors, autonomous systems, and route filters.

Source class usage (SCU) counts packets sent to customers by performing lookups on the IP source address and the IP destination address. SCU makes it possible to track traffic originating from specific prefixes on the provider core and destined for specific prefixes on the customer edge. You must enable SCU accounting on both the inbound and outbound physical interfaces.

Destination class usage (DCU) counts packets from customers by performing lookups of the IP destination address. DCU makes it possible to track traffic originating from the customer edge and destined for specific prefixes on the provider core router.

On T Series Core Routers and M320 Multiservice Edge Routers, the source class and destination classes are not carried across the platform fabric. The implications of this are as follows:

- On T Series and M320 routers, SCU and DCU accounting is performed before the packet enters the fabric.
- On T Series and M320 routers, DCU is performed before output filters are evaluated.
- On M Series platforms, DCU is performed after output filters are evaluated.
- If an output filter drops traffic on M Series devices, the dropped packets are excluded from DCU statistics.
- If an output filter drops traffic on T Series and M320 routers, the dropped packets are included in DCU statistics.



NOTE: SCU and DCU is supported on PTX series routers when *enhanced-mode* is configured on the chassis.

On MX Series platforms with MPC/MIC interfaces, SCU and DCU are performed after output filters are evaluated. Packets dropped by output filters are not included in SCU or DCU statistics.

On MX Series platforms with non-MPC/MIC interfaces, SCU and DCU are performed before output filters are evaluated. Packets dropped by output filters are included in SCU and DCU statistics.

On PTX Series platforms, SCU and DCU accounting is performed before output filters are evaluated. Packets dropped by output filters are included in SCU and DCU statistics.

On Enhanced Scaling FPCs (T640-FPC1-ES, T640-FPC2-ES, T640-FPC3-ES, T640-FPC4-1P-ES, and T1600-FPC4-ES), the source class accounting is performed at ingress. Starting with Junos OS Release 14.2, the SCU accounting is performed at ingress on a T4000 Type 5 FPC. The implications of this are as follows:

- SCU accounting is performed when packets traverse from T4000 Type 5 FPC (ingress FPC) to Enhanced Scaling FPCs (egress FPC).
- SCU accounting is performed when packets traverse from Enhanced Scaling FPCs (ingress FPC) to T4000 Type 5 FPC (egress FPC).



NOTE: When the interface statistics are cleared and then the routing engine is replaced, the SCU and DCU statistics will not match the statistics of the previous routing engine.

For more information about source class usage, see the *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide* and the *Junos OS Network Interfaces Library for Routing Devices*.

Related Documentation

- [Example: Grouping Source and Destination Prefixes into a Forwarding Class](#)
- [Configuring SCU or DCU on page 458](#)
- [Configuring SCU on a Virtual Loopback Tunnel Interface on page 460](#)
- [Configuring Class Usage Profiles on page 461](#)
- [Configuring the MIB Profile on page 464](#)
- [Configuring the Routing Engine Profile on page 466](#)

CHAPTER 18

Configuring Accounting Options, Source Class Usage and Destination Class Usage Options

- Configuration Statements at the [edit accounting-options] Hierarchy Level on page 435
- Accounting Options Configuration on page 437
- Configuring Accounting-Data Log Files on page 444
- Managing Accounting Files on page 449
- Configuring the Interface Profile on page 450
- Configuring the Filter Profile on page 453
- Example: Configuring a Filter Profile on page 455
- Example: Configuring Interface-Specific Firewall Counters and Filter Profiles on page 456
- Configuring SCU or DCU on page 458
- Configuring SCU on a Virtual Loopback Tunnel Interface on page 460
- Configuring Class Usage Profiles on page 461
- Configuring the MIB Profile on page 464
- Configuring the Routing Engine Profile on page 466

Configuration Statements at the [edit accounting-options] Hierarchy Level

This topic shows all possible configuration statements at the **[edit accounting-options]** hierarchy level and their level in the configuration hierarchy. When you are configuring Junos OS, your current hierarchy level is shown in the banner on the line preceding the **user@host#** prompt.

```
[edit]
accounting-options {
  class-usage-profile profile-name {
    file filename;
    interval minutes;
    destination-classes {
      destination-class-name;
    }
  }
}
```

```
source-classes {
    source-class-name;
}
}
file filename {
    archive-sites {
    }
    files number;
    nonpersistent;
    size bytes;
    start-time time;
    transfer-interval minutes;
}
filter-profile profile-name {
    counters {
        counter-name;
    }
    file filename;
    interval minutes;
}
}
interface-profile profile-name {
    fields {
        field-name;
    }
    file filename;
    interval minutes;
}
}
mib-profile profile-name {
    file filename;
    interval seconds;
    object-names {
        mib-object-name;
    }
    operation operation-name;
}
}
routing-engine-profile profile-name {
    fields {
        field-name;
    }
    file filename;
    interval minutes;
}
}
```

- Related Documentation**
- [Accounting Options Overview on page 431](#)
 - [Accounting Options Configuration on page 437](#)

Accounting Options Configuration

This topic contains the following sections:

- [Accounting Options—Full Configuration on page 437](#)
- [Minimum Accounting Options Configuration on page 440](#)

Accounting Options—Full Configuration

To configure accounting options, include the following statements at the **[edit accounting-options]** hierarchy level:

```
accounting-options {
  class-usage-profile profile-name {
    file filename;
    interval minutes;
    destination-classes {
      destination-class-name;
    }
    source-classes {
      source-class-name;
    }
    file filename {
      archive-sites {
        site-name;
      }
      files number;
      nonpersistent;
      size bytes;
      source-classes time;
      transfer-interval minutes;
    }
    filter-profile profile-name {
      counters {
        counter-name;
      }
      file filename;
      interval minutes;
    }
  }
  flat-file-profile profile-name {
    fields {
      all-fields;
      egress-stats {
        all-fields;
        input-bytes;
        input-packets;
        output-bytes;
        output-packets;
        queue-id;
        red-drop-bytes;
        red-drop-packets;
        tail-drop-packets;
      }
    }
  }
}
```

```
}
general-param {
  all-fields;
  accounting-type;
  descr;
  line-id;
  logical-interface;
  nas-port-id;
  physical-interface;
  routing-instance;
  timestamp;
  vlan-id;
}
ingress-stats {
  all-fields;
  drop-packets;
  input-bytes;
  input-packets;
  output-bytes;
  output-packets;
  queue-id;
}
l2-stats {
  all-fields;
  input-mcast-bytes;
  input-mcast-packets;
}
fields {
  all-fields;
  egress-stats {
    all-fields;
    input-bytes;
    input-packets;
    output-bytes;
    output-packets;
    queue-id;
    red-drop-bytes;
    red-drop-packets;
    tail-drop-packets;
  }
  general-param {
    all-fields;
    accounting-type;
    descr;
    line-id;
    logical-interface;
    nas-port-id;
    physical-interface;
    routing-instance;
    timestamp;
    vlan-id;
  }
  ingress-stats {
    all-fields;
    drop-packets;
```

```

        input-bytes;
        input-packets;
        output-bytes;
        output-packets;
        queue-id;
    }
    general-param {
        all-fields;
        accounting-type;
        descr;
        line-id;
        logical-interface;
        nas-port-id;
        physical-interface;
        routing-instance;
        timestamp;
        vlan-id;
    }
    ingress-stats {
        all-fields;
        drop-packets;
        input-bytes;
        input-packets;
        output-bytes;
        output-packets;
        queue-id;
    }
    l2-stats {
        all-fields;
        input-mcast-bytes;
        input-mcast-packets;
    }
    overall-packet {
        all-fields;
        input-bytes;
        input-discards;
        input-errors;
        input-packets;
        inputv6-bytes;
        inputv6-packets;
        output-bytes;
        output-errors;
        output-packets;
        outputv6-bytes;
        outputv6-packets;
    }
}
file filename;
format (csv | ipdr)
interval minutes;
schema-version schema-name;
}
interface-profile profile-name {
    fields {
        field-name;

```

```

    }
    file filename;
    interval minutes;
  }
  mib-profile profile-name {
    file filename;
    interval seconds;
    object-names {
      mib-object-name;
    }
    operation operation-name;
  }
  routing-engine-profile profile-name {
    fields {
      field-name;
    }
    file filename;
    interval minutes;
  }
}

```

By default, accounting options are disabled.



NOTE: Do not configure MIB objects related to interface octets or packets for a MIB profile, because doing so can cause the SNMP walk or a CLI show command to time out.

Minimum Accounting Options Configuration

To enable accounting options on the router, you must perform at least the following tasks:

- Configure accounting options by including a **file** statement and one or more **source-class-usage**, **destination-class-profile**, **filter-profile**, **interface-profile**, **mib-profile**, or **routing-engine-profile** statements at the **[edit accounting-options]** hierarchy level:

```

[edit]
accounting-options {
  class-usage-profile profile-name {
    file filename;
    interval minutes;
    source-classes {
      source-class-name;
    }
    destination-classes {
      destination-class-name;
    }
  }
  file filename {
    archive-sites {
      site-name;
    }
  }
}

```

```
files number;
size bytes;
transfer-interval minutes;
}
filter-profile profile-name {
  counters {
    counter-name;
  }
  file filename;
  interval minutes;
}
flat-file-profile profile-name {
  fields {
    all-fields;
    egress-stats {
      all-fields;
      input-bytes;
      input-packets;
      output-bytes;
      output-packets;
      queue-id;
      red-drop-bytes;
      red-drop-packets;
      tail-drop-packets;
    }
    general-param {
      all-fields;
      accounting-type;
      descr;
      line-id;
      logical-interface;
      nas-port-id;
      physical-interface;
      routing-instance;
      timestamp;
      vlan-id;
    }
    ingress-stats {
      all-fields;
      drop-packets;
      input-bytes;
      input-packets;
      output-bytes;
      output-packets;
      queue-id;
    }
    l2-stats {
      all-fields;
      input-mcast-bytes;
      input-mcast-packets;
    }
    overall-packet {
      all-fields;
      input-bytes;
      input-discards;
```

```
    input-errors;
    input-packets;
    inputv6-bytes;
    inputv6-packets;
    output-bytes;
    output-errors;
    output-packets;
    outputv6-bytes;
    outputv6-packets;
  }
}
file filename;
format (csv | ipdr)
interval minutes;
schema-version schema-name;
}
flat-file-profile profile-name{
  fields {
    all-fields;
    egress-stats {
      all-fields;
      input-bytes;
      input-packets;
      output-bytes;
      output-packets;
      queue-id;
      red-drop-bytes;
      red-drop-packets;
      tail-drop-packets;
    }
    general-param {
      all-fields;
      accounting-type;
      descr;
      line-id;
      logical-interface;
      nas-port-id;
      physical-interface;
      routing-instance;
      timestamp;
      vlan-id;
    }
    ingress-stats {
      all-fields;
      drop-packets;
      input-bytes;
      input-packets;
      output-bytes;
      output-packets;
      queue-id;
    }
    l2-stats {
      all-fields;
      input-mcast-bytes;
      input-mcast-packets;
```



```

    }
    overall-packet {
        all-fields;
        input-bytes;
        input-discards;
        input-errors;
        input-packets;
        inputv6-bytes;
        inputv6-packets;
        output-bytes;
        output-errors;
        output-packets;
        outputv6-bytes;
        outputv6-packets;
    }
}
file filename;
format (csv | ipdr)
interval minutes;
schema-version schema-name;
}
interface-profile profile-name {
    fields {
        field-name;
    }
    file filename;
    interval minutes;
}
mib-profile profile-name {
    file filename;
    interval minutes;
    object-names {
        mib-object-name;
    }
    operation operation-name;
}
routing-engine-profile profile-name {
    fields {
        field-name;
    }
    file filename;
    interval minutes;
}
}
}

```

- Apply the profiles to the chosen interfaces or filters.

Apply an interface profile to a physical or logical interface by including the **accounting-profile** statement at either the **[edit interfaces *interface-name*]** or the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level.

```

[edit interfaces]
interface-name {
    accounting-profile profile-name;
}

```

```
unit logical-unit-number {  
    accounting-profile profile-name;  
}  
}
```



NOTE: You do not apply destination class profiles to interfaces. Although the interface needs to have the **destination-class-usage** statement configured, the destination class profile automatically finds all interfaces with the destination class configured.

Apply a filter profile to a firewall filter by including the **accounting-profile** statement at the **[edit firewall filter *filter-name*]** hierarchy level:

```
[edit firewall]  
filter filter-name {  
    accounting-profile profile-name;  
}
```

You do not need to apply the Routing Engine profile to an interface because the statistics are collected on the Routing Engine itself.

**Related
Documentation**

- [Accounting Options Overview on page 431](#)
- [Understanding Device Management Functions in Junos OS on page 3](#)
- [Configuring Accounting-Data Log Files on page 444](#)
- [Configuring the Interface Profile on page 450](#)
- [Configuring the Filter Profile on page 453](#)
- [Configuration Statements at the \[edit accounting-options\] Hierarchy Level on page 435](#)

Configuring Accounting-Data Log Files

An accounting profile specifies what statistics to collect and write to a log file. To configure an accounting-data log file, include the **file** statement at the **[edit accounting-options]** hierarchy level:

```
[edit accounting-options]  
cleanup-interval {  
    interval days;  
}  
file filename {  
    archive-sites {  
        site-name;  
    }  
    backup-on-failure (master-and-slave | master-only);  
    files number;  
    nonpersistent;  
    push-backup-to-master;
```

```
size bytes;
start-time time;
transfer-interval minutes;
}
```

where **filename** is the name of the file in which to write accounting data.

If the filename contains spaces, enclose it in quotation marks (" "). The filename cannot contain a forward slash (/). The file is created in the **/var/log** directory and can contain data from multiple profiles.

All accounting-data log files include header and trailer sections that start with a **#** in the first column. The header contains the file creation time, the hostname, and the columns that appear in the file. The trailer contains the time that the file was closed.

Whenever any configured value changes that affects the columns in a file, the file creates a new profile layout record that contains a new list of columns.

You must configure the file size; all other properties are optional.

- [Configuring How Long Backup Files Are Retained on page 445](#)
- [Configuring the Maximum Size of the File on page 446](#)
- [Configuring Archive Sites for the Files on page 446](#)
- [Configuring Local Backup for Accounting Files on page 446](#)
- [Configuring Files to Be Compressed on page 447](#)
- [Configuring the Maximum Number of Files on page 447](#)
- [Configuring the Storage Location of the File on page 447](#)
- [Configuring Files to Be Saved After a Change in Mastership on page 448](#)
- [Configuring the Start Time for File Transfer on page 448](#)
- [Configuring the Transfer Interval of the File on page 449](#)

Configuring How Long Backup Files Are Retained

You can configure how many days the files are retained in the local directory before they are deleted.



NOTE: Files saved to the **/var/log/pfedBackup** directory are always compressed to conserve local storage, regardless of whether the **compress** statement is configured.

To configure retention for backup files:

- Specify the number of days.

```
[edit accounting-options]
user@host# set cleanup-interval interval days
```



NOTE: Files are retained for 1 day if you do not configure this option.

This value, whether configured or default, applies to all configured files at the **[edit accounting-options file]** hierarchy level.

Configuring the Maximum Size of the File

To configure the maximum size of the file:

- Specify the size.

```
[edit accounting-options file filename]
size bytes;
```

The **size** statement is the maximum size of the log file, in bytes, kilobytes (KB), megabytes (MB), or gigabytes (GB). The minimum value for **bytes** is 256 KB. You must configure **bytes**; the remaining attributes are optional.

Configuring Archive Sites for the Files

After a file reaches its maximum size or the **transfer-interval** time is exceeded, the file is closed, renamed, and, if you configured an archive site, transferred to a remote host.

To configure the sites where files are archived:

- Specify one or more site names.

```
[edit accounting-options file filename]
user@host# set archive-sites site-name
```

where **site-name** is any valid FTP URL. For more information about specifying valid FTP URLs, see the *Junos OS Administration Library*. You can specify more than one URL, in any order. When a file is archived, the router or switch attempts to transfer the file to the first URL in the list, trying the next site in the list only if the transfer does not succeed. The log file is stored at the archive site with a filename of the format **router-name_log-filename_timestamp**.

Configuring Local Backup for Accounting Files

You can configure the router to save a copy of the accounting file locally when the normal transfer of the files to the archive site fails. The file is saved to the **/var/log/pfedBackup** directory of the relevant Routing Engine. You must specify whether only the files from the master Routing Engine are saved or files are saved from both the master Routing Engine and the backup (slave) Routing Engine.



NOTE: Files saved to the **/var/log/pfedBackup** directory are always compressed to conserve local storage, regardless of whether the **compress** statement is configured.

To configure local backup in the event of failure:

- Specify local backup and which files are saved.

```
[edit accounting-options file filename]
user@host# set backup-on-failure (master-and-slave | master-only)
```

Disabling this feature deletes the backed-up accounting files from the directory.



NOTE: When you do not configure this option, the file is saved on failure into the local directory specified as the last site in the list of archive sites.

Configuring Files to Be Compressed

By default, accounting files are transferred in an uncompressed format. To conserve resources during transmission and on the archive site, you can configure compression for the files.



NOTE: Files saved to the `/var/log/pfedBackup` directory are always compressed to conserve local storage, regardless of whether the `compress` statement is configured.

To configure the router to compress accounting files when they are transferred:

- Specify compression.

```
[edit accounting-options file filename]
user@host# set compress
```

Configuring the Maximum Number of Files

To configure the maximum number of files:

- Specify the number.

```
[edit accounting-options file filename]
user@host# set files number
```

When a log file reaches its maximum size, it is renamed **filename.0**, then **filename.1**, and so on, until the maximum number of log files is reached. Then the oldest log file is overwritten. The minimum value for **number** is 3 and the default value is 10.

Configuring the Storage Location of the File

On J Series Services Routers, the files are stored by default on the compact flash drive. Alternatively, you can configure the files to be stored in the **mfs/var/log** directory (on DRAM) instead of the **cf/var/log** directory (on the compact flash drive).

To configure the storage location on DRAM:

- Specify nonpersistent storage.

```
[edit accounting-options file filename]
user@host# set nonpersistent
```

This feature is useful for minimizing read/write traffic on the router's compact flash drive.



NOTE: If log files for accounting data are stored on DRAM, these files are lost when you reboot the router. We recommend that you back up these files periodically.

Configuring Files to Be Saved After a Change in Mastership

You can configure the router to save the accounting files from the new backup Routing Engine to the new master Routing Engine when a change in mastership occurs. The files are stored in the `/var/log/pfedBackup` directory on the router. The master Routing Engine includes these accounting files with its own current accounting files when it transfers the files from the backup directory to the archive site at the next transfer interval. Configure this option when the new backup Routing Engine is not able to connect to the archive site; for example, when the site is not connected by means of an out-of-band interface or the path to the site is routed through a line card.

To configure the backup Routing Engine files to be saved when mastership changes:

- Specify the backup.

```
[edit accounting-options file filename]
user@host# set push-backup-to-master
```



NOTE: The backup Routing Engine's files on the master Routing Engine are sent at each interval even though the files remain the same. If this is more activity than you want, consider using the `backup-on-failure master-and-slave` statement instead.

Configuring the Start Time for File Transfer

To configure the start time for transferring files:

- Specify the time.

```
[edit accounting-options file filename]
user@host# set start-time YYYY-MM-DD.hh:mm
```

For example, 10:00 a.m. on January 30, 2007 is represented as `2007-01-30.10:00`.

Configuring the Transfer Interval of the File

To configure the interval at which files are transferred:

- Specify the interval.

```
[edit accounting-options file filename]
user@host# set transfer-interval minutes
```

The range for **transfer-interval** is 5 through 2880 minutes. The default is 30 minutes.



TIP:

Junos OS saves the existing log file and creates a new file at the configured transfer intervals irrespective of whether:

- The file has reached the maximum size.
- An archive site is configured.

When you have a relatively small transfer interval configured and if no archive site is configured, data can be lost as Junos OS overwrites the log files when the maximum number of log files is reached. To ensure that the log information is saved for a reasonably long time:

- Configure an archive site to archive the log files every time a new log file is created.
- Configure the maximum value (2880 minutes) for **transfer-interval** so that new files are created less frequently; that is, only when the file exceeds the maximum size limit or once in 2 days.

Related Documentation

- [Accounting Options Overview on page 431](#)
- [Understanding Device Management Functions in Junos OS on page 3](#)
- [Accounting Options Configuration on page 437](#)
- [Configuring the Interface Profile on page 450](#)
- [Configuring the Filter Profile on page 453](#)

Managing Accounting Files

If you configure SRX300, SRX320, SRX340, SRX345, SRX550M, SRX1500, SRX4100, SRX4200, and SRX4600 devices to capture accounting data in log files, set the location for your accounting files to the DRAM.

The default location for accounting files is the **cfs/var/log** directory on the CompactFlash (CF) card. The **nonpersistent** option minimizes the read/write traffic to your CF card. We

recommend that you use the **nonpersistent** option for all accounting files configured on your system.

To store accounting log files in DRAM instead of the CF card:

1. Enter configuration mode in the CLI.
2. Create an accounting data log file in DRAM and replace *filename* with the name of the file.

```
[edit]
user@host# edit accounting-options file filename
```

3. Store accounting log files in the DRAM file.

```
[edit]
user@host# set file filename nonpersistent
```



CAUTION: If log files for accounting data are stored on DRAM, these files are lost when the device reboots. Therefore, we recommend that you back up these files periodically.



NOTE: The CLI **nonpersistent** option is not supported on SRX5000 Series devices.

Related
Documentation

- [Accounting Options Overview on page 431](#)

Configuring the Interface Profile

An interface profile specifies the information collected and written to a log file. You can configure a profile to collect error and statistic information for input and output packets on a particular physical or logical interface.

To configure an interface profile, include the **interface-profile** statement at the **[edit accounting-options]** hierarchy level:

```
[edit accounting-options]
interface-profile profile-name {
  fields {
    field-name;
  }
  file filename;
  interval minutes;
}
```


By default, the Packet Forwarding Engine (PFE) periodically collects the statistics for all interfaces. To improve the performance, you can optionally disable the periodic refresh by including the **periodic-refresh disable** statement at the **[edit accounting-options]** hierarchy level.

Each accounting profile must have a unique **profile-name**. To apply a profile to a physical or logical interface, include the **accounting-profile** statement at either the **[edit interfaces interface-name]** or the **[edit interfaces interface-name unit logical-unit-number]** hierarchy level. You can also apply an accounting profile at the **[edit firewall family family-type filter filter-name]** hierarchy level. For more information, see the *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide*.

To configure an interface profile, perform the tasks described in the following sections:

- [Configuring Fields on page 451](#)
- [Configuring the File Information on page 451](#)
- [Configuring Cleared Statistics to be Reported in the Flat File on page 451](#)
- [Configuring the Interval on page 452](#)
- [Example: Configuring the Interface Profile on page 452](#)

Configuring Fields

An interface profile must specify what statistics are collected. To configure which statistics should be collected for an interface, include the **fields** statement at the **[edit accounting-options interface-profile profile-name]** hierarchy level:

```
[edit accounting-options interface-profile profile-name]
fields {
    field-name;
}
```

Configuring the File Information

Each accounting profile logs its statistics to a file in the **/var/log** directory.

To configure which file to use, include the **file** statement at the **[edit accounting-options interface-profile profile-name]** hierarchy level:

```
[edit accounting-options interface-profile profile-name]
file filename;
```

You must specify a **file** statement for the interface profile that has already been configured at the **[edit accounting-options]** hierarchy level.

Configuring Cleared Statistics to be Reported in the Flat File

When you issue the **clear interfaces statistics** command for a logical interface configured to collect accounting statistics, all accounting statistics received on that interface from the Packet Forwarding Engine are cleared. The current values when the command is issued become the new baseline and the statistics counters are reset to zero. The new values, starting from zero, are displayed in the CLI. However, they are not reported that

way in the accounting flat file associated with the interface. Instead, the values as reported in the file continue to increment as if the command had not been issued.

You can change this result by including the **allow-clear** statement in the interface profile. In this case, when you issue the **clear interfaces statistics** command, the statistics are reset to zero and reported to the flat file.

To configure reporting of cleared accounting statistics to the flat file, specify reporting:

```
[edit accounting-options interface-profile profile-name]
allow-clear;
```

Configuring the Interval

Each interface with an accounting profile enabled has statistics collected once per interval time specified for the accounting profile. Statistics collection time is scheduled evenly over the configured interval. To configure the interval, include the **interval** statement at the **[edit accounting-options interface-profile *profile-name*]** hierarchy level:

```
[edit accounting-options interface-profile profile-name]
interval minutes;
```



NOTE: The minimum interval allowed is 1 minute. Configuring a low interval in an accounting profile for a large number of interfaces might cause serious performance degradation.

The range for the **interval** statement is 1 through 2880 minutes. The default is 30 minutes.

Example: Configuring the Interface Profile

Configure the interface profile:

```
[edit]
accounting-options {
  file if_stats {
    size 40 files 5;
  }
  interface-profile if_profile1 {
    file if_stats;
    interval 30;
    fields {
      input-bytes;
      output-bytes;
      input-packets;
      output-packets;
      input-multicast;
      output-multicast;
    }
  }
  interface-profile if_profile2 {
    file if_stats;
```

```

interval 30;
fields {
    input-bytes;
    output-bytes;
    input-packets;
    output-packets;
    input-multicast;
    output-multicast;
}
}
interfaces {
    xe-1/0/0 {
        accounting-profile if_profile1;
        unit 0 {
            accounting-profile if_profile2;
            ...
        }
    }
}
}

```

The two interface profiles, if-profile1 and if-profile2, write data to the same file, if-stats. The if-stats file might look like the following:

```

#FILE CREATED 976823478 2000-12-14-19:51:18
#hostname host
#profile-layout
if_profile2,epoch-timestamp,interface-name,snmp-index,input-bytes,output-bytes,
input-packets,output-packets,input-multicast,output-multicast
#profile-layout
if_profile1,epoch-timestamp,interface-name,snmp-index,input-bytes,output-bytes,
input-packets
if_profile2,976823538,xe-1/0/0.0,8,134696815,3681534,501088,40723,0,0
if_profile1,976823538,xe-1/0/0,7,134696815,3681534,501088
...
#FILE CLOSED 976824378 2000-12-14-20:06:18

```

Related Documentation

- [Accounting Options Overview on page 431](#)
- [Understanding Device Management Functions in Junos OS on page 3](#)
- [Accounting Options Configuration on page 437](#)
- [Configuring Accounting-Data Log Files on page 444](#)
- [Configuring the Filter Profile on page 453](#)
- [Configuration Statements at the \[edit accounting-options\] Hierarchy Level on page 435](#)

Configuring the Filter Profile

A filter profile specifies error and statistics information collected and written to a file. A filter profile must specify counter names for which statistics are collected.

To configure a filter profile, include the **filter-profile** statement at the **[edit accounting-options]** hierarchy level:

```
[edit accounting-options]
filter-profile profile-name {
  counters {
    counter-name;
  }
  file filename;
  interval minutes;
}
```

To apply the filter profile, include the **accounting-profile** statement at the **[edit firewall filter filter-name]** hierarchy level.

To configure a filter profile, perform the tasks described in the following sections:

- [Configuring the Counters on page 454](#)
- [Configuring the File Information on page 454](#)
- [Configuring the Interval on page 455](#)

Configuring the Counters

Statistics are collected for all counters specified in the filter profile. To configure the counters, include the **counters** statement at the **[edit accounting-options filter-profile profile-name]** hierarchy level:

```
[edit accounting-options filter-profile profile-name]
counters {
}
```

Configuring the File Information

Each accounting profile logs its statistics to a file in the **/var/log** directory.

To configure which file to use, include the **file** statement at the **[edit accounting-options filter-profile profile-name]** hierarchy level:

```
[edit accounting-options filter-profile profile-name]
file filename;
```

You must specify a filename for the filter profile that has already been configured at the **[edit accounting-options]** hierarchy level.



NOTE: The limit on the total number of characters per line in a log file equals 1023. If this limit is exceeded, the output written to the log file is incomplete. Ensure that you limit the number of counters or requested data so that this character limit is not exceeded.



NOTE: If the configured file size or transfer interval is exceeded, Junos OS closes the file and starts a new one. By default, the transfer interval value is 30 minutes. If the transfer interval is not configured, Junos OS closes the file and starts a new one when the file size exceeds its configured value or the default transfer interval value exceeds 30 minutes. To avoid transferring files every 30 minutes, specify a different value for the transfer interval.

Configuring the Interval

Each filter with an accounting profile enabled has statistics collected once per interval time specified for the accounting profile. Statistics collection time is scheduled evenly over the configured interval. To configure the interval, include the **interval** statement at the **[edit accounting-options filter-profile *profile-name*]** hierarchy level:

```
[edit accounting-options filter-profile profile-name]  
interval;
```



NOTE: The minimum interval allowed is 1 minute. Configuring a low interval in an accounting profile for a large number of filters might cause serious performance degradation.

The range for the **interval** statement is 1 through 2880 minutes. The default is 30 minutes.

Related Documentation

- [Accounting Options Overview on page 431](#)
- [Understanding Device Management Functions in Junos OS on page 3](#)
- [Accounting Options Configuration on page 437](#)
- [Configuring Accounting-Data Log Files on page 444](#)

Example: Configuring a Filter Profile

Configure a filter profile:

```
[edit]  
accounting-options {  
  file fw_accounting {  
    size 500k files 4;  
  }  
  filter-profile fw_profile1 {  
    file fw_accounting;  
    interval 60;  
    counters {  
      counter1;  
      counter2;  
      counter3;  
    }  
  }  
}
```

```

    }
  }
  firewall {
    filter myfilter {
      accounting-profile fw_profile1;
      ...
      term accept-all {
        then {
          count counter1;
          accept;
        }
      }
    }
  }
}

```

The filter profile, **fw-profile1**, writes data to the file **fw_accounting**. The file might look like the following:

```

#FILE CREATED 976825278 2000-12-14-20:21:18
#hostname host
#profile-layout
fw_profile1,epoch-timestamp,filter-name,counter-name,packet-count,byte-count
fw_profile1,976826058,myfilter,counter1,163,10764
...
#FILE CLOSED 976826178 2000-12-14-20:36:18

```

**Related
Documentation**

- [Configuring the Filter Profile on page 453](#)
- [Example: Configuring Interface-Specific Firewall Counters and Filter Profiles on page 456](#)

Example: Configuring Interface-Specific Firewall Counters and Filter Profiles

To collect and log count statistics collected by firewall filters on a per-interface basis, you must configure a filter profile and include the interface-specific statement at the **[edit firewall filter *filter-name*]** hierarchy level.

Configure the firewall filter accounting profile:

```

[edit accounting-options]
file cust1_accounting {
  size 500k;
}
filter-profile cust1_profile {
  file cust1_accounting;
  interval 1;
  counters {
    r1;
  }
}

```

Configure the interface-specific firewall counter:

```
[edit firewall]
filter f3 {
  accounting-profile cust1_profile;
  interface-specific;
  term f3-term {
    then {
      count r1;
      accept;
    }
  }
}
```

Apply the firewall filter to an interface:

```
[edit interfaces]
xe-1/0/0 {
  unit 0 {
    family inet {
      filter {
        input f3;
        output f3;
      }
      address 20.20.20.30/24;
    }
  }
}
```

The following example shows the contents of the **cust1_accounting** file in the **/var/log** folder that might result from the preceding configuration:

```
#FILE CREATED 995495212 2001-07-18-22:26:52
#hostname host
#profile-layout cust1_profile,epoch-timestamp,interfaces,filter-name,
counter-name,packet-count,byte-count
cust1_profile,995495572,xe-1/0/0.0,f3-xe-1/0/0.0-i,r1-xe-1/0/0.0-i,5953,1008257
cust1_profile,995495602,xe-1/0/0.0,f3-xe-1/0/0.0-o,r1-xe-1/0/0.0-o,5929,1006481
...
```

If the **interface-specific** statement is not included in the configuration, the following output might result:

```
#FILE CREATED 995495212 2001-07-18-22:26:52
#hostname host
#profile-layout cust1_profile,epoch-timestamp,interfaces,filter-name,
counter-name,packet-count,byte-count
cust1_profile,995495572,xe-1/0/0.0,f3,r1,5953,1008257
cust1_profile,995495632,xe-1/0/0.0,f3,r1,5929,1006481
```

Related Documentation

- [Configuring the Filter Profile on page 453](#)
- [Configuring the Interface Profile on page 450](#)

Configuring SCU or DCU

To configure SCU or DCU, perform the following tasks described in this section:



NOTE: We recommend that you stop the network traffic on an interface before you modify the DCU or SCU configuration for that interface. Modifying the DCU or SCU configuration without stopping the traffic might corrupt the DCU or SCU statistics. Before you restart the traffic after modifying the configuration, enter the `clear interfaces statistics` command.

- [Creating Prefix Route Filters in a Policy Statement on page 458](#)
- [Applying the Policy to the Forwarding Table on page 458](#)
- [Enabling Accounting on Inbound and Outbound Interfaces on page 458](#)

Creating Prefix Route Filters in a Policy Statement

To define prefix router filters:

```
[edit policy-options]
policy-statement scu-1 {
  term term1;
  from {
    route-filter 192.0.2.0/24 or longer;
  }
  then source-class gold;
}
```

Applying the Policy to the Forwarding Table

To apply the policy to the forwarding table:

```
[edit]
routing-options {
  forwarding-table {
    export scu-1;
  }
}
```

Enabling Accounting on Inbound and Outbound Interfaces

To enable accounting on inbound and outbound interfaces:

```
[edit]
interfaces {
  so-6/1/0 {
    unit 0 {
      family inet;
      accounting {
        destination-class-usage;
      }
    }
  }
}
```



```

        source-class-usage {
            output;
        }
    }
}
[edit]
interfaces {
    xe-0/1/0 {
        unit 0 {
            family inet6 {
                accounting {
                    source-class-usage {
                        input;
                    }
                }
            }
        }
    }
}

```

Optionally, you can include the input and output statements on a single interface as shown:

```

[edit]
interfaces {
    xe-0/1/2 {
        unit 0 {
            family inet6 {
                accounting {
                    source-class-usage {
                        input;
                        output;
                    }
                }
            }
        }
    }
}

```

For more information about configuring route filters and source classes in a routing policy, see the *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide* and the *Junos OS Network Interfaces Library for Routing Devices*.

Related Documentation

- [Understanding Source Class Usage and Destination Class Usage Options on page 432](#)
- [Configuring SCU on a Virtual Loopback Tunnel Interface on page 460](#)
- [Configuring Class Usage Profiles on page 461](#)
- [Configuring the MIB Profile on page 464](#)
- [Configuring the Routing Engine Profile on page 466](#)

Configuring SCU on a Virtual Loopback Tunnel Interface

To configure source class usage on the virtual loopback tunnel interface, perform the tasks described in the following sections:

- [Example: Configuring a Virtual Loopback Tunnel Interface on a Provider Edge Router Equipped with a Tunnel PIC on page 460](#)
- [Example: Mapping the VRF Instance Type to the Virtual Loopback Tunnel Interface on page 460](#)
- [Example: Sending Traffic Received from the Virtual Loopback Interface Out the Source Class Output Interface on page 461](#)

Example: Configuring a Virtual Loopback Tunnel Interface on a Provider Edge Router Equipped with a Tunnel PIC

Define a virtual loop interface on a provider edge router with a Tunnel PIC:

```
[edit interfaces]
vt-0/3/0 {
  unit 0 {
    family inet {
      accounting {
        source-class-usage {
          input;
        }
      }
    }
  }
}
```

Example: Mapping the VRF Instance Type to the Virtual Loopback Tunnel Interface

Map the VRF instance type to the virtual loopback tunnel interface:

```
[edit]
routing-instances {
  VPN-A {
    instance-type vrf;
    interface at-2/1/1.0;
    interface vt-0/3/0.0;
    route-distinguisher 10.255.14.225;
    vrf-import import-policy-name;
    vrf-export export-policy-name;
    protocols {
      bgp {
        group to-r4 {
          local-address 10.27.253.1;
          peer-as 400;
          neighbor 10.27.253.2;
        }
      }
    }
  }
}
```

```
}
}
```



NOTE: For SCU and DCU to work, do not include the `vrf-table-label` statement at the `[edit routing-instances instance-name]` hierarchy level.

Example: Sending Traffic Received from the Virtual Loopback Interface Out the Source Class Output Interface

Send traffic received from the virtual loopback tunnel interface out of the source class output interface:

```
[edit interfaces]
at-1/1/0 {
  unit 0 {
    family inet {
      accounting {
        source-class-usage {
          output;
        }
      }
    }
  }
}
```

For more information about configuring source class usage on the virtual loopback tunnel interface, see the *Junos OS Network Interfaces Library for Routing Devices*.

Related Documentation

- [Understanding Source Class Usage and Destination Class Usage Options on page 432](#)
- [Configuring SCU or DCU on page 458](#)
- [Configuring Class Usage Profiles on page 461](#)
- [Configuring the MIB Profile on page 464](#)
- [Configuring the Routing Engine Profile on page 466](#)

Configuring Class Usage Profiles

To collect class usage statistics, perform the tasks described in these sections:

- [Configuring a Class Usage Profile on page 462](#)
- [Configuring the File Information on page 462](#)
- [Configuring the Interval on page 462](#)
- [Creating a Class Usage Profile to Collect Source Class Usage Statistics on page 463](#)
- [Creating a Class Usage Profile to Collect Destination Class Usage Statistics on page 463](#)

Configuring a Class Usage Profile

You can configure the class usage profile to collect statistics for particular source and destination classes.

To configure the class usage profile to filter by source classes, include the **source-classes** statement at the **[edit accounting-options class-usage-profile *profile-name*]** hierarchy level:

```
[edit accounting-options class-usage-profile profile-name]  
source-classes {  
    source-class-name;  
}
```

To configure the class usage profile to filter by destination classes, include the **destination-classes** statement at the **[edit accounting-options class-usage-profile *profile-name*]** hierarchy level:

```
[edit accounting-options class-usage-profile profile-name]  
destination-classes {  
    destination-class-name;  
}
```

Configuring the File Information

Each accounting profile logs its statistics to a file in the **/var/log** directory.

To specify which file to use, include the **file** statement at the **[edit accounting-options class-usage-profile *profile-name*]** hierarchy level:

```
[edit accounting-options class-usage-profile profile-name]  
file filename;
```

You must specify a filename for the source class usage profile that has already been configured at the **[edit accounting-options]** hierarchy level. You can also specify a filename for the destination class usage profile configured at the **[edit accounting-options]** hierarchy level.

Configuring the Interval

Each interface with a class usage profile enabled has statistics collected once per interval specified for the accounting profile. Statistics collection time is scheduled evenly over the configured interval. To configure the interval, include the **interval** statement at the **[edit accounting-options class-usage-profile *profile-name*]** hierarchy level:

```
[edit accounting-options class-usage-profile profile-name]  
interval;
```

Creating a Class Usage Profile to Collect Source Class Usage Statistics

To create a class usage profile to collect source class usage statistics:

```
[edit]
accounting-options {
  class-usage-profile scu-profile1;
  file usage-stats;
  interval 15;
  source-classes {
    gold;
    silver;
    bronze;
  }
}
```

The class usage profile, **scu-profile1**, writes data to the file **usage_stats**. The file might look like the following:

```
#FILE CREATED 976825278 2000-12-14-20:21:18
#profile-layout, scu_profile,epoch-timestamp,interface-name,source-class,
packet-count,byte-count
scu_profile,980313078,xe-1/0/0.0,gold,82,6888
scu_profile,980313078,xe-1/0/0.0,silver,164,13776
scu_profile,980313078,xe-1/0/0.0,bronze,0,0
scu_profile,980313678,xe-1/0/0.0,gold,82,6888
scu_profile,980313678,xe-1/0/0.0,silver,246,20664
scu_profile,980313678,xe-1/0/0.0,bronze,0,0
```

Creating a Class Usage Profile to Collect Destination Class Usage Statistics

To create a class usage profile to collect destination class usage statistics:

```
[edit]
accounting-options {
  class-usage-profile dcu-profile1;
  file usage-stats
  interval 15;
  destination-classes {
    gold;
    silver;
    bronze;
  }
}
```

The class usage profile, **dcu-profile1**, writes data to the file **usage_stats**. The file might look like the following:

```
#FILE CREATED 976825278 2000-12-14-20:21:18
#profile-layout, dcu_profile,epoch-timestamp,interface-name,destination-class,
packet-count,byte-count
dcu_profile,980313078,xe-1/0/0.0,gold,82,6888
dcu_profile,980313078,xe-1/0/0.0,silver,164,13776
```

```
dcu_profile,980313078,xe-1/0/0.0,bronze,0,0
dcu_profile,980313678,xe-1/0/0.0,gold,82,6888
dcu_profile,980313678,xe-1/0/0.0,silver,246,20664
dcu_profile,980313678,xe-1/0/0.0,bronze,0,0
...
#FILE CLOSED 976826178 2000-12-14-20:36:18
```

**Related
Documentation**

- [Understanding Source Class Usage and Destination Class Usage Options on page 432](#)
- [Configuring SCU or DCU on page 458](#)
- [Configuring SCU on a Virtual Loopback Tunnel Interface on page 460](#)
- [Configuring the Routing Engine Profile on page 466](#)

Configuring the MIB Profile

The MIB profile collects MIB statistics and logs them to a file. The MIB profile specifies the SNMP operation and MIB object names for which statistics are collected.

To configure a MIB profile, include the **mib-profile** statement at the **[edit accounting-options]** hierarchy level:

```
[edit accounting-options]
mib-profile profile-name {
  file filename;
  interval minutes;
  object-names {
    mib-object-name;
  }
  operation operation-name;
}
```

To configure a MIB profile, perform the tasks described in the following sections:

- [Configuring the File Information on page 464](#)
- [Configuring the Interval on page 465](#)
- [Configuring the MIB Operation on page 465](#)
- [Configuring MIB Object Names on page 465](#)
- [Example: Configuring a MIB Profile on page 465](#)

Configuring the File Information

Each accounting profile logs its statistics to a file in the **/var/log** directory.

To configure which file to use, include the **file** statement at the **[edit accounting-options mib-profile profile-name]** hierarchy level:

```
[edit accounting-options mib-profile profile-name]
file filename;
```

You must specify a **filename** for the MIB profile that has already been configured at the **[edit accounting-options]** hierarchy level.

Configuring the Interval

A MIB profile has statistics collected once per interval time specified for the profile. Statistics collection time is scheduled evenly over the configured interval. To configure the interval, include the **interval** statement at the **[edit accounting-options mib-profile profile-name]** hierarchy level:

```
[edit accounting-options mib-profile profile-name]
interval;
```

The range for the **interval** statement is 1 through 2880 minutes. The default is 30 minutes.

Configuring the MIB Operation

A MIB profile must specify the operation that is used to collect MIB statistics. To configure which operation is used to collect MIB statistics, include the **operation** statement at the **[edit accounting-options mib-profile profile-name]** hierarchy level:

```
[edit accounting-options mib-profile profile-name]
operation operation-name;
```

You can configure a **get**, **get-next**, or **walk** operation. The default operation is **walk**.

Configuring MIB Object Names

A MIB profile must specify the MIB objects for which statistics are to be collected. To configure the MIB objects for which statistics are collected, include the **objects-names** statement at the **[edit accounting-options mib-profile profile-name]** hierarchy level:

```
[edit accounting-options mib-profile profile-name]
object-names {
  mib-object-name;
}
```

You can include multiple MIB object names in the configuration.



NOTE: In Junos OS Release 15.1X49-D10 and later, do not configure MIB objects related to interface octets or packets for a MIB profile, because it can cause the SNMP walk or a CLI show command to time out.

Example: Configuring a MIB Profile

Configure a MIB profile:

```
[edit accounting-options]
mib-profile mstatistics {
  file stats;
  interval 60;
  operation walk;
```

```

objects-names {
  ipCidrRouteStatus;
}

```

Release History Table

Release	Description
15.1X49-D10	In Junos OS Release 15.1X49-D10 and later, do not configure MIB objects related to interface octets or packets for a MIB profile, because it can cause the SNMP walk or a CLI show command to time out.

Related Documentation

- [Understanding Source Class Usage and Destination Class Usage Options on page 432](#)
- [Configuring SCU or DCU on page 458](#)
- [Configuring SCU on a Virtual Loopback Tunnel Interface on page 460](#)
- [Configuring Class Usage Profiles on page 461](#)
- [Configuring the Routing Engine Profile on page 466](#)

Configuring the Routing Engine Profile

The Routing Engine profile collects Routing Engine statistics and logs them to a file. The Routing Engine profile specifies the fields for which statistics are collected.

To configure a Routing Engine profile, include the **routing-engine-profile** statement at the **[edit accounting-options]** hierarchy level:

```

[edit accounting-options]
routing-engine-profile profile-name {
  fields {
    field-name;
  }
  file filename;
  interval minutes;
}

```

To configure a Routing Engine profile, perform the tasks described in the following sections:

- [Configuring Fields on page 467](#)
- [Configuring the File Information on page 467](#)
- [Configuring the Interval on page 467](#)
- [Example: Configuring a Routing Engine Profile on page 467](#)

Configuring Fields

A Routing Engine profile must specify what statistics are collected. To configure which statistics should be collected for the Routing Engine, include the **fields** statement at the **[edit accounting-options routing-engine-profile *profile-name*]** hierarchy level:

```
[edit accounting-options routing-engine-profile profile-name]
fields {
  field-name;
}
```

Configuring the File Information

Each accounting profile logs its statistics to a file in the **/var/log** directory.

To configure which file to use, include the **file** statement at the **[edit accounting-options routing-engine-profile *profile-name*]** hierarchy level:

```
[edit accounting-options routing-engine-profile profile-name]
file filename;
```

You must specify a ***filename*** for the Routing Engine profile that has already been configured at the **[edit accounting-options]** hierarchy level.

Configuring the Interval

A Routing Engine profile has statistics collected once per interval time specified for the profile. Statistics collection time is scheduled evenly over the configured interval. To configure the interval, include the **interval** statement at the **[edit accounting-options routing-engine-profile *profile-name*]** hierarchy level:

```
[edit accounting-options routing-engine-profile profile-name]
interval;
```

The range for **interval** is 1 through 2880 minutes. The default is 30 minutes.

Example: Configuring a Routing Engine Profile

Configure a Routing Engine profile:

```
[edit accounting-options]
file my-file {
  size 300k;
}
routing-engine-profile profile-1 {
  file my-file;
  fields {
    host-name;
    date;
    time-of-day;
    uptime;
    cpu-load-1;
    cpu-load-5;
```

```
    cpu-load-15;  
  }  
}
```

**Related
Documentation**

- [Understanding Source Class Usage and Destination Class Usage Options on page 432](#)
- [Configuring SCU or DCU on page 458](#)
- [Configuring SCU on a Virtual Loopback Tunnel Interface on page 460](#)
- [Configuring Class Usage Profiles on page 461](#)
- [Configuring the MIB Profile on page 464](#)

PART 7

Monitoring Options

- [Configuring Interface Alarms on page 471](#)
- [Configuring Real-Time Performance Monitoring on page 483](#)
- [Configuring IP Monitoring on page 525](#)
- [Configuring sFlow Monitoring Technology on page 541](#)
- [Packet Flow Accelerator Diagnostics Software on page 575](#)

CHAPTER 19

Configuring Interface Alarms

- [Alarm Overview on page 471](#)
- [Monitoring Active Alarms on a Device on page 477](#)
- [Monitoring Alarms on page 478](#)
- [Example: Configuring Interface Alarms on page 480](#)

Alarm Overview

Alarms alert you to conditions on a network interface, on the device chassis, or in the system software that might prevent the device from operating normally. You can set the conditions that trigger alarms on an interface. Chassis and system alarm conditions are preset.

An active alarm lights the **ALARM** LED on the front panel of the device. You can monitor active alarms from the J-Web user interface or the CLI. When an alarm condition triggers an alarm, the device lights the yellow (amber) **ALARM** LED on the front panel. When the condition is corrected, the light turns off.

This section contains the following topics:

- [Alarm Types on page 471](#)
- [Alarm Severity on page 472](#)
- [Alarm Conditions on page 472](#)

Alarm Types

The device supports three types of alarms:

- Interface alarms indicate a problem in the state of the physical links on fixed or installed Physical Interface Modules (PIMs). To enable interface alarms, you must configure them.
- Chassis alarms indicate a failure on the device or one of its components. Chassis alarms are preset and cannot be modified.
- System alarms indicate a missing rescue configuration or software license, where valid. System alarms are preset and cannot be modified, although you can configure them to appear automatically in the J-Web user interface or CLI.

Starting with Junos OS Release 15.1X49-D60 and Junos OS Release 17.3R1, a new system alarm is introduced to indicate that the PICs (I/O card or SPC) have failed to come online during system start time.



NOTE: Run the following commands when the CLI prompt indicates that an alarm has been raised:

- `show system alarms`
- `show chassis alarms`
- `show chassis fpc pic-status`

For more information about the CLI commands, see [show system alarms](#), [show chassis alarms](#), and [show chassis fpc \(View\)](#).

Alarm Severity

Alarms have two severity levels:

- **Major (red)**—Indicates a critical situation on the device that has resulted from one of the following conditions. A red alarm condition requires immediate action.
 - One or more hardware components have failed.
 - One or more hardware components have exceeded temperature thresholds.
 - An alarm condition configured on an interface has triggered a critical warning.
- **Minor (yellow)**—Indicates a noncritical condition on the device that, if left unchecked, might cause an interruption in service or degradation in performance. A yellow alarm condition requires monitoring or maintenance.

A missing rescue configuration or software license generates a yellow system alarm.

Alarm Conditions

To enable alarms on a device interface, you must select an alarm condition and an alarm severity. In contrast, alarm conditions and severity are preconfigured for chassis alarms and system alarms.



NOTE: For information about chassis alarms for your device, see the [Hardware Guide for your device](#).

This section contains the following topics:

- [Interface Alarm Conditions on page 473](#)
- [System Alarm Conditions on page 476](#)

Interface Alarm Conditions

Table 57 on page 473 lists the interface conditions, sorted by interface type, that you can configure for an alarm. You can configure each alarm condition to trigger either a major (red) alarm or minor a (yellow) alarm. The corresponding configuration option is included.

For the services stateful firewall filters (NAT, IDP, and IPsec), which operate on an internal adaptive services module within a device, you can configure alarm conditions on the integrated services and services interfaces.

Table 57: Interface Alarm Conditions

Interface	Alarm Condition	Description	Configuration Option
DS1 (T1)	Alarm indication signal (AIS)	The normal T1 traffic signal contained a defect condition and has been replaced by the AIS. A transmission interruption occurred at the remote endpoint or upstream of the remote endpoint. This all-ones signal is transmitted to prevent consequential downstream failures or alarms.	ais
	Yellow alarm	The remote endpoint is in yellow alarm failure. This condition is also known as a far-end alarm failure.	ylw
Ethernet	Link is down	The physical link is unavailable.	link-down
Integrated services	Hardware or software failure	On the adaptive services module, either the hardware associated with the module or the software that drives the module has failed.	failure

Table 57: Interface Alarm Conditions (continued)

Interface	Alarm Condition	Description	Configuration Option
Serial	Clear-to-send (CTS) signal absent	The remote endpoint of the serial link is not transmitting a CTS signal. The CTS signal must be present before data can be transmitted across a serial link.	cts-absent
	Data carrier detect (DCD) signal absent	The remote endpoint of the serial link is not transmitting a DCD signal. Because the DCD signal transmits the state of the device, no signal probably indicates that the remote endpoint of the serial link is unavailable.	dcd-absent
	Data set ready (DSR) signal absent	The remote endpoint of the serial link is not transmitting a DSR signal. The DSR signal indicates that the remote endpoint is ready to receive and transmit data across the serial link.	dsr-absent
	Loss of receive clock	The clock signal from the remote endpoint is not present. Serial connections require clock signals to be transmitted from one endpoint and received by the other endpoint of the link.	loss-of-rx-clock
	Loss of transmit clock	The local clock signal is not present. Serial connections require clock signals to be transmitted from one endpoint and received by the other endpoint of the link.	loss-of-tx-clock
Services	Services module hardware down	A hardware problem has occurred on the device's services module. This error typically means that one or more of the CPUs on the module has failed.	hw-down
	Services link down	The link between the device and its services module is unavailable.	linkdown
	Services module held in reset	The device's services module is stuck in reset mode. If the services module fails to start up five or more times in a row, the services module is held in reset mode. Startup fails when the amount of time from CPU release to CPU halt is less than 300 seconds.	pic-hold-reset
	Services module reset	The device's services module is resetting. The module resets after it crashes or is reset from the CLI, or when it takes longer than 60 seconds to start up.	pic-reset
	Services module software down	A software problem has occurred on the device's services module.	sw-down

Table 57: Interface Alarm Conditions (continued)

Interface	Alarm Condition	Description	Configuration Option
E3	Alarm indication signal (AIS)	The normal E3 traffic signal contained a defect condition and has been replaced by the AIS. A transmission interruption occurred at the remote endpoint or upstream of the remote endpoint. This all-ones signal is transmitted to prevent consequential downstream failures or alarms.	ais
	Loss of signal (LOS)	No remote E3 signal is being received at the E3 interface.	los
	Out of frame (OOF)	An OOF condition has existed for 10 seconds. This alarm applies only to E3 interfaces configured in frame mode. The OOF failure is cleared when no OOF or LOS defects have occurred for 20 seconds.	oof
	Remote defect indication	An AIS, LOS, or OOF condition exists. This alarm applies only to E3 interfaces configured in frame mode.	rdi

Table 57: Interface Alarm Conditions (continued)

Interface	Alarm Condition	Description	Configuration Option
T3 (DS3)	Alarm indication signal	The normal T3 traffic signal contained a defect condition and has been replaced by the AIS. A transmission interruption occurred at the remote endpoint or upstream of the remote endpoint. This all-ones signal is transmitted to prevent consequential downstream failures or alarms.	ais
	Excessive number of zeros	The bit stream received from the upstream host has more consecutive zeros than are allowed in a T3 frame.	exz
	Far-end receive failure (FERF)	The remote endpoint of the connection has failed. A FERF differs from a yellow alarm, because the failure can be any failure, not just an OOF or LOS failure.	ferf
	Idle alarm	The Idle signal is being received from the remote endpoint.	idle
	Line code violation	Either the line encoding along the T3 link is corrupted or a mismatch between the encoding at the local and remote endpoints of a T3 connection occurred.	lcv
	Loss of frame (LOF)	An OOF or loss-of-signal LOS condition has existed for 10 seconds. The LOF failure is cleared when no OOF or LOS defects have occurred for 20 seconds. A LOF failure is also called a red failure.	lof
	Loss of signal (LOS)	No remote T3 signal is being received at the T3 interface.	los
	Phase-locked loop out of lock	The clocking signals for the local and remote endpoints no longer operate in lock-step.	pll
	Yellow alarm	The remote endpoint is in yellow alarm failure. This condition is also known as a far-end alarm failure.	ylw

System Alarm Conditions

Table 58 on page 476 lists the two preset system alarms, the condition that triggers each alarm, and the action you take to correct the condition.

Table 58: System Alarm Conditions and Corrective Actions

Alarm Type	Alarm Condition	Corrective Action
Configuration	The rescue configuration is not set.	Set the rescue configuration.

Table 58: System Alarm Conditions and Corrective Actions (continued)

Alarm Type	Alarm Condition	Corrective Action
License	<p>You have configured at least one software feature that requires a feature license, but no valid license for the feature is currently installed.</p> <p>NOTE: This alarm indicates that you are in violation of the software license agreement. You must install a valid license key to be in compliance with all agreements.</p>	Install a valid license key.

Release History Table

Release	Description
15.1X49-D60	Starting with Junos OS Release 15.1X49-D60 and Junos OS Release 17.3R1, a new system alarm is introduced to indicate that the PICs (I/O card or SPC) have failed to come online during system start time.

Related Documentation

- [Example: Configuring Interface Alarms on page 480](#)
- [Monitoring Active Alarms on a Device on page 477](#)
- [Monitoring Alarms on page 478](#)
- [System Log Messages](#)

Monitoring Active Alarms on a Device

Purpose Use to monitor and filter alarms on a Juniper Networks device.

Action Select **Monitor>Events and Alarms>View Alarms** in the J-Web user interface. The J-Web View Alarms page displays the following information about preset system and chassis alarms:

- Type—Type of alarm: System, Chassis, or All.
- Severity—Severity class of the alarm: Minor or Major.
- Description—Description of the alarm.
- Time—Time that the alarm was registered.

To filter which alarms appear, use the following options:

- **Alarm Type**—Specifies which type of alarm to monitor: System, Chassis, or All. System alarms include FRU detection alarms (power supplies removed, for instance). Chassis alarms indicate environmental alarms such as temperature.
- **Severity**—Specifies the alarm severity that you want to monitor: Major, Minor, or All. A major (red) alarm condition requires immediate action. A minor (yellow) condition requires monitoring and maintenance.
- **Description**—Specifies the alarms you want to monitor. Enter a brief synopsis of the alarms that you want to monitor.
- **Date From**—Specifies the beginning of the date range that you want to monitor. Set the date using the calendar pick tool.
- **To**—Specifies the end of the date range that you want to monitor. Set the date using the calendar pick tool.
- **Go**—Executes the options that you specified.
- **Reset**—Clears the options that you specified.

Alternatively, you can enter the following **show** commands in the CLI editor:

- **show chassis alarms**
- **show system alarms**

Related Documentation

- [Alarm Overview on page 471](#)
- [Example: Configuring Interface Alarms on page 480](#)
- [Monitoring Alarms on page 478](#)

Monitoring Alarms

Purpose Use the monitoring functionality to view the alarms page.

Action To monitor alarms, select one of the following in the J-Web user interface:

- If you are using SRX5400, SRX5600, or SRX5800 platforms, select **Monitor>Events and Alarms>View Alarms**.
- Select **Monitor>Alarms>View Alarms**.

Meaning [Table 59 on page 478](#) summarizes key output fields in the alarms page.

Table 59: Alarms Monitoring Page

Field	Value	Additional Information
Alarm Filter		

Table 59: Alarms Monitoring Page (continued)

Field	Value	Additional Information
Alarm Type	Specifies the type of alarm to monitor: <ul style="list-style-type: none"> • System— System alarms include FRU detection alarms (power supplies removed, for instance). • Chassis— Chassis alarms indicate environmental alarms such as temperature. • All— Indicates to display all the types of alarms. 	—
Severity	Specifies the alarm severity that you want to monitor <ul style="list-style-type: none"> • Major— A major (red) alarm condition requires immediate action. • Minor— A minor (yellow) condition requires monitoring and maintenance. • All— Indicates to display all the severities. 	—
Description	Enter a brief synopsis of the alarms you want to monitor.	—
Date From	Specifies the beginning of the date range that you want to monitor. Set the date using the calendar pick tool.	—
To	Specifies the end of the date range that you want to monitor. Set the date using the calendar pick tool.	—
Go	Executes the options that you specified.	—
Reset	Clears the options that you specified.	—
Alarm Details	Displays the following information about each alarm: <ul style="list-style-type: none"> • Type— Type of alarm: System, Chassis, or All. • Severity— Severity class of the alarm: Minor or Major. • Description— Description of the alarm. • Time— Time that the alarm was registered. 	—

- Related Documentation**
- [Monitoring Active Alarms on a Device on page 477](#)
 - [Monitoring Events on page 707](#)
 - [Monitoring Security Events by Policy on page 631](#)

Example: Configuring Interface Alarms

This example shows how to configure interface alarms.

- [Requirements on page 480](#)
- [Overview on page 480](#)
- [Configuration on page 480](#)
- [Verification on page 482](#)

Requirements

Before you begin:

- Establish basic connectivity.
- Configure network interfaces. See [Interfaces Feature Guide for Security Devices](#).
- Select the network interface on which to apply an alarm and the condition you want to trigger the alarm. See [“Alarm Overview” on page 471](#).

Overview

In this example, you enable interface alarms by explicitly setting alarm conditions. You configure the system to generate a red interface alarm when a yellow alarm is detected on a DS1 link. You configure the system to generate a red interface alarm when a link-down failure is detected on an Ethernet link.

For a serial link, you set `cts-absent` and `dcd-absent` to yellow to signify either the CST or the DCD signal is not detected. You set `loss-of-rx-clock` and `loss-of-tx-clock` to red alarm to signify either the receiver clock signal or the transmission clock signal is not detected.

For a T3 link, you set the interface alarm to red when the remote endpoint is experiencing a failure. You set `exz` to yellow alarm when the upstream bit has more consecutive zeros than are permitted in a T3 interface. You then set a red alarm when there is loss-of-signal on the interface.

Finally, you configure the system to display active system alarms whenever a user with the login class admin logs in to the device.

Configuration

CLI Quick Configuration

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

```
set chassis alarm ds1 ylw red
set chassis alarm ethernet link-down red
set chassis alarm serial cts-absent yellow dcd-absent yellow
set chassis alarm serial loss-of-rx-clock red loss-of-tx-clock red
set chassis alarm t3 ylw red exz yellow los red
```

```
set system login class admin login-alarms
```

Step-by-Step Procedure The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

To configure interface alarms:

1. Configure an alarm.

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

2. Specify the interface alarms on a DSI and an Ethernet link.

```
[edit chassis alarm]
user@host# set ds1 ylw red
user@host# set ethernet link-down red
```

3. Specify the interface alarms on a serial link.

```
[edit chassis alarm]
user@host# set serial cts-absent yellow
user@host# set serial dcd-absent yellow
user@host# set serial loss-of-rx-clock red
user@host# set serial loss-of-tx-clock red
```

4. Specify the interface alarms on a T3 link.

```
[edit chassis alarm]
user@host# set t3 ylw red
user@host# set t3 exz yellow
user@host# set t3 los red
```

5. Configure the system to display active system alarms.

```
[edit]
user@host# edit system login
user@host# set class admin login-alarms
```

Results From configuration mode, confirm your configuration by entering the **show chassis alarms** and **show system login** commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

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

```
t3 {
  exz yellow;
  los red;
  ylw red;
}
ds1 {
  ylw red;
}
ethernet {
  link-down red;
}
serial {
  loss-of-rx-clock red;
  loss-of-tx-clock red;
  dcd-absent yellow;
  cts-absent yellow;
}
[edit]
user@host# show system login
show system login
show system login
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Verifying the Alarm Configurations

Purpose Confirm that the configuration is working properly.

Verify that the alarms are configured.

Action From configuration mode, enter the **show chassis alarms** command. Verify that the output shows the intended configuration of the alarms.

Related Documentation

- [Alarm Overview on page 471](#)
- [Monitoring Active Alarms on a Device on page 477](#)
- [Monitoring Alarms on page 478](#)

CHAPTER 20

Configuring Real-Time Performance Monitoring

- [RPM Overview on page 483](#)
- [Understanding Real-Time Performance Monitoring on Switches on page 489](#)
- [RPM Support for VPN Routing and Forwarding on page 493](#)
- [RPM Configuration Options on page 493](#)
- [Two-Way Active Measurement Protocol \(TWAMP\) Overview on page 497](#)
- [Example: Configuring TWAMP Client and Server on page 500](#)
- [Guidelines for Configuring RPM Probes for IPv6 on page 504](#)
- [Configuring the Interface for RPM Timestamping for Client/Server on a Switch \(CLI Procedure\) on page 505](#)
- [Directing RPM Probes to Select BGP Devices on page 507](#)
- [IPv6 RPM Probes on page 508](#)
- [Configuring IPv6 RPM Probes on page 508](#)
- [Tuning RPM Probes on page 509](#)
- [Monitoring RPM Probes on page 510](#)
- [Example: Configuring Basic RPM Probes on page 513](#)
- [Example: Configuring RPM Using TCP and UDP Probes on page 518](#)
- [Example: Configuring RPM Probes for BGP Monitoring on page 521](#)
- [Viewing Real-Time Performance Monitoring Information on page 524](#)

RPM Overview

The real-time performance monitoring (RPM) feature allows network operators and their customers to accurately measure the performance between two network endpoints. With the RPM tool, you configure and send probes to a specified target and monitor the analyzed results to determine packet loss, round-trip time, and jitter.

RPM allows you to perform service-level monitoring. When RPM is configured on a device, the device calculates network performance based on packet response time, jitter, and packet loss. These values are gathered by Hypertext Transfer Protocol (HTTP) GET

requests, Internet Control Message Protocol (ICMP) requests, and TCP and UDP requests, depending on the configuration.

This section contains the following topics:

- [RPM Probes on page 484](#)
- [RPM Tests on page 485](#)
- [Probe and Test Intervals on page 485](#)
- [Jitter Measurement with Hardware Timestamping on page 485](#)
- [RPM Statistics on page 486](#)
- [RPM Thresholds and Traps on page 487](#)
- [RPM for BGP Monitoring on page 487](#)

RPM Probes

You gather RPM statistics by sending out probes to a specified probe target, identified by an IP address or URL. When the target receives the probe, it generates responses, which are received by the device. By analyzing the transit times to and from the remote server, the device can determine network performance statistics.

The device sends out the following probe types:

- HTTP GET request at a target URL
- HTTP GET request for metadata at a target URL
- ICMP echo request to a target address (the default)
- ICMP timestamp request to a target address
- UDP ping packets to a target device
- UDP timestamp requests to a target address
- TCP ping packets to a target device

UDP and TCP probe types require that the remote server be configured as an RPM receiver so that it generates responses to the probes.

The RPM probe results are also available in the form of MIB objects through the SNMP protocol.



NOTE: On SRX300, SRX320, SRX340, SRX1500 devices and vSRX instances, when you configure basic RPM probes, the following combination of the configuration parameters is not supported:

Source address and destination port and next-hop.

Configuring RPM probe with these parameters prevents sending out RPM probes to a specified probe target. We recommend you to configure either the source address or destination port and next-hop to configure RPM probe.

RPM Tests

Each probed target is monitored over the course of a test. A test represents a collection of probes, sent out at regular intervals, as defined in the configuration. Statistics are then returned for each test. Because a test is a collection of probes that have been monitored over some amount of time, test statistics such as standard deviation and jitter can be calculated and included with the average probe statistics.

Probe and Test Intervals

Within a test, RPM probes are sent at regular intervals, configured in seconds. When the total number of probes has been sent and the corresponding responses received, the test is complete. You can manually set the probe interval for each test to control how the RPM test is conducted.

After all the probes for a particular test have been sent, the test begins again. The time between tests is the test interval. You can manually set the test interval to tune RPM performance.



NOTE: On SRX340 devices, the RPM server operation with icmp is not supported. The RPM server works fine with TCP and UDP.

Jitter Measurement with Hardware Timestamping

Jitter is the difference in relative transit time between two consecutive probes.

You can timestamp the following RPM probes to improve the measurement of latency or jitter:

- ICMP ping
- ICMP ping timestamp
- UDP ping
- UDP ping timestamp



NOTE: The device supports hardware timestamping of UDP ping and UDP ping timestamp RPM probes only if the destination port is UDP-ECHO (port 7).

Timestamping takes place during the forwarding process of the device originating the probe (the RPM client), but not on the remote device that is the target of the probe (the RPM server).

The supported encapsulations on a device for timestamping are Ethernet including VLAN, synchronous PPP, and Frame Relay. The only logical interface supported is an `lt` services interface.

RPM probe generation with hardware timestamp can be retrieved through the SNMP protocol.

RPM Statistics

At the end of each test, the device collects the statistics for packet round-trip time, packet inbound and outbound times (for ICMP timestamp probes only), and probe loss as shown in [Table 60 on page 486](#).

Table 60: RPM Statistics

RPM Statistics	Description
Round-Trip Times	
Minimum round-trip time	Shortest round-trip time from the Juniper Networks device to the remote server, as measured over the course of the test
Maximum round-trip time	Longest round-trip time from the Juniper Networks device to the remote server, as measured over the course of the test
Average round-trip time	Average round-trip time from the Juniper Networks device to the remote server, as measured over the course of the test
Standard deviation round-trip time	Standard deviation of the round-trip times from the Juniper Networks device to the remote server, as measured over the course of the test
Jitter	Difference between the maximum and minimum round-trip times, as measured over the course of the test
Inbound and Outbound Times (ICMP Timestamp Probes Only)	
Minimum egress time	Shortest one-way time from the Juniper Networks device to the remote server, as measured over the course of the test
Maximum ingress time	Shortest one-way time from the remote server to the Juniper Networks device, as measured over the course of the test
Average egress time	Average one-way time from the Juniper Networks device to the remote server, as measured over the course of the test
Average ingress time	Average one-way time from the remote server to the Juniper Networks device, as measured over the course of the test
Standard deviation egress time	Standard deviation of the one-way times from the Juniper Networks device to the remote server, as measured over the course of the test
Standard deviation ingress time	Standard deviation of the one-way times from the remote server to the Juniper Networks device, as measured over the course of the test
Egress jitter	Difference between the maximum and minimum outbound times, as measured over the course of the test
Ingress jitter	Difference between the maximum and minimum inbound times, as measured over the course of the test

Table 60: RPM Statistics (continued)

RPM Statistics	Description
Probe Counts	
Probes sent	Total number of probes sent over the course of the test
Probe responses received	Total number of probe responses received over the course of the test
Loss percentage	Percentage of probes sent for which a response was not received

RPM Thresholds and Traps

You can configure RPM threshold values for the round-trip times, ingress (inbound) times, and egress (outbound) times that are measured for each probe, as well as for the standard deviation and jitter values that are measured for each test. Additionally, you can configure threshold values for the number of successive lost probes within a test and the total number of lost probes within a test.

If the result of a probe or test exceeds any threshold, the device generates a system log message and sends any Simple Network Management Protocol (SNMP) notifications (traps) that you have configured.

Starting in Junos OS Release 18.4R1, if the result of a probe or test exceeds the packet loss threshold, the real-time performance monitoring (RPM) test probe is marked as failed. The test probe also fails when the round-trip time (RTT) exceeds the configured threshold value. As a result, the device generates an SNMP notification (trap) and marks the RPM test as failed.

RPM allows you to perform service-level monitoring. When RPM is configured on a device, the device calculates network performance based on packet response time, jitter, and packet loss.

RPM for BGP Monitoring

When managing peering networks that are connected using Border Gateway Protocol (BGP), you might need to find out if a path exists between the Juniper Networks device and its configured BGP neighbors. You can ping each BGP neighbor manually to determine the connection status, but this method is not practical when the device has a large number of BGP neighbors configured.

In the device, you can configure RPM probes to monitor the BGP neighbors and determine if they are active.

Release History Table

Release	Description
18.4R1	<p>Starting in Junos OS Release 18.4R1, if the result of a probe or test exceeds the packet loss threshold, the real-time performance monitoring (RPM) test probe is marked as failed. The test probe also fails when the round-trip time (RTT) exceeds the configured threshold value. As a result, the device generates an SNMP notification (trap) and marks the RPM test as failed.</p> <p>RPM allows you to perform service-level monitoring. When RPM is configured on a device, the device calculates network performance based on packet response time, jitter, and packet loss.</p>

**Related
Documentation**

- [RPM Configuration Options on page 493](#)
- [RPM Support for VPN Routing and Forwarding on page 493](#)
- [Example: Configuring Basic RPM Probes on page 513](#)
- [Monitoring RPM Probes on page 510](#)
- [Determine What Causes Jitter and Latency on the Multilink Bundle on page 1244](#)

Understanding Real-Time Performance Monitoring on Switches

Real-time performance monitoring (RPM) enables you to configure active probes to track and monitor traffic across the network and to investigate network problems. You can use RPM with Juniper Networks EX Series and QFX Series switches.

The ways in which you can use RPM include:

- Monitor time delays between devices.
- Monitor time delays at the protocol level.
- Set thresholds to trigger SNMP traps when values are exceeded.

You can configure thresholds for round-trip time, ingress or egress delay, standard deviation, jitter, successive lost probes, and total lost probes per test. (SNMP trap results are stored in `pingResultsTable`, `jnxPingResultsTable`, `jnxPingProbeHistoryTable`, and `pingProbeHistoryTable`.)

- Determine automatically whether a path exists between a host router or switch and its configured BGP neighbors. You can view the results of the discovery using an SNMP client.
- Use the history of the most recent 50 probes to analyze trends in your network and predict future needs.

RPM provides MIB support with extensions for RFC 2925, *Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations*.

This topic includes:

- [RPM Packet Collection on page 489](#)
- [Tests and Probe Types on page 489](#)
- [Hardware Timestamps on page 490](#)
- [Limitations of RPM on EX Series and QFX Series Switches on page 492](#)

RPM Packet Collection

Probes collect packets per destination and per application, including ping Internet Control Message Protocol (ICMP) packets, User Datagram Protocol and Transmission Control Protocol (UDP/TCP) packets with user-configured ports, user-configured Differentiated Services code point (DSCP) type-of-service (ToS) packets, and Hypertext Transfer Protocol (HTTP) packets.

Tests and Probe Types

A test can contain multiple probes. The probe type specifies the packet and protocol contents of the probe.

EX Series and QFX Series switches support the following tests and probe types:



NOTE: QFX Series switches do not support hardware-timestamp probes.

- Ping tests:
 - ICMP echo probe
 - ICMP timestamp probe
- HTTP tests:
 - HTTP get probe (not available for BGP RPM services)
 - HTTP get metadata probe
- UDP and TCP tests with user-configured ports:
 - UDP echo probe
 - TCP connection probe
 - UDP timestamp probe

Hardware Timestamps

To account for latency or jitter in the communication of probe messages, you can enable timestamping of the probe packets (hardware timestamps). If hardware timestamps are not configured, then timers are generated at the software level and are less accurate than they would have been with hardware timestamps.



NOTE: QFX Series switches do not support hardware timestamps.



NOTE: On the EX4300 switch, RPM timestamping is performed in the software. The RPM probes at the requester and responder devices are timestamped in the Packet Forwarding Engine instead of the Junos OS process (rmpod) that runs on the Routing Engine. This timestamping method is referred to as pseudo-hardware timestamping.



NOTE: EX Series switches support hardware timestamps for UDP and ICMP probes. EX Series switches do not support hardware timestamps for HTTP or TCP probes.

You can timestamp the following RPM probes to improve the measurement of latency or jitter.

- ICMP ping
- ICMP ping timestamp
- UDP ping
- UDP ping timestamp



NOTE: icmp-ping is the default probe type on devices running Junos OS.

The probe packets are time stamped with the times at which they are sent and received at both the source and destination endpoints.

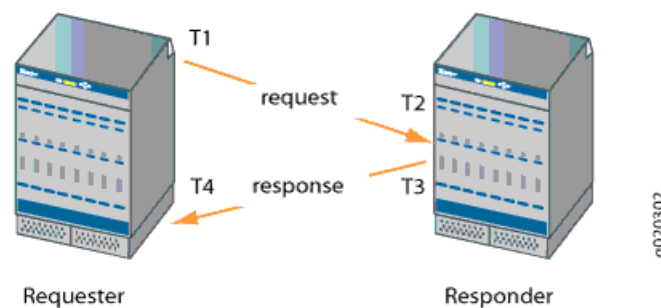
You should configure the requester (the RPM client) with hardware timestamps (see [Figure 12 on page 491](#)) to get more meaningful results than you would get without the timestamps. The responder (the RPM server) does not need to be configured to support hardware timestamps. If the responder supports hardware timestamps, it timestamps the RPM probes. If the responder does not support hardware timestamps, RPM can only report round-trip measurements that include the processing time on the responder.



NOTE: On the EX4300 switch, you must configure the switch as both the requester (the RPM client) and the responder (the RPM server) to timestamp the RPM packet.

[Figure 12 on page 491](#) shows the timestamps:

Figure 12: RPM Timestamps



- T1 is the time the packet leaves the requester port.
- T2 is the time the responder receives the packet.
- T3 is the time the responder sends the response.
- T4 is the time the requester receives the response.

The round-trip time is $(T2 - T1) + (T4 - T3)$. If the responder does not support hardware timestamps, then the round-trip time is $(T4 - T1) / 2$, and thus includes the processing time of the responder.

You can use RPM probes to find the following time measurements:

- Minimum round-trip time
- Maximum round-trip time
- Average round-trip time
- Standard deviation of the round-trip time
- Jitter of the round-trip time—Difference between the minimum and maximum round-trip time

The RPM feature provides a configuration option to set one-way hardware timestamps. Use one-way timestamps when you want information about one-way time, rather than round-trip times, for packets to traverse the network between the requester and the responder. As shown in [Figure 12 on page 491](#), one-way timestamps represent the time $T_2 - T_1$ and the time from $T_4 - T_3$. Use one-way timestamps when you want to gather information about delay in each direction and to find egress and ingress jitter values.



NOTE: For correct one-way measurement, the clocks of the requester and responder must be synchronized. If the clocks are not synchronized, one-way jitter measurements and calculations can include significant variations, in some cases orders of magnitude greater than the round-trip times.

When you enable one-way timestamps in a probe, the following one-way measurements are reported:

- Minimum, maximum, standard deviation, and jitter measurements for egress and ingress times
- Number of probes sent
- Number of probe responses received
- Percentage of lost probes

Limitations of RPM on EX Series and QFX Series Switches

- Two-Way Active Measurement Protocol (TWAMP) is not supported on the switches.
- The switches do not support user-configured class-of-service (CoS) classifiers or prioritization of RPM packets over regular data packets received on an input interface.
- Timestamps:
 - If the responder does not support hardware timestamps, RPM can only report the round-trip measurements and cannot calculate round-trip jitter.



NOTE: QFX Series switches do not support hardware timestamps.

- EX Series switches do not support hardware timestamps or pseudo-hardware timestamps for HTTP and TCP probes.
- Timestamps apply only to IPv4 traffic.

- In-Service Software Upgrades (ISSU) and Nonstop Software Upgrades (NSSU) do not support pseudo-hardware timestamps.

RPM Support for VPN Routing and Forwarding

Real-time performance monitoring (RPM) is supported on all Juniper Network devices.

VRF in a Layer 3 VPN implementation allows multiple instances of a routing table to coexist within the same device at the same time. Because the routing instances are independent, the same or overlapping IPv4 or IPv6 addresses can be used without conflicting each other.

RPM ICMP and UDP probe with VPN routing and forwarding (VRF) has been improved. In previous releases, the RPM probes specified to a VRF table were not handled by the real-time forwarding process (FWDD-RT). In Junos OS Release 10.0, RPM probes specified to a VRF table are handled by the FWDD-RT, thereby providing more accurate results.

This feature supports RPM ICMP and UDP probes configured with routing instances of type VRF.

- Related Documentation**
- [RPM Overview on page 483](#)
 - [RPM Configuration Options on page 493](#)
 - [Monitoring RPM Probes on page 510](#)

RPM Configuration Options

You can configure real-time performance monitoring (RPM) parameters. See [Table 61 on page 493](#) for a summary of the configuration options.

Table 61: RPM Configuration Summary

Field	Function	Your Action
Performance Probe Owners		
Owner Name (required)	Identifies an RPM owner for which one or more RPM tests are configured. In most implementations, the owner name identifies a network on which a set of tests is being run (a particular customer, for example).	Type the name of the RPM owner.
Identification		
Test name (required)	Uniquely identifies the RPM test	Type the name of the RPM test.
Target (Address or URL) (required)	IPv4 or IPv6 address or URL of probe target	Type the IPv4 address, in dotted decimal notation, IPv6 address, or the URL of the probe target. If the target is a URL, type a fully formed URL that includes http:// .

Table 61: RPM Configuration Summary (continued)

Field	Function	Your Action
Source Address	Explicitly configured IPv4 or IPv6 address to be used as the probe source address	Type the source address to be used for the probe. If the source address is not one of the device's assigned addresses, the packet uses the outgoing interface's address as its source.
Routing Instance	Particular routing instance over which the probe is sent	Type the routing instance name. The routing instance applies only to probes of type icmp , icmp6-ping , and icmp-timestamp . The default routing instance is inet.0 .
History Size	Number of probe results saved in the probe history	Type a number between 0 and 255. The default history size is 50 probes.
Request Information		
Probe Type (required)	Specifies the type of probe to send as part of the test.	Select the desired probe type from the list: <ul style="list-style-type: none"> • http-get • http-get-metadata • icmp6-ping • icmp-ping • icmp-ping-timestamp • tcp-ping • udp-ping
Interval	Sets the wait time (in seconds) between each probe transmission	Type a number between 1 and 255 (seconds).
Test Interval (required)	Sets the wait time (in seconds) between tests.	Type a number between 0 and 86400 (seconds).
Probe Count	Sets the total number of probes to be sent for each test.	Type a number between 1 and 15.
Destination Port	Specifies the TCP or UDP port to which probes are sent. To use TCP or UDP probes, you must configure the remote server as a probe receiver. Both the probe server and the remote server must be Juniper Networks devices configured to receive and transmit RPM probes on the same TCP or UDP port.	Type the number 7—a standard TCP or UDP port number—or a port number from 49152 through 65535.
DSCP Bits	Specifies the Differentiated Services code point (DSCP) bits. This value must be a valid 6-bit pattern. The default is 000000 .	Type a valid 6-bit pattern.
Data Size	Specifies the size of the data portion of the ICMP probes.	Type a size (in bytes) between 0 and 65507.

Table 61: RPM Configuration Summary (continued)

Field	Function	Your Action
Data Fill	Specifies the contents of the data portion of the ICMP probes.	Type a hexadecimal value between 1 and 800h to use as the contents of the ICMP probe data.
Hardware Timestamp	<p>Enables timestamping of RPM probe messages. You can timestamp the following RPM probes to improve the measurement of latency or jitter:</p> <ul style="list-style-type: none"> • ICMP ping • ICMP ping timestamp • UDP ping—destination port UDP-ECHO (port 7) only • UDP ping timestamp—destination port UDP-ECHO (port 7) only 	To enable timestamping, select the check box.
Maximum Probe Thresholds		
Successive Lost Probes	Sets the total number of probes that must be lost successively to trigger a probe failure and generate a system log message.	Type a number between 0 and 15.
Lost Probes	Sets the total number of probes that must be lost to trigger a probe failure and generate a system log message.	Type a number between 0 and 15.
Round Trip Time	Sets the total round-trip time (in microseconds), from the device to the remote server, that triggers a probe failure and generates a system log message.	Type a number between 0 and 60,000,000 (microseconds).
Jitter	Sets the total jitter (in microseconds), for a test, that triggers a probe failure and generates a system log message.	Type a number between 0 and 60,000,000 (microseconds).
Standard Deviation	Sets the maximum allowable standard deviation (in microseconds) for a test, which, if exceeded, triggers a probe failure and generates a system log message.	Type a number between 0 and 60,000,000 (microseconds).
Egress Time	Sets the total one-way time (in microseconds), from the device to the remote server, that triggers a probe failure and generates a system log message.	Type a number between 0 and 60,000,000 (microseconds).
Ingress Time	Sets the total one-way time (in microseconds), from the remote server to the device, that triggers a probe failure and generates a system log message.	Type a number between 0 and 60,000,000 (microseconds)
Jitter Egress Time	Sets the total outbound-time jitter (in microseconds), for a test, that triggers a probe failure and generates a system log message.	Type a number between 0 and 60,000,000 (microseconds)
Jitter Ingress Time	Sets the total inbound-time jitter (in microseconds), for a test, that triggers a probe failure and generates a system log message.	Type a number between 0 and 60,000,000 (microseconds).

Table 61: RPM Configuration Summary (continued)

Field	Function	Your Action
Egress Standard Deviation	Sets the maximum allowable standard deviation of outbound times (in microseconds) for a test, which, if exceeded, triggers a probe failure and generates a system log message.	Type a number between 0 and 60,000,000 (microseconds).
Ingress Standard Deviation	Sets the maximum allowable standard deviation of inbound times (in microseconds) for a test, which, if exceeded, triggers a probe failure and generates a system log message.	Type a number between 0 and 60,000,000 (microseconds).
Traps		
Egress Jitter Exceeded	Generates SNMP traps when the threshold for jitter in outbound time is exceeded.	<ul style="list-style-type: none"> To enable SNMP traps for this condition, select the check box. To disable SNMP traps, clear the check box.
Egress Standard Deviation Exceeded	Generates SNMP traps when the threshold for standard deviation in outbound times is exceeded.	<ul style="list-style-type: none"> To enable SNMP traps for this condition, select the check box. To disable SNMP traps, clear the check box.
Egress Time Exceeded	Generates SNMP traps when the threshold for maximum outbound time is exceeded.	<ul style="list-style-type: none"> To enable SNMP traps for this condition, select the check box. To disable SNMP traps, clear the check box.
Ingress Jitter Exceeded	Generates SNMP traps when the threshold for jitter in inbound time is exceeded.	<ul style="list-style-type: none"> To enable SNMP traps for this condition, select the check box. To disable SNMP traps, clear the check box.
Ingress Standard Deviation Exceeded	Generates SNMP traps when the threshold for standard deviation in inbound times is exceeded.	<ul style="list-style-type: none"> To enable SNMP traps for this condition, select the check box. To disable SNMP traps, clear the check box.
Ingress Time Exceeded	Generates traps when the threshold for maximum inbound time is exceeded.	<ul style="list-style-type: none"> To enable SNMP traps for this condition, select the check box. To disable SNMP traps, clear the check box.
Jitter Exceeded	Generates traps when the threshold for jitter in round-trip time is exceeded.	<ul style="list-style-type: none"> To enable SNMP traps for this condition, select the check box. To disable SNMP traps, clear the check box.
Probe Failure	Generates traps when the threshold for the number of successive lost probes is reached.	<ul style="list-style-type: none"> To enable SNMP traps for this condition, select the check box. To disable SNMP traps, clear the check box.
RTT Exceeded	Generates traps when the threshold for maximum round-trip time is exceeded.	<ul style="list-style-type: none"> To enable SNMP traps for this condition, select the check box. To disable SNMP traps, clear the check box.
Standard Deviation Exceeded	Generates traps when the threshold for standard deviation in round-trip times is exceeded.	<ul style="list-style-type: none"> To enable SNMP traps for this condition, select the check box. To disable SNMP traps, clear the check box.

Table 61: RPM Configuration Summary (continued)

Field	Function	Your Action
Test Completion	Generates traps when a test is completed.	<ul style="list-style-type: none"> To enable SNMP traps for this condition, select the check box. To disable SNMP traps, clear the check box.
Test Failure	Generates traps when the threshold for the total number of lost probes is reached.	<ul style="list-style-type: none"> To enable SNMP traps for this condition, select the check box. To disable SNMP traps, clear the check box.
Performance Probe Server		
TCP Probe Server	Specifies the port on which the device is to receive and transmit TCP probes.	Type the number 7—a standard TCP or UDP port number—or a port number from 49160 through 65535.
UDP Probe Server	Specifies the port on which the device is to receive and transmit UDP probes.	Type the number 7—a standard TCP or UDP port number—or a port number from 49160 through 65535.



NOTE: On SRX300, SRX320, SRX340, SRX1500 devices and vSRX instances, when you configure basic RPM probes, the following combination of the configuration parameters is not supported:

Source address and destination port and next-hop.

Configuring RPM probe with these parameters prevents sending out RPM probes to a specified probe target. We recommend you to configure either the source address or destination port and next-hop to configure RPM probe.

Related Documentation

- [RPM Overview on page 483](#)
- [Example: Configuring Basic RPM Probes on page 513](#)
- [Example: Configuring RPM Using TCP and UDP Probes on page 518](#)
- [Example: Configuring RPM Probes for BGP Monitoring on page 521](#)

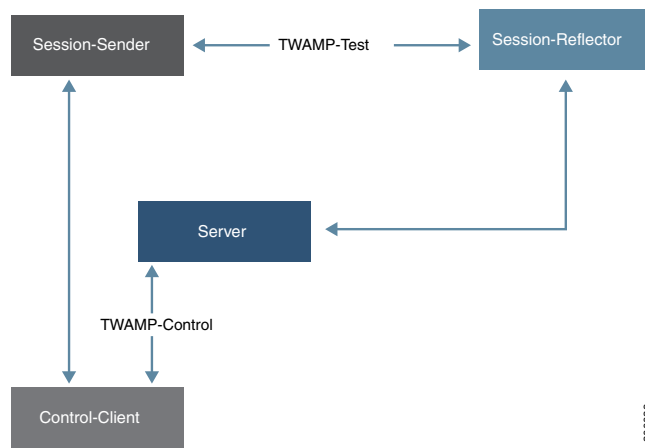
Two-Way Active Measurement Protocol (TWAMP) Overview

The Two-Way Active Measurement Protocol (TWAMP) is an open protocol for measuring network performance between any two devices in a network that supports the protocols in the TWAMP framework. It is a standard protocol framework that separates sessions based on the client/server architecture. The TWAMP client is a host that initiates the TCP connection and acts as a control-client and a session-sender, while the TWAMP server is a host that acknowledges the TCP connection and performs the roles of a server and a session-reflector. TWAMP-Control messages are exchanged between the control-client and the server and TWAMP-Test messages are exchanged between the

session-sender and the session-reflector. Four different TWAMP devices can perform the four logical roles of TWAMP control-client, server, session-sender, and session-reflector.

The four elements are shown [Figure 13 on page 498](#).

Figure 13: Four Elements of TWAMP



TWAMP consists of two interrelated protocols –TWAMP-Control and TWAMP-Test. TWAMP- Control is used to initiate, start, and stop test sessions, whereas TWAMP-Test is used to exchange test packets between two TWAMP entities.

- **TWAMP-Control** —A TWAMP control connection is responsible for managing (initiating, starting, and ending) the test sessions between a TWAMP client and a TWAMP server for performance measurement.

The remote operation process or daemon (rmopd) in the Junos OS Routing Engine takes care of the control plane operations that include handling both the client and server control message exchanges. The packet path processing for the control connection is the same as for any other control process. After the server-greeting, setup-response, and setup-start messages are successfully exchanged, the TWAMP client starts processing the session creation messages. One or more test sessions are created with the following tuples, that contain:

- Destination IP (DIP) addresses of the client and server
 - Source IP (SIP) addresses of the client and server
 - UDP ports on the client and server
- **TWAMP-Test** —A TWAMP test session exchanges probe packets to measure the performance metrics. Each test session between a client and server can use different QoS values –for example, round trip time (RTT), delay, and latency variations –to test QoS behavior on the network path for different packet priorities.

The timestamps on the test probes on the sender side are just before the packet is sent out on the link. Similarly, timestamps on the test probes on the receiver (server) side are recorded as soon as the probe packets are received from the link. This prompt

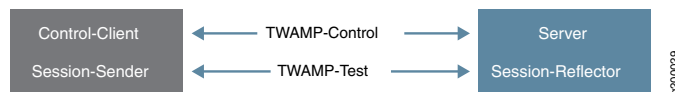
recording of timestamps helps to calculate fairly accurate RTT, delay, and jitter characteristics of the probes. The test probes can also be set to different QoS values to test the QoS behavior on the network path.

Implementation of TWAMP Elements

A common implementation of TWAMP elements combines the roles of control-client and session-sender in one device (known as the *TWAMP controller* or *TWAMP client*) and the roles of server and session-reflector in the other device (known as the *TWAMP responder* or *TWAMP server*). In this case, each device runs both the TWAMP-Control (between control-client and server) and TWAMP-Test (between session-sender and session-reflector) protocols.

Figure 14 on page 499 illustrates the TWAMP elements, which are implemented as client and server.

Figure 14: The Elements of TWAMP Implemented as Client and Server



Limitations

SRX300, SRX320, SRX340, SRX345, SRX550M, SRX1500, SRX4100, and SRX4200 devices and vSRX instances have the following limitations for TWAMP support:

- TWAMP for IPv6 is not supported.
- TWAMP server and TWAMP client authentication are not supported.

Benefits of TWAMP

- TWAMP configuration helps you activate, test, monitor, and troubleshoot your network end-to-end without using a dedicated testing device.
- TWAMP-Test timestamps provide two-way or round-trip metrics with greater accuracy than other methods (processing delays can be factored as well).
- TWAMP is often used to check service-level agreement (SLA) compliance, and the TWAMP feature is often used in that context.
- Two-way measurements are better than one-way measurements because round-trip delays do not require host clock synchronization. This is possible because the reflector places its own sequence number in the packet.

Related Documentation

- [Example: Configuring TWAMP Client and Server on page 500](#)

Example: Configuring TWAMP Client and Server

This example shows how to configure TWAMP client and server and contains the following sections.

- [Requirements on page 500](#)
- [Overview on page 500](#)
- [Configuration for TWAMP client on page 501](#)
- [Configuration for TWAMP server on page 502](#)
- [Verification on page 503](#)

Requirements

This example uses the following hardware and software components:

- SRX Series routers.
- Junos OS Release 18.1R1 or later.

Overview

This example explains the Two-Way Active Measurement Protocol (TWAMP). TWAMP is an open protocol for measuring network performance between any two devices supporting the TWAMP protocol. The TWAMP-Control protocol is used to set up performance measurement sessions. The TWAMP-Test protocol is used to send and receive performance measurement probes.

The TWAMP architecture is composed of the following entities that are responsible for starting a monitoring session and exchanging packets:

- The control client initiates all requested test sessions with a start sessions message, and the server acknowledges. When necessary, the control client sends a message to stop all test sessions.
- The session sender and the session reflector exchange test packets according to the TWAMP-Test protocol for each active session. On receiving a TWAMP-Test packet, the session reflector only reflects a measurement packet and does not collect packet statistics in TWAMP.

The TWAMP server is an end system that manages one or more TWAMP sessions and is also capable of configuring per-session ports. The server listens on the TCP port. The session reflector and server make up the TWAMP responder in an IP service-level agreement operation.

For 18.1R1, both the control client and session sender would be residing on the same Juniper router. The client design does not mandate the server and the session reflector to be on the same system. Hence the Juniper TWAMP client will also be capable of working with a third-party server implementation.

Configuration for TWAMP client

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

```
set services rpm twamp client control-connection c1 target-address 10.20.30.2
set services rpm twamp client control-connection c1 test-session t1 target-address
  10.20.30.2
set services rpm twamp client control-connection c1 test-session t1 probe-count 2000
set interfaces ge-0/0/6 unit 0 family inet address 10.20.30.1/24
set security zones security-zone trust host-inbound-traffic system-services all
set security zones security-zone trust host-inbound-traffic protocols all
set security zones security-zone trust interfaces ge-0/0/5.0
```

Step-by-Step Procedure The following example requires you to navigate various levels in the configuration hierarchy.

To configure TWAMP Client:

1. Configure the target address.

```
[edit services]
user@router1# set services rpm twamp client control-connection c1 target-address
  10.20.30.2
```

2. Specify the name of the test-session and the target address.

```
user@router1# set services rpm twamp client control-connection c1 test-session t1
  target-address 10.20.30.2
```

3. Specify the number of probes within a test.

```
user@router1# set services rpm twamp client control-connection c1 test-session t1
  probe-count 2000
```

4. Set the family inet address.

```
user@router1# set interfaces ge-0/0/6 unit 0 family inet address 10.20.30.1/24
```

5. Configure zones.

```
user@router1# set security zones security-zone trust host-inbound-traffic
  system-services all
user@router1# set security zones security-zone trust host-inbound-traffic protocols
  all
user@router1# set security zones security-zone trust interfaces ge-0/0/5.0
```

Results From the configuration mode of Router 1, confirm your configuration by entering the **show services rpm twamp** command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
user@router1# show services rpm twamp
client {
  control-connection c1 {
    target-address 200.20.2.2;
    test-session t1 {
      target-address 200.20.2.2;
      probe-count 10;
      thresholds {
        jitter-egress 1;
      }
    }
  }
}
```

Configuration for TWAMP server

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

```
set services rpm twamp server authentication-mode none
set services rpm twamp server client-list client1 address 10.20.30.0/24
set interfaces ge-0/0/5 unit 0 family inet address 10.20.30.2/24
set security zones security-zone trust host-inbound-traffic system-services all
set security zones security-zone trust host-inbound-traffic protocols all
set security zones security-zone trust interfaces ge-0/0/5.0
```

Step-by-Step Procedure The following example requires you to navigate various levels in the configuration hierarchy.

To configure TWAMP Server:

1. Configure the services and set the authentication mode for TWAMP server.

```
[edit services]
user@router1# set services rpm twamp server authentication-mode none
```

2. Specify the client-list name and the address.

```
user@router1# set services rpm twamp server client-list client1 address 10.20.30.0/24
```

3. Configure the interface and the address..

```
user@router1# set interfaces ge-0/0/5 unit 0 family inet address 10.20.30.2/24
```

4. Configure zones.

```

user@router1# set security zones security-zone trust host-inbound-traffic
system-services all
user@router1# set security zones security-zone trust host-inbound-traffic protocols
all
user@router1# set security zones security-zone trust interfaces ge-0/0/5.0

```

Results From the configuration mode of Router 1, confirm your configuration by entering the **show services rpm twamp** commands. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```

user@router1# show services rpm twamp
server {
  authentication-mode none;
  client-list abc {
    address {
      200.20.0.0/16;
    }
  }
}

```

Verification

Verifying TWAMP server sessions

Purpose Verify that the TWAMP server sessions are established.

Action From operational mode, enter the **show services rpm twamp server session**.

```
user@router1>show services rpm twamp server session
```

Session ID	Connection ID	Sender address	Sender port	Reflector address	Reflector port
3	6	123.0.0.1	40000	123.0.0.2	40000

Verifying TWAMP client sessions

Purpose Verify that the TWAMP client sessions are established.

Action From operational mode, enter the **show services rpm twamp client session**.

```
user@router1>show services rpm twamp client session
```

Connection Name	Session Name	Sender address	Sender port	Reflector address	Reflector port
c1	t1	123.0.0.2	10001	123.0.0.1	10001

**Related
Documentation**

- [Two-Way Active Measurement Protocol \(TWAMP\) Overview on page 497](#)

Guidelines for Configuring RPM Probes for IPv6

Starting with Junos OS Release 15.1X49-D10, you can configure RPM Probes for IPv6.

Keep the following guidelines in mind when you configure IPv6 addresses for RPM destinations or servers:

- IPv6 RPM uses ICMPv6 probe requests. You cannot configure ICMP or ICMP timestamp probe types.
- Only Routing Engine-based RPM is supported for IPv6 targets including VRF support, specification of the size of the data portion of ICMPv6 probes, data pattern, and traffic class.
- You can configure probes with a combination of IPv4 and IPv6 tests. However, an individual test must be either IPv4 or IPv6.
- Routing Engine-based RPM does not support hardware-based, or one-way hardware-based timestamping.
- We recommend that you include the **probe-limit** statement at the **[edit services rpm]** hierarchy level to set the limit on concurrent probes to 10. Higher concurrent probes can result in higher spikes.
- SNMP set operation is permitted only on ICMP probes and it is not supported for other probe types.
- The following table describes the IPv6 special address prefixes that you cannot configure in a probe.

IPv6 Address Type	IPv6 Address Prefix
Node-Scoped Unicast	::1/128 is the loopback address ::/128 is the unspecified address
IPv4-Mapped Addresses	::FFFF:0:0/96
IPv4-Compatible Addresses	:<ipv4-address>/96
Link-Scoped Unicast	fe80::/10
Unique-Local	fc00::/7
Documentation Prefix	2001:db8::/32
6to4	2002::/16
6bone	5f00::/8

IPv6 Address Type	IPv6 Address Prefix
ORCHID	2001:10::/28
Teredo	2001::/32
Default Route	::/0
Multicast	ff00::/8

- In Routing Engine-based RPM, route-trip time (RTT) spikes might occur because of queuing delays, even with a single test.
- Since RPM might open TCP and UDP ports to communicate between the RPM server and RPM client, we recommend that you use firewalls and distributed denial-of-service (DDoS) attack filters to protect against security threats.

Related Documentation

- [Configuring IPv6 RPM Probes on page 508](#)

Configuring the Interface for RPM Timestamping for Client/Server on a Switch (CLI Procedure)

Use real-time performance monitoring (RPM) to configure active probes to track and monitor traffic across the network and to investigate network problems. To configure basic RPM probes on the EX Series or QFX Series switch, you must configure the probe owner, the test, and the specific parameters of the RPM probe.

You can also set a timestamp to improve the measurement of latency or jitter. The probe is timestamped by the device originating the probe (the RPM client). If you do not enable hardware timestamps, the timer values are set. You should configure both the RPM client (the requester) and the RPM server (the responder) to timestamp the RPM packets. However, if the RPM server does not support hardware timestamps, RPM can only report the round-trip measurements.



NOTE: On the EX4300 switch, RPM timestamping is performed in the software. The RPM probes at the requester and responder devices are timestamped in the Packet Forwarding Engine instead of the Junos OS process (rmpod) that runs on the Routing Engine. This timestamping method is referred to as pseudo-hardware timestamping.



NOTE: QFX Series switches do not support hardware timestamps.

Timestamps apply only to IPv4 traffic.

You can enable hardware timestamps for the following RPM probe types:

- **icmp-ping**
- **icmp-ping-timestamp**
- **udp-ping**
- **udp-ping-timestamp**

To configure RPM probes and to enable hardware timestamping:

1. Specify the probe owner:

```
[edit services rpm]
user@switch# set probe owner
```

2. Specify a test name. A test represents the range of probes over which the standard deviation, average, and jitter are calculated.

```
[edit services rpm probe owner]
user@switch# set test test-name
```

3. Specify the packet and protocol contents of the probe:

```
[edit services rpm probe owner test test-name]
user@switch# set probe-type type
```

4. Specify the destination IPv4 address to be used for the probes:

```
[edit services rpm probe owner test test-name]
user@switch# set target address
```

5. Specify the number of probes within a test:

```
[edit services rpm probe owner test test-name]
user@switch# set probe-count count
```

6. Specify the time, in seconds, to wait between sending packets:

```
[edit services rpm probe owner test test-name]
user@switch# set probe-interval interval
```

7. Specify the time, in seconds, to wait between tests:

```
[edit services rpm probe owner test test-name]
user@switch# set test-interval interval
```

8. Specify the source IP address to be used for probes. If the source IP address is not one of the switch's assigned addresses, the packet uses the outgoing interface's address as its source.

```
[edit services rpm probe owner test test-name]
user@switch# set source-address address
```

9. Specify the value of the Differentiated Services (DiffServ) field within the IP header. The DiffServ code point (DSCP) bits value must be set to a valid 6-bit pattern.


```
[edit services rpm probe owner test test-name]
user@switch# set dscp-code-point (Services) dscp-bits
```

10. If you are using ICMP probes, specify the size of the data portion of ICMP probes:

```
[edit services rpm probe owner test test-name]
user@switch# set data-size size
```

11. Enable hardware timestamping of RPM probe messages:



NOTE: QFX Series switches do not support hardware timestamps.

```
[edit services rpm probe owner test test-name]
user@switch# set hardware-timestamp
```

**Related
Documentation**

- [Understanding Real-Time Performance Monitoring on Switches on page 489](#)

Directing RPM Probes to Select BGP Devices

If a device has a large number of BGP neighbors configured, you can direct (filter) the RPM probes to a selected group of BGP neighbors rather than to all the neighbors. To identify the BGP devices to receive RPM probes, you can configure routing instances.

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

To direct RPM probes to select BGP neighbors:

1. Configure routing instance **R11** to send RPM probes to BGP neighbors within the routing instance.

```
[edit services rpm bgp]
user@host# set routing-instances R11
```

2. If you are done configuring the device, enter **commit** from configuration mode.

**Related
Documentation**

- [RPM Overview on page 483](#)
- [RPM Configuration Options on page 493](#)
- [Example: Configuring Basic RPM Probes on page 513](#)
- [Example: Configuring RPM Probes for BGP Monitoring on page 521](#)
- [Tuning RPM Probes on page 509](#)

IPv6 RPM Probes

Starting with Junos OS Release 15.1X49-D10, Route Engine-based RPM can send and receive IPv6 probe packets to monitor performance on IPv6 networks.

A probe request is a standard IPv6 packet with corresponding TCP, UDP, and ICMPv6 headers. A probe response is also a standard IPv6 packet with corresponding TCP, UDP, and ICMPv6 headers. No RPM header is appended to the standard packet for RE-based RPM. An IPv6-based RPM test occurs between an IPv6 RPM client and IPv6 RPM server.



NOTE: You can have both IPv4 tests and IPv6 tests in the same probe.

Related Documentation

- [Guidelines for Configuring RPM Probes for IPv6 on page 504](#)
- [Configuring IPv6 RPM Probes on page 508](#)

Configuring IPv6 RPM Probes

Starting with Junos OS Release 15.1X49-D10, you can configure IPv6 destination addresses for an IPv6-based RPM probe test.

To configure an IPv6 RPM test:

1. Specify the RPM probe owner for the probe you want to configure as an IPv6 test.

```
[edit services rpm]  
user@host# edit probe customerA
```

2. Specify a name for the test.

```
[edit services rpm probe customerA]  
user@host# edit test ipv6-test
```

3. Specify the probe type.

```
[edit services rpm probe customerA test ipv6-test]  
user@host# set probe-type icmp6-ping
```

4. Specify the target address for the test.

```
[edit services rpm probe customerA test ipv6-test]  
user@host# set target inet6-address 2001::2
```

5. Configure the remaining RPM test parameters.

Related Documentation

- [Guidelines for Configuring RPM Probes for IPv6 on page 504](#)

Tuning RPM Probes

After configuring an RPM probe, you can set parameters to control probe functions, such as the interval between probes, the total number of concurrent probes that a system can handle, and the source address used for each probe packet. See “[Example: Configuring Basic RPM Probes](#)” on page 513.

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

To tune RPM probes:

1. Set the maximum number of concurrent probes allowed on the system to **10**.

```
[edit services rpm]
user@host# set probe-limit 10
```

2. Access the ICMP probe of customer A.

```
[edit]
user@host# edit services rpm probe customerA test icmp-test
```

3. Set the time between probe transmissions to 15 seconds.

```
[edit services rpm probe customerA test icmp-test]
user@host# set probe-interval 15
```

4. Set the number of probes within a test to **10**.

```
[edit services rpm probe customerA test icmp-test]
user@host# set probe-count 10
```

5. Set the source address for each probe packet to **192.168.2.9**. If you do not explicitly configure a source address, the address on the outgoing interface through which the probe is sent is used as the source address.

```
[edit services rpm probe customerA test icmp-test]
user@host# set source-address 192.168.2.9
```

6. If you are done configuring the device, enter **commit** from configuration mode.

Related Documentation

- [RPM Overview on page 483](#)

- [RPM Configuration Options on page 493](#)
- [Example: Configuring RPM Probes for BGP Monitoring on page 521](#)

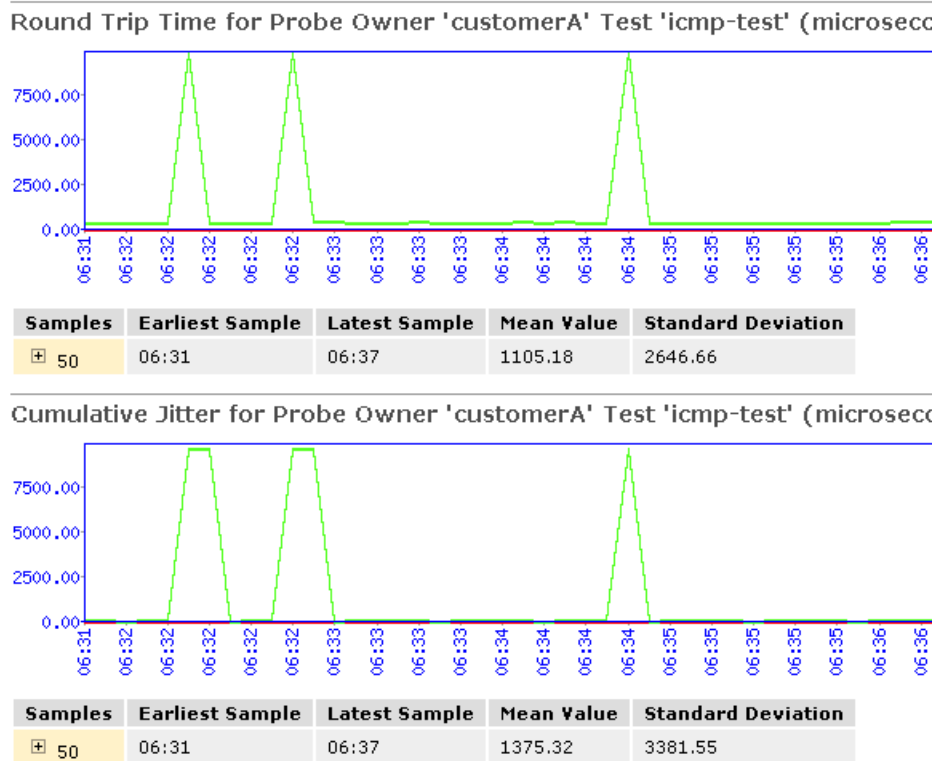
Monitoring RPM Probes

The RPM information includes the round-trip time, jitter, and standard deviation values for each configured RPM test on the device. To view these RPM properties, select **Troubleshoot>RPM>View RPM** in the J-Web user interface, or in configuration mode enter the **show** command:

```
[edit]
user@host# run show services rpm probe-results
```

In addition to the RPM statistics for each RPM test, the J-Web user interface displays the round-trip times and cumulative jitter graphically. [Figure 15 on page 510](#) shows sample graphs for an RPM test.

Figure 15: Sample RPM Graphs



In [Figure 15 on page 510](#), the round-trip time and jitter values are plotted as a function of the system time. Large spikes in round-trip time or jitter indicate a slower outbound (egress) or inbound (ingress) time for the probe sent at that particular time.

[Table 62 on page 511](#) summarizes key output fields in RPM displays.

Table 62: Summary of Key RPM Output Fields

Field	Values	Additional Information
Currently Running Tests		
Graph		Click the Graph link to display the graph (if it is not already displayed) or to update the graph for a particular test.
Owner	Configured owner name of the RPM test.	—
Test Name	Configured name of the RPM test.	—
Probe Type	Type of RPM probe configured for the specified test: <ul style="list-style-type: none"> • http-get • http-get-metadata • icmp-ping • icmp6-ping • icmp-ping-timestamp • tcp-ping • udp-ping 	—
Target Address	IPv4 address, IPv6 address, or URL of the remote server that is being probed by the RPM test.	—
Source Address	Explicitly configured IPv4 or IPv6 source address that is included in the probe packet headers.	If no source address is configured, the RPM probe packets use the outgoing interface as the source address, and the Source Address field is empty.
Minimum RTT	Shortest round-trip time from the Juniper Networks device to the remote server, as measured over the course of the test.	—
Maximum RTT	Longest round-trip time from the Juniper Networks device to the remote server, as measured over the course of the test.	—
Average RTT	Average round-trip time from the Juniper Networks device to the remote server, as measured over the course of the test.	—
Standard Deviation RTT	Standard deviation of round-trip times from the Juniper Networks device to the remote server, as measured over the course of the test.	—
Probes Sent	Total number of probes sent over the course of the test.	—
Loss Percentage	Percentage of probes sent for which a response was not received.	—
Round-Trip Time for a Probe		

Table 62: Summary of Key RPM Output Fields (continued)

Field	Values	Additional Information
Samples	Total number of probes used for the data set.	The Juniper Networks device maintains records of the most recent 50 probes for each configured test. These 50 probes are used to generate RPM statistics for a particular test.
Earliest Sample	System time when the first probe in the sample was received.	—
Latest Sample	System time when the last probe in the sample was received.	—
Mean Value	Average round-trip time for the 50-probe sample.	—
Standard Deviation	Standard deviation of the round-trip times for the 50-probe sample.	—
Lowest Value	Shortest round-trip time from the device to the remote server, as measured over the 50-probe sample.	—
Time of Lowest Sample	System time when the lowest value in the 50-probe sample was received.	—
Highest Value	Longest round-trip time from the Juniper Networks device to the remote server, as measured over the 50-probe sample.	—
Time of Highest Sample	System time when the highest value in the 50-probe sample was received.	—

Cumulative Jitter for a Probe

Samples	Total number of probes used for the data set.	The Juniper Networks device maintains records of the most recent 50 probes for each configured test. These 50 probes are used to generate RPM statistics for a particular test.
Earliest Sample	System time when the first probe in the sample was received.	—
Latest Sample	System time when the last probe in the sample was received.	—
Mean Value	Average jitter for the 50-probe sample.	—
Standard Deviation	Standard deviation of the jitter values for the 50-probe sample.	—
Lowest Value	Smallest jitter value, as measured over the 50-probe sample.	—

Table 62: Summary of Key RPM Output Fields (continued)

Field	Values	Additional Information
Time of Lowest Sample	System time when the lowest value in the 50-probe sample was received.	—
Highest Value	Highest jitter value, as measured over the 50-probe sample.	—
Time of Highest Sample	System time when the highest jitter value in the 50-probe sample was received.	—

- Related Documentation**
- [RPM Overview on page 483](#)
 - [RPM Support for VPN Routing and Forwarding on page 493](#)
 - [RPM Configuration Options on page 493](#)

Example: Configuring Basic RPM Probes

This example shows how to configure basic RPM probes to measure performance between two network endpoints.

- [Requirements on page 513](#)
- [Overview on page 513](#)
- [Configuration on page 514](#)
- [Verification on page 516](#)

Requirements

Before you begin:

- Establish basic connectivity.
- Configure network interfaces. See *Interfaces Feature Guide for Security Devices*.

Overview

In this example, you configure basic probes for two RPM owners, customerA and customerB. You configure the RPM test as icmp-test for customerA with a test interval of 15 seconds and specify a probe type as icmp-ping-timestamp, a probe timestamp, and a target address as 192.178.16.5. You then configure the RPM thresholds and corresponding SNMP traps to catch ingress (inbound) times greater than 3000 microseconds.

Then you configure the RPM test as http-test for customerB with a test interval of 30 seconds and specify a probe type as http-get and a target URL as http://customerB.net. Finally, you configure RPM thresholds and corresponding SNMP traps as probe-failure

and test-failure to catch three or more successive lost probes and total lost probes of 10.



NOTE: On SRX300, SRX320, SRX340, SRX1500 devices and vSRX instances, when you configure basic RPM probes, the following combination of the configuration parameters is not supported:

Source address and destination port and next-hop.

Configuring RPM probe with these parameters prevents sending out RPM probes to a specified probe target. We recommend you to configure either the source address or destination port and next-hop to configure RPM probe.

Configuration

CLI Quick Configuration

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

```
set services rpm probe customerA test icmp-test probe-interval 15
set services rpm probe customerA test icmp-test probe-type icmp-ping-timestamp
set services rpm probe customerA test icmp-test hardware-timestamp
set services rpm probe customerA test icmp-test target address 192.178.16.5
set services rpm probe customerA test icmp-test thresholds ingress-time 3000
set services rpm probe customerA test icmp-test traps ingress-time-exceeded
set services rpm probe customerB test http-test probe-interval 30
set services rpm probe customerB test http-test probe-type http-get
set services rpm probe customerB test http-test target url http://customerB.net
set services rpm probe customerB test http-test thresholds successive-loss 3
set services rpm probe customerB test http-test thresholds total-loss 10
set services rpm probe customerB test http-test traps probe-failure
set services rpm probe customerB test http-test traps test-failure
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

To configure basic RPM probes:

1. Configure the RPM.

```
[edit]
user@host# edit services rpm
```

2. Configure the RPM owners.

```
[edit services rpm]
user@host# set probe customerA
```



```
user@host# set probe customerB
```

3. Configure the RPM test for customerA.

```
[edit services rpm]
user@host# edit probe customerA
user@host# set test icmp-test probe-interval 15
user@host# set test icmp-test probe-type icmp-ping-timestamp
```

4. Specify a probe timestamp and a target address.

```
[edit services rpm probe customerA]
user@host# set test icmp-test hardware-timestamp
user@host# set test icmp-test target address 192.178.16.5
```

5. Configure RPM thresholds and corresponding SNMP traps.

```
[edit services rpm probe customerA]
user@host# set test icmp-test thresholds ingress-time 3000
user@host# set test icmp-test traps ingress-time-exceeded
```

6. Configure the RPM test for customerB.

```
[edit]
user@host# edit services rpm probe customerB
user@host# set test http-test probe-interval 30
```

7. Specify a probe type and a target URL.

```
[edit services rpm probe customerB]
user@host# set test http-test probe-type http-get
user@host# set test http-test target url http://customerB.net
```

8. Configure RPM thresholds and corresponding SNMP traps.

```
[edit services rpm probe customerB]
user@host# set test http-test thresholds successive-loss 3
user@host# set test http-test thresholds total-loss 10
user@host# set test http-test traps probe-failure
user@host# set test http-test traps test-failure
```

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

```
[edit]
user@host# show services rpm
probe customerA {
  test icmp-test {
    probe-type icmp-ping-timestamp;
    target address 192.178.16.5;
    probe-interval 15;
    thresholds {
      ingress-time 3000;
    }
    traps ingress-time-exceeded;
    hardware-timestamp;
  }
}
probe customerB {
  test http-test {
    probe-type http-get;
    target url http://customerB.net;
    probe-interval 30;
    thresholds {
      successive-loss 3;
      total-loss 10;
    }
    traps [ probe-failure test-failure ];
  }
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

- [Verifying RPM Services on page 516](#)
- [Verifying RPM Statistics on page 516](#)

Verifying RPM Services

Purpose Verify that the RPM configuration is within the expected values.

Action From configuration mode, enter the **show services rpm** command. The output shows the values that are configured for RPM on the device.

Verifying RPM Statistics

Purpose Verify that the RPM probes are functioning and that the RPM statistics are within expected values.

Action From configuration mode, enter the **show services rpm probe-results** command.

```
user@host> show services rpm probe-results
```

```
Owner: customerD, Test: icmp-test
Probe type: icmp-ping-timestamp
Minimum Rtt: 312 usec, Maximum Rtt: 385 usec, Average Rtt: 331 usec,
Jitter Rtt: 73 usec, Stddev Rtt: 27 usec
Minimum egress time: 0 usec, Maximum egress time: 0 usec,
Average egress time: 0 usec, Jitter egress time: 0 usec,
Stddev egress time: 0 usec
Minimum ingress time: 0 usec, Maximum ingress time: 0 usec,
Average ingress time: 0 usec, Jitter ingress time: 0 usec,
Stddev ingress time: 0 usec
Probes sent: 5, Probes received: 5, Loss percentage: 0

Owner: customerE, Test: http-test
Target address: 192.176.17.4, Target URL: http://customerB.net,
Probe type: http-get
Minimum Rtt: 1093 usec, Maximum Rtt: 1372 usec, Average Rtt: 1231 usec,
Jitter Rtt: 279 usec, Stddev Rtt: 114 usec
Probes sent: 3, Probes received: 3, Loss percentage: 0

Owner: Rpm-Bgp-Owner, Test: Rpm-Bgp-Test-1
Target address: 10.209.152.37, Probe type: icmp-ping, Test size: 5 probes
Routing Instance Name: LR1/RI1
Probe results:
  Response received, Fri Oct 28 05:20:23 2005
  Rtt: 662 usec
Results over current test:
  Probes sent: 5, Probes received: 5, Loss percentage: 0
  Measurement: Round trip time
    Minimum: 529 usec, Maximum: 662 usec, Average: 585 usec,
    Jitter: 133 usec, Stddev: 53 usec
Results over all tests:
  Probes sent: 5, Probes received: 5, Loss percentage: 0
  Measurement: Round trip time
    Minimum: 529 usec, Maximum: 662 usec, Average: 585 usec,
    Jitter: 133 usec, Stddev: 53 usec
```

Configure the traps you want using the **set services rpm probe p1 test t1 traps** command.

If a trap is triggered, you can view the same in the log file named **messages** using the **show snmp log messages | match rmopd** command.

Possible Option	Set of values
egress-jitter-exceeded	Exceeded jitter in egress time threshold
egress-std-dev-exceeded	Exceeded egress time standard deviation threshold
egress-time-exceeded	Exceeded maximum egress time threshold
ingress-jitter-exceeded	Exceeded jitter in ingress time threshold
ingress-std-dev-exceeded	Exceeded ingress time standard deviation threshold

Possible Option	Set of values
probe-failure	Successive probe loss threshold reached
rtt-exceeded	Exceeded maximum round trip time threshold
std-dev-exceeded	Exceeded round trip time standard deviation threshold
test-completion	Test completed
test-failure	Total probe loss threshold reached

- Related Documentation**
- [RPM Overview on page 483](#)
 - [RPM Configuration Options on page 493](#)
 - [Tuning RPM Probes on page 509](#)

Example: Configuring RPM Using TCP and UDP Probes

This example shows how to configure RPM using TCP and UDP probes.

- [Requirements on page 518](#)
- [Overview on page 518](#)
- [Configuration on page 519](#)
- [Verification on page 521](#)

Requirements

Before you begin:

- Establish basic connectivity.
- Configure network interfaces. See *Interfaces Feature Guide for Security Devices*.
- Configure the probe owner, the test, and the specific parameters of the RPM probe. See [“Example: Configuring Basic RPM Probes” on page 513](#).

Overview

In this example, you configure both the host (device A) and the remote device (device B) to act as TCP and UDP servers. You configure a probe for customerC, which uses TCP packets. Device B is configured as an RPM server for both TCP and UDP packets, using an lt services interface as the destination interface, and ports 50000 and 50037, respectively.



CAUTION: Use probe classification with caution, because improper configuration can cause packets to be dropped.

Configuration

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

```
{device A}
set services rpm probe customerC test tcp-test probe-interval 5
set services rpm probe customerC test tcp-test probe-type tcp-ping
set services rpm probe customerC test tcp-test target address 192.162.45.6
set services rpm probe customerC test tcp-test destination-interface lt-0/0/0
set services rpm probe customerC test tcp-test destination-port 50000
```

```
{device B}
set services rpm probe-server tcp port 50000
set services rpm probe-server udp port 50037
```

Step-by-Step Procedure The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

To configure RPM using TCP and UDP probes:

1. Configure the RPM owner on device A.

```
{device A}
[edit]
user@host# edit services rpm
user@host# set probe customerC
```

2. Configure the RPM test.

```
{device A}
[edit services rpm]
user@host# edit services rpm probe customerC
user@host# set test tcp-test probe-interval 5
```

3. Set the probe type.

```
{device A}
[edit services rpm probe customerC]
user@host# set test tcp-test probe-type tcp-ping
```

4. Specify the target address.

```
{device A}
[edit services rpm probe customerC]
```

```
user@host# set test tcp-test target address 192.162.45.6
```

5. Configure the destination interface.

```
{device A}  
[edit services rpm probe customerC]  
user@host# set test tcp-test destination-interface lt-0/0/0
```

6. Configure port 50000 as the TCP port to which the RPM probes are sent.

```
{device A}  
[edit services rpm probe customerC]  
user@host# set test tcp-test destination-port 50000
```

7. Configure device B to act as a TCP server using port 50000.

```
{device B}  
[edit]  
user@host# edit services rpm  
user@host# set probe-server tcp port 50000
```

8. Configure device B to act as a UDP server using port 50037.

```
{device B}  
[edit services rpm]  
user@host# set probe-server udp port 50037
```

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

```
[edit]  
user@host# show services rpm  
  probe customerC {  
    test tcp-test {  
      probe-type tcp-ping;  
      target address 192.162.45.6;  
      probe-interval 5;  
      destination-port 50000;  
      destination-interface lt-0/0/0.0;  
    }  
  }  
  probe-server {  
    tcp {  
      port 50000;  
    }  
    udp {
```

```

    port 50037;
  }
}

```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Verifying RPM Probe Servers

Purpose Confirm that the configuration is working properly.

Verify that the device is configured to receive and transmit TCP and UDP RPM probes on the correct ports.

Action From configuration mode, enter the **show services rpm active-servers** command. The output shows a list of the protocols and corresponding ports for which the device is configured as an RPM server.

```
user@host> show services rpm active-servers
```

```
Protocol: TCP, Port: 50000
```

```
Protocol: UDP, Port: 50037
```

Related Documentation

- [RPM Overview on page 483](#)
- [RPM Configuration Options on page 493](#)
- [Example: Configuring Basic RPM Probes on page 513](#)
- [Example: Configuring RPM Probes for BGP Monitoring on page 521](#)
- [Tuning RPM Probes on page 509](#)

Example: Configuring RPM Probes for BGP Monitoring

This example shows how to configure RPM probes to monitor BGP neighbors.

- [Requirements on page 521](#)
- [Overview on page 522](#)
- [Configuration on page 522](#)
- [Verification on page 524](#)

Requirements

Before you begin:

- Configure the BGP parameters under RPM configuration to send RPM probes to BGP neighbors. See [“Example: Configuring Basic RPM Probes” on page 513.](#)
- Use TCP or UDP probes by configure both the probe server (Juniper Networks device) and the probe receiver (the remote device) to transmit and receive RPM probes on the same TCP or UDP port. See [“Example: Configuring RPM Using TCP and UDP Probes” on page 518.](#)

Overview

In this example, you specify a hexadecimal value that you want to use for the data portion of the RPM probe as ABCD123. (It ranges from 1 through 2048 characters.) You specify the data size of the RPM probe as 1024 bytes. (The value ranges from 0 through 65,507.)

Then you configure destination port 50000 as the TCP port to which the RPM probes are sent. You specify the number of probe results to be saved in the probe history as 25. (It ranges from 0 through 255, and the default is 50.) You set the probe count to 5 and probe interval as 1. (The probe count ranges from 1 through 15, and the default is 1; and the probe interval ranges from 1 through 255, and the default is 3.) You then specify tcp-ping as the type of probe to be sent as part of the test.

Finally, you set the test interval as 60. The value ranges from 0 through 86,400 seconds for the interval between tests.

Configuration

CLI Quick Configuration

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

```
set services rpm bgp data-fill ABCD123 data-size 1024
set services rpm bgp destination-port 50000 history-size 25
set services rpm bgp probe-count 5 probe-interval 1
set services rpm bgp probe-type tcp-ping test-interval 60
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide* .

To configure RPM probes to monitor BGP neighbors:

1. Configure the RPM and BGP.

```
[edit]
user@host# edit services rpm bgp
```

2. Specify a hexadecimal value.

```
[edit services rpm bgp]
```



```
user@host# set data-fill ABCD123
```

3. Specify the data size of the RPM probe.

```
[edit services rpm bgp]
user@host# set data-size 1024
```

4. Configure the destination port.

```
[edit services rpm bgp]
user@host# set destination-port 50000
```

5. Specify the number of probes.

```
[edit services rpm bgp]
user@host# set history-size 25
```

6. Set the probe count and probe interval.

```
[edit services rpm bgp]
user@host# set probe-count 5 probe-interval 1
```

7. Specify the type of probe.

```
[edit services rpm bgp]
user@host# set probe-type tcp-ping
```



NOTE: If you do not specify the probe type the default ICMP probes are sent.

8. Set the test interval.

```
[edit services rpm bgp]
user@host# set test-interval 60
```

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

```
[edit]
user@host# show services rpm
bgp {
```

```
probe-type tcp-ping;
probe-count 5;
probe-interval 1;
test-interval 60;
destination-port 50000;
history-size 25;
data-size 1024;
data-fill ABCD123;
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Verifying RPM Probes for BGP Monitoring

- Purpose** Confirm that the configuration is working properly.
- Verify that the RPM probes for BGP monitoring is configured.
- Action** From configuration mode, enter the **show services rpm** command.
- Related Documentation**
- [RPM Overview on page 483](#)
 - [RPM Configuration Options on page 493](#)
 - [Directing RPM Probes to Select BGP Devices on page 507](#)
 - [Tuning RPM Probes on page 509](#)

Viewing Real-Time Performance Monitoring Information



NOTE: This topic applies only to the J-Web Application package.

Real-time performance monitoring (RPM) on EX Series switches enables you to configure and send probes to a specified target and monitor the analyzed results to determine packet loss, round-trip time, and jitter. The J-Web interface provides a graphical view of RPM information for EX Series switches.

To view the RPM information using the J-Web interface:

1. Select **Troubleshoot > RPM > View RPM**.
2. Select the **Round Trip Time** check box to display the graph with round-trip time included. Clear the check-box to view the graph without the round-trip time.
3. From the **Refresh Time** list, select a refresh time interval for the graph.

CHAPTER 21

Configuring IP Monitoring

- [IP Monitoring Overview on page 525](#)
- [Understanding IP Monitoring Test Parameters on page 526](#)
- [Understanding IP Monitoring Through Redundant Ethernet Interface Link Aggregation Groups on page 527](#)
- [Example: Configuring IP Monitoring on SRX Series Devices on page 527](#)
- [Example: Configuring IP Monitoring on SRX Series Devices on page 533](#)
- [Example: Configuring Chassis Cluster Redundancy Group IP Address Monitoring on page 536](#)

IP Monitoring Overview

This feature monitors IP on standalone SRX Series devices or a chassis cluster redundant Ethernet (reth) interface. Existing RPM probes are sent to an IP address to check for reachability. The user takes action based on the reachability result. Supported action currently is preferred static route injection to system route table.

The actions supported are:

- Adding or deleting a new static route that has a higher priority (lower preference) value than a route configured through the CLI command **set routing-options static route**
- Defining multiple probe names under the same IP monitoring policy. If any probe fails, the action is taken. If all probes are reachable, the action is reverted
- Configuring multiple tests in one RPM probe. All tests must fail for the RPM probe to be considered unreachable. If at least one test reaches its target, the RPM probe is considered reachable
- Configuring multiple failure thresholds in one RPM test. If one threshold is reached, the test fails. If no thresholds are reached, the test succeeds.
- Specifying the no-preempt option. If the no-preempt option is specified, the policy does not perform preemptive failback when it is in a failover state or when the RPM probe test recovers from a failure.
- Setting preferred metric values. If the preferred metric value is set, during failover, the route is injected with the set preferred metric value.
- Enabling and disabling interfaces.

- **Interface-Enable**—On a physical or logical interface, when the interface-enable action is configured, the initial state of the interface is disable after startup, and it continues to remain in the disable state as long as the associated RPM probe is in the pass state. When the associated RPM probe fails, the configured physical and logical interfaces are enabled.
- **Interface-Disable**—On a physical or logical interface, when the interface-disable action is configured, the interface state remains unchanged. When the associated RPM probe fails, the physical and logical interfaces are disabled.



NOTE: Multiple probe names and actions can be defined for the same IP monitoring policy.

Related Documentation

- [Understanding IP Monitoring Test Parameters on page 526](#)

Understanding IP Monitoring Test Parameters

Each probed target is monitored over the course of a test, which represents a collection of probes during which statistics such as standard deviation and jitter are collected are calculated. During a test, probes are generated and responses collected at a rate defined by the probe interval, the number of seconds between probes.



NOTE: To avoid flap, an action is reverted only at the end of a test cycle. During the test cycle, if no threshold is reached, the action is reverted. Although action-failover takes place based on a predefined condition of a monitored IP, when the condition is reversed, the IP becomes reachable on the original route, and the newly added route is deleted. Recovery is performed only when all RPM probes report the IP as reachable.

Table 63 on page 526 lists the test parameters and its default values:

Table 63: Test Parameters and Default Values

Parameter	Default Value
probe-count	1
probe-interval	3 seconds
test-interval	1 second

Table 64 on page 527 lists the supported threshold and its description:

Table 64: Threshold Supported and Description

Threshold	Description
Successive-Loss	Successive loss count of probes
Total-Loss	Total probe lost count

Related Documentation

- [IP Monitoring Overview on page 525](#)

Understanding IP Monitoring Through Redundant Ethernet Interface Link Aggregation Groups

IP monitoring checks the reachability of an upstream device. It is designed to check the end-to-end connectivity of configured IP addresses and allows a redundancy group (RG) to automatically failover when the monitored IP address is not reachable through the redundant Ethernet (reth) interface. Both the primary and secondary devices in the chassis cluster monitor specific IP addresses to determine whether an upstream device in the network is reachable.

A reth interface contains physical interfaces from both the primary and secondary nodes in the SRX Series chassis cluster. In a reth interface, two physical interfaces are configured with each node contributing one physical interface. When you configure multiple IP addresses on the reth interface in a chassis cluster setup, IP address monitoring uses the first IP address from the list of primary and secondary IP addresses configured for that reth interface of the primary node, and the secondary node respectively. The first IP address is the one with smallest prefix (netmask). In a reth interface LAG, more than two physical interfaces are configured in the reth interface.

Related Documentation

- [IP Monitoring Overview on page 525](#)

Example: Configuring IP Monitoring on SRX Series Devices

This example shows how to monitor IP on SRX1500, SRX5600, and SRX5800 devices with chassis cluster enabled.

- [Requirements on page 527](#)
- [Overview on page 528](#)
- [Configuration on page 529](#)
- [Verification on page 531](#)

Requirements

- You need two SRX5800 Services Gateways with identical hardware configurations, one SRX Series device and one EX8208 Ethernet Switch.

- Physically connect the two SRX5800 devices (back-to-back for the fabric and control ports) and ensure that they are the same models. Configure/add these two devices in a cluster.

Overview

IP address monitoring checks end-to-end reachability of configured IP address and allows a redundancy group to automatically fail over when not reachable through the child link of redundant Ethernet interface (known as a reth) interface. Redundancy groups on both devices in a cluster can be configured to monitor specific IP addresses to determine whether an upstream device in the network is reachable.

When you configure multiple IP addresses on the reth Interface in a chassis cluster setup, IP monitoring uses the first IP address from the list of IP addresses configured for that reth interface on the primary node, and the first IP address from the list of secondary IP addresses configured for that reth interface on the backup node. The first IP address is the one with smallest prefix (netmask).

This example shows how to set up IP monitoring on an SRX Series device.



NOTE: IP monitoring is not supported on an NP-IOC card.

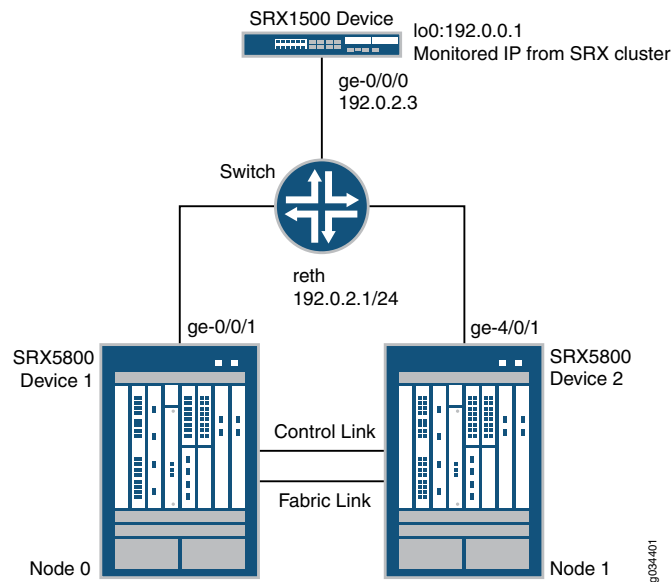


NOTE: IP monitoring does not support MIC online/offline status on SRX devices.

Topology

Figure 16 on page 529 shows the topology used in this example.

Figure 16: IP Monitoring on an SRX Series Device Topology Example



In this example, two SRX5800 devices in a chassis cluster are connected to an SRX1500 device through an EX8208 Ethernet Switch. The example shows how the redundancy groups can be configured to monitor key upstream resources reachable through redundant Ethernet interfaces on either node in a cluster.

Configuration

- [Configuring IP Monitoring on SRX Series Device on page 530](#)

CLI Quick Configuration

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

```
set chassis cluster reth-count 1
set chassis cluster redundancy-group 0 node 0 priority 254
set chassis cluster redundancy-group 0 node 1 priority 1
set chassis cluster redundancy-group 1 node 0 priority 200
set chassis cluster redundancy-group 1 node 1 priority 199
set chassis cluster redundancy-group 1 ip-monitoring global-weight 255
set chassis cluster redundancy-group 1 ip-monitoring global-threshold 80
set chassis cluster redundancy-group 1 ip-monitoring retry-interval 3
set chassis cluster redundancy-group 1 ip-monitoring retry-count 10
set chassis cluster redundancy-group 1 ip-monitoring family inet 192.0.0.1 weight 80
set chassis cluster redundancy-group 1 ip-monitoring family inet 192.0.0.1
interface reth0.0 secondary-ip-address 192.0.2.2
set interfaces ge-0/0/1 gigether-options redundant-parent reth0
set interfaces ge-4/0/1 gigether-options redundant-parent reth0
set interfaces reth0 redundant-ether-options redundancy-group 1
set interfaces reth0 unit 0 family inet address 192.0.2.1/24
set routing-options static route 192.0.0.1/32 next-hop 192.0.2.3
```

Configuring IP Monitoring on SRX Series Device

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

To configure IP monitoring on an SRX Series device:

1. Specify the number of redundant Ethernet interfaces.

```
{primary:node0}[edit]
user@host# set chassis cluster reth-count 1
```

2. Specify a redundancy group's priority for primacy on each node of the cluster. The higher number takes precedence.

```
{primary:node0}[edit]
user@host# set chassis cluster redundancy-group 0 node 0 priority 254
user@host# set chassis cluster redundancy-group 0 node 1 priority 1
user@host# set chassis cluster redundancy-group 1 node 0 priority 200
user@host# set chassis cluster redundancy-group 1 node 1 priority 199
```

3. Configure the redundant Ethernet interfaces to redundancy-group 1.

```
{primary:node0}[edit]
user@host# set interfaces reth0 redundant-ether-options redundancy-group 1
user@host# set interfaces reth0 unit 0 family inet address 192.0.2.1/24
```

4. Assign child interfaces for the redundant Ethernet interfaces from node 0 and node 1.

```
{primary:node0}[edit]
user@host# set interfaces ge-0/0/1 gigether-options redundant-parent reth0
user@host# set interfaces ge-4/0/1 gigether-options redundant-parent reth0
```

5. Configure the static route to the IP address that is to be monitored.

```
{primary:node0}[edit]
user@host# set routing-options static route 192.0.0.1/32 next-hop 192.0.2.3
```

6. Configure IP monitoring under redundancy-group 1 with global weight and global threshold.

```
{primary:node0}[edit]
user@host# set chassis cluster redundancy-group 1 ip-monitoring global-weight 255
user@host# set chassis cluster redundancy-group 1 ip-monitoring global-threshold 80
```


7. Specify the retry interval.

```
{primary:node0}[edit]
user@host# set chassis cluster redundancy-group 1 ip-monitoring retry-interval 3
```

8. Specify the retry count.

```
{primary:node0}[edit]
user@host# set chassis cluster redundancy-group 1 ip-monitoring retry-count 10
```

9. Assign a weight to the IP address to be monitored, and configure a secondary IP address that will be used to send ICMP packets from the secondary node to track the IP being monitored.

```
{primary:node0}[edit]
user@host# set chassis cluster redundancy-group 1 ip-monitoring family inet 192.0.0.1
weight 80
user@host# set chassis cluster redundancy-group 1 ip-monitoring family inet 192.0.0.1
interface reth0.0 secondary-ip-address 192.0.2.2
```



NOTE:

- The redundant Ethernet (reth0) IP address, 192.0.2.1/24, is used to send ICMP packets from node 0 to check the reachability of the monitored IP.
- The secondary IP address, 192.0.2.2, should belong to the same network as the reth0 IP address.
- The secondary IP address is used to send ICMP packets from node 1 to check the reachability of the monitored IP.

Verification

Confirm the configuration is working properly.

- [Verifying Chassis Cluster Status— Before Failover on page 531](#)
- [Verifying Chassis Cluster IP Monitoring Status— Before Failover on page 532](#)
- [Verifying Chassis Cluster Status— After Failover on page 532](#)
- [Verifying Chassis Cluster IP Monitoring Status— After Failover on page 533](#)

Verifying Chassis Cluster Status— Before Failover

Purpose Verify the chassis cluster status, failover status, and redundancy group information before failover.

Action From operational mode, enter the **show chassis cluster status** command.

```
show chassis cluster status
```

```
Cluster ID: 11
Node Priority Status Preempt Manual failover
Redundancy group: 0 , Failover count: 0
node0 254 primary no no
node1 1 secondary no no
Redundancy group: 1 , Failover count: 0
node0 200 primary no no
node1 199 secondary no no
```

Verifying Chassis Cluster IP Monitoring Status— Before Failover

Purpose Verify the IP status being monitored from both nodes and the failover count for both nodes before failover.

Action From operational mode, enter the **show chassis cluster ip-monitoring status redundancy-group 1** command.

```
show chassis cluster ip-monitoring status redundancy-group 1
```

```
node0:
```

```
-----
Redundancy group: 1
IP address Status Failure count Reason
192.0.0.1 reachable 0 n/a
```

```
node1:
```

```
-----
Redundancy group: 1
IP address Status Failure count Reason
192.0.0.1 reachable 0 n/a
```

Verifying Chassis Cluster Status— After Failover

Purpose Verify the chassis cluster status, failover status, and redundancy group information after failover.



NOTE: If the IP address is not reachable, the following output will be displayed.

Action From operational mode, enter the **show chassis cluster status** command.

```
show chassis cluster status
```

```
Cluster ID: 11
Node Priority Status Preempt Manual failover
Redundancy group: 0 , Failover count: 0
node0 254 primary no no
node1 1 secondary no no
Redundancy group: 1 , Failover count: 1
node0 0 secondary no no
node1 199 primary no no
```

Verifying Chassis Cluster IP Monitoring Status— After Failover

Purpose Verify the IP status being monitored from both nodes and the failover count for both nodes after failover.

Action From operational mode, enter the **show chassis cluster ip-monitoring status redundancy-group 1** command.

```
show chassis cluster ip-monitoring status redundancy-group 1
```

```
node0:
```

```
-----
Redundancy group: 1
IP address Status Failure count Reason
192.0.0.1 unreachable 1 unknown
```

```
node1:
```

```
-----
Redundancy group: 1
IP address Status Failure count Reason
192.0.0.1 reachable 0 n/a
```

Related Documentation

- [Example: Configuring an Active/Passive Chassis Cluster on SRX5800 Devices](#)

Example: Configuring IP Monitoring on SRX Series Devices

This example shows how to monitor IP on SRX300, SRX320, SRX340, SRX550M, and SRX1500 devices.

- [Requirements on page 534](#)
- [Overview on page 534](#)
- [Configuration on page 534](#)
- [Verification on page 536](#)

Requirements

Before you begin:

Configure the following RPM options for RPM test:

- target-address
- probe-count
- probe-interval
- test-interval
- thresholds
- next-hop

Overview

This example shows how to set up IP monitoring on an SRX Series device.

Configuration

CLI Quick Configuration

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

```
set services rpm probe Probe-Payment-Server test paysvr target address 1.1.1.10
set services rpm probe Probe-Payment-Server test paysvr probe-count 10
set services rpm probe Probe-Payment-Server test paysvr probe-interval 5
set services rpm probe Probe-Payment-Server test paysvr test-interval 5
set services rpm probe Probe-Payment-Server test paysvr thresholds successive-loss 10
set services rpm probe Probe-Payment-Server test paysvr next-hop 2.2.2.1
set services ip-monitoring policy Payment-Server-Tracking match rpm-probe
  Probe-Payment-Server
set services ip-monitoring policy Payment-Server-Tracking then preferred-route route
  1.1.1.0/24 next-hop 1.1.1.99
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

To configure IP monitoring on an SRX Series Services Gateway:

1. Configure the target address under the RPM probe.

```
[edit ]
user@host# set services rpm probe Probe-Payment-Server test paysvr target address
  1.1.1.10
```

2. Configure the probe count under the RPM probe.

```
[edit ]
user@host# set services rpm probe Probe-Payment-Server test paysvr probe-count
10
```

3. Configure the probe interval (in seconds) under the RPM probe.

```
[edit ]
user@host# set services rpm probe Probe-Payment-Server test paysvr probe-interval
5
```

4. Configure the test interval (in seconds) under the RPM probe.

```
[edit ]
user@host# set services rpm probe Probe-Payment-Server test paysvr test-interval
5
```

5. Configure the threshold successive loss count under the RPM

```
[edit ]
user@host# set services rpm probe Probe-Payment-Server test paysvr thresholds
successive-loss 10
```

6. Configure the next-hop IP address under the RPM probe.

```
[edit ]
user@host# set services rpm probe Probe-Payment-Server test paysvr next-hop
2.2.2.1
```

7. Configure the IP monitoring policy under services.

```
[edit ]
user@host# set services ip-monitoring policy Payment-Server-Tracking match
rpm-probe Probe-Payment-Server
```



NOTE: The following steps are not mandatory. You can configure interface actions and route actions independently, or you can configure both the interface action and the route action together in one IP monitoring policy.

8. Configure the IP monitoring preferred route under services.

```
[edit ]
user@host# set services ip-monitoring policy Payment-Server-Tracking then
preferred-route route 1.1.1.0/24 preferred-metric 4
```

9. Configure the IP monitoring interface actions.

- Enable

```
[edit ]
user@host# set services ip-monitoring policy Payment-Server-Tracking then
interface ge-0/0/1 enable
```

- Disable

```
[edit ]
user@host# set services ip-monitoring policy Payment-Server-Tracking then
interface fe-0/0/[4-6] disable
```

10. Configure the no-preempt option.

```
[edit ]
user@host# set services ip-monitoring policy Payment-Server-Tracking no-preempt
```

Verification

Verifying IP Monitoring

Purpose Verify the IP monitoring status of a policy.

Action To verify the configuration is working properly, enter the following command:

```
show services ip-monitoring status <policy-name>
```

Related Documentation

- [IP Monitoring Overview on page 525](#)
- [Understanding IP Monitoring Test Parameters on page 526](#)

Example: Configuring Chassis Cluster Redundancy Group IP Address Monitoring

This example shows how to configure redundancy group IP address monitoring for an SRX Series device in a chassis cluster.

- [Requirements on page 536](#)
- [Overview on page 537](#)
- [Configuration on page 537](#)
- [Verification on page 539](#)

Requirements

Before you begin:

- Set the chassis cluster node ID and cluster ID. See *Example: Setting the Node ID and Cluster ID for SRX Series Devices in a Chassis Cluster*
- Configure the chassis cluster management interface. See *Example: Configuring the Chassis Cluster Management Interface*.
- Configure the chassis cluster fabric. See *Example: Configuring the Chassis Cluster Fabric Interfaces*.

Overview

You can configure redundancy groups to monitor upstream resources by pinging specific IP addresses that are reachable through redundant Ethernet interfaces on either node in a cluster. You can also configure global threshold, weight, retry interval, and retry count parameters for a redundancy group. When a monitored IP address becomes unreachable, the weight of that monitored IP address is deducted from the redundancy group IP address monitoring global threshold. When the global threshold reaches 0, the global weight is deducted from the redundancy group threshold. The retry interval determines the ping interval for each IP address monitored by the redundancy group. The pings are sent as soon as the configuration is committed. The retry count sets the number of allowed consecutive ping failures for each IP address monitored by the redundancy group.

In this example, you configure the following settings for redundancy group 1:

- IP address to monitor—10.1.1.10
- IP address monitoring global-weight—100
- IP address monitoring global-threshold—200



NOTE: The threshold applies cumulatively to all IP addresses monitored by the redundancy group.

- IP address retry-interval—3 seconds
- IP address retry-count—10
- Weight—100
- Redundant Ethernet interface—reth1.0
- Secondary IP address—10.1.1.101

Configuration

CLI Quick Configuration

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

```
{primary:node0}[edit]
user@host#
```

```

set chassis cluster redundancy-group 1 ip-monitoring global-weight 100
set chassis cluster redundancy-group 1 ip-monitoring global-threshold 200
set chassis cluster redundancy-group 1 ip-monitoring retry-interval 3
set chassis cluster redundancy-group 1 ip-monitoring retry-count 10
set chassis cluster redundancy-group 1 ip-monitoring family inet 10.1.1.10 weight 100
interface reth1.0 secondary-ip-address 10.1.1.101

```

Step-by-Step Procedure

To configure redundancy group IP address monitoring:

1. Specify a global monitoring weight.

```

{primary:node0}[edit]
user@host# set chassis cluster redundancy-group 1 ip-monitoring global-weight 100

```

2. Specify the global monitoring threshold.

```

{primary:node0}[edit]
user@host# set chassis cluster redundancy-group 1 ip-monitoring global-threshold 200

```

3. Specify the retry interval.

```

{primary:node0}[edit]
user@host# set chassis cluster redundancy-group 1 ip-monitoring retry-interval 3

```

4. Specify the retry count.

```

{primary:node0}[edit]
user@host# set chassis cluster redundancy-group 1 ip-monitoring retry-count 10

```

5. Specify the IP address to be monitored, weight, redundant Ethernet interface, and secondary IP address.

```

{primary:node0}[edit]
user@host# set chassis cluster redundancy-group 1 ip-monitoring family inet 10.1.1.10 weight 100 interface reth1.0 secondary-ip-address 10.1.1.101

```

Results From configuration mode, confirm your configuration by entering the **show chassis cluster redundancy-group 1** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

For brevity, this **show** command output includes only the configuration that is relevant to this example. Any other configuration on the system has been replaced with ellipses (...).


```
{primary:node0}[edit]
user@host# show chassis cluster redundancy-group 1
ip-monitoring {
  global-weight 100;
  global-threshold 200;
  family {
    inet {
      10.1.1.10 {
        weight 100;
        interface reth1.0 secondary-ip-address 10.1.1.101;
      }
    }
  }
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Verifying the Status of Monitored IP Addresses for a Redundancy Group

Purpose Verify the status of monitored IP addresses for a redundancy group.

Action From operational mode, enter the **show chassis cluster ip-monitoring status** command. For information about a specific group, enter the **show chassis cluster ip-monitoring status redundancy-group** command.

```
{primary:node0}
user@host> show chassis cluster ip-monitoring status
```

node0:

```
-----
Redundancy group: 1
Global threshold: 200
Current threshold: -120
```

IP address	Status	Failure count	Reason	Weight
10.1.1.10	reachable	0	n/a	220
10.1.1.101	reachable	0	n/a	100

node1:

```
-----
Redundancy group: 1
Global threshold: 200
Current threshold: -120
```

IP address	Status	Failure count	Reason	Weight
10.1.1.10	reachable	0	n/a	220
10.1.1.101	reachable	0	n/a	100

CHAPTER 22

Configuring sFlow Monitoring Technology

- [Overview of sFlow Technology on page 541](#)
- [Overview of sFlow Technology on ACX Series Routers on page 544](#)
- [Understanding How to Use sFlow Technology for Network Monitoring on page 546](#)
- [Understanding How to Use sFlow Technology for Network Monitoring on an EX Series Switch on page 552](#)
- [Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches on page 555](#)
- [Example: Configuring sFlow Technology to Monitor Network Traffic on MX Series Routers on page 560](#)
- [Configuring sFlow Technology for Network Monitoring \(CLI Procedure\) on page 565](#)
- [Configuring sFlow Technology on page 567](#)
- [Example: Monitoring Network Traffic Using sFlow Technology on page 569](#)

Overview of sFlow Technology

The sFlow technology is a monitoring technology for high-speed switched or routed networks. sFlow monitoring technology collects samples of network packets and sends them in a UDP datagram to a monitoring station called a *collector*. You can configure sFlow technology on a device to monitor traffic continuously at wire speed on all interfaces simultaneously. You must enable sFlow monitoring on each interface individually; you cannot globally enable sFlow monitoring on all interfaces with a single configuration statement. Junos OS supports the sFlow technology standard described in RFC 3176, *InMon Corporation's sFlow: A Method for Monitoring Traffic in Switched and Routed Networks*.

sFlow technology implements the following two sampling mechanisms:

- **Packet-based sampling**—Samples one packet out of a specified number of packets from an interface enabled for sFlow technology. Only the first 128 bytes of each packet are sent to the collector. Data collected include the Ethernet, IP, and TCP headers, along with other application-level headers (if present). Although this type of sampling might not capture infrequent packet flows, the majority of flows are reported over time, allowing the collector to generate a reasonably accurate representation of network activity. You configure packet-based sampling when you specify a sample rate.

- Time-based sampling—Samples interface statistics (counters) at a specified interval from an interface enabled for sFlow technology. Statistics such as Ethernet interface errors are captured. You configure time-based sampling when you specify a polling interval.

An sFlow monitoring system consists of an sFlow agent embedded in the device and up to four external collectors. On a QFX Series standalone switch, the sFlow agent performs packet sampling and gathers interface statistics, and then combines the information into UDP datagrams that are sent to the sFlow collectors. An sFlow collector can be connected to the switch through the management network or data network. The software forwarding infrastructure daemon (SFID) on the switch looks up the next-hop address for the specified collector IP address to determine whether the collector is reachable by way of the management network or data network.



NOTE: On the QFX Series standalone switches, if you configure sFlow technology monitoring on multiple interfaces and a high sampling rate, we recommend that you specify a collector that is on the data network instead of the management network. Having a high volume of sFlow technology monitoring traffic on the management network might interfere with other management interface traffic.

On a QFabric system, the sFlow technology architecture is distributed. The global sFlow technology configuration defined on the QFabric system Director device is distributed to Node groups that have sFlow sampling configured on their interfaces. The sFlow agent has a separate sampling entity, known as a *subagent*, running on each Node device. Each subagent has its own independent state and forwards its own sample information (datagrams) directly to the sFlow collectors.

On the QFabric system, an sFlow collector must be reachable through the data network. Because each Node device has all routes stored in the default routing instance, the collector IP address should be included in the default routing instance to ensure the collector's reachability from the Node device.

Regardless of the rate of traffic or the configured sampling interval, a datagram is sent whenever its size reaches the maximum Ethernet transmission unit (MTU) of 1500 bytes, or whenever a 250-ms timer expires, whichever occurs first. The timer ensures that a collector receives regularly sampled data.

To ensure sampling accuracy and efficiency, QFX Series devices use adaptive sFlow sampling. Adaptive sampling monitors the overall incoming traffic rate on the device and provides feedback to the interfaces to dynamically adapt their sampling rate to traffic conditions. The sFlow agent reads the statistics on the interfaces every 5 seconds and identifies five interfaces with the highest number of samples. On a standalone switch, when the CPU processing limit is reached, a binary backoff algorithm is implemented to reduce the sampling load of the top five interfaces by half. The adapted sampling rate is then to those top five interfaces.

On a QFabric system, sFlow technology monitors the interfaces on each Node device as a group, and implements the binary backoff algorithm based on the traffic on that group of interfaces.

Using adaptive sampling prevents overloading of the CPU and keeps the device operating at its optimum level even when there is a change in traffic patterns on the interfaces. The reduced sampling rate is used until the device is rebooted or when a new sampling rate is configured.

The sFlow collector uses the IP address of the sFlow agent to determine the source of the sFlow data. You can configure the IP address of the sFlow agent to ensure that the agent ID for the sFlow agent remains constant. If you do not assign an IP address to the agent, an IP address will be assigned to the agent using the IP address of a configured interface.

On the QFX Series standalone switches, the following priority is used to determine which interface will be used:

1. Management Ethernet interface me0 IP address
2. Any Layer 3 interface if the me0 IP address is not available

If a particular interface is not configured, the IP address of the next interface in the priority list is used as the IP address for the agent. Once an IP address is assigned to the agent, the agent ID is not modified until the sFlow service is restarted. At least one interface has to be configured for an IP address to be assigned to the agent.

In addition, you can explicitly configure the IP address for the source data (sFlow datagrams). On the QFX Series standalone switches, if you do not configure that address, the following priority is used:

- Any Layer 3 interface IP address
- The me0 IP address if no Layer 3 interface IP address is available

On the QFabric system, the following default values are used if the optional parameters are not configured:

- Agent ID is the management IP address of the default partition.
- Source IP is the management IP address of the default partition.

In addition, the QFabric system subagent ID (which is included in the sFlow datagrams) is the ID of the Node group from which the datagram is sent to the collector.



NOTE: On QFX5100 standalone switches and the QFX Series Virtual Chassis (with QFX3500 and QFX3600 switches), egress firewall filters are not applied to sFlow sampling packets. On these platforms, the software architecture is different from that on other QFX Series devices, and sFlow packets are sent by the Routing Engine (not the line card on the host) and are not transiting the switch. Egress firewall filters affect data packets that are transiting a switch but do not affect packets sent by the Routing Engine. As a result, sFlow sampling packets are always sent to the sFlow collector.

On the QFX Series, limitations of sFlow traffic sampling include:

- sFlow sampling on ingress interfaces does not capture CPU-bound traffic.
- sFlow sampling on egress interfaces does not support broadcast and multicast packets.
- Egress samples do not contain modifications made to the packet in the egress pipeline.
- If a packet is discarded because of a firewall filter, the reason code for discarding the packet is not sent to the collector.
- The **out-priority** field for a VLAN is always set to 0 (zero) on ingress and egress samples.
- You cannot configure sFlow monitoring on a link aggregation group (LAG), but you can configure it individually on a LAG member interface.

**Related
Documentation**

- [Understanding How to Use sFlow Technology for Network Monitoring on page 546](#)
- [Example: Monitoring Network Traffic Using sFlow Technology on page 569](#)
- [Configuring sFlow Technology on page 567](#)

Overview of sFlow Technology on ACX Series Routers

The sFlow technology is a monitoring technology for high-speed switched or routed networks. sFlow monitoring technology collects samples of network packets and sends them in a UDP datagram to a monitoring station called a *collector*. You can configure sFlow technology on a device to monitor traffic continuously at wire speed on all interfaces simultaneously. You must enable sFlow monitoring on each interface individually; you cannot globally enable sFlow monitoring on all interfaces with a single configuration statement. Junos OS supports the sFlow technology standard described in RFC 3176, *InMon Corporation's sFlow: A Method for Monitoring Traffic in Switched and Routed Networks*.

An sFlow monitoring system consists of an sFlow agent embedded in the device and a central data collector, or sFlow analyzer. The sFlow agent performs packet sampling and gathers interface statistics, and then combines the information into UDP datagrams that are sent to the sFlow collectors for analysis. The sFlow agent is responsible for monitoring the network port, sample all incoming packets including control traffic and traffic arriving on all the ports in the system. The collector can be connected to one of the data ports or the management interface.



NOTE: sFlow technology is supported only on the ACX5000 line of routers, other ACX Series routers do not support this technology.

The following sFlow features are supported on the ACX5000 line of routers:

- Packet-based sampling—Samples one packet out of a specified number of packets from an interface enabled for sFlow technology. Only the first 128 bytes of each packet are sent to the collector. Data collected include the Ethernet, IP, and TCP headers, along with other application-level headers (if present). Although this type of sampling might not capture infrequent packet flows, the majority of flows are reported over time, allowing the collector to generate a reasonably accurate representation of network activity. You configure packet-based sampling when you specify a sample rate.
- Time-based sampling—Samples interface statistics (counters) at a specified interval from an interface enabled for sFlow technology. Statistics such as Ethernet interface errors are captured. You configure time-based sampling when you specify a polling interval.
- Adaptive sampling—Monitors the overall incoming traffic rate on the device and provides feedback to the interfaces to dynamically adapt their sampling rate to traffic conditions.



NOTE: If you configure sFlow technology monitoring on multiple interfaces and a high sampling rate, we recommend that you specify a collector that is on the data network instead of the management network. Having a high volume of sFlow technology monitoring traffic on the management network might interfere with other management interface traffic.

The sFlow collector uses the IP address of the sFlow agent to determine the source of the sFlow data. You can configure the IP address of the sFlow agent to ensure that the agent ID for the sFlow agent remains constant. If you do not assign an IP address to the agent, an IP address will be assigned to the agent using the IP address of a configured interface.

If a particular interface is not configured, the IP address of the next interface in the priority list is used as the IP address for the agent. Once an IP address is assigned to the agent, the agent ID is not modified until the sFlow service is restarted. At least one interface has to be configured for an IP address to be assigned to the agent.

The following sFlow technology limitations apply on ACX5000 line of routers:

- The ingress and egress sampling can be configured only on one of the units under a physical interface and the sFlow is enabled for the physical interface (port). The sFlow cannot be enabled if the unit under a physical interface is not configured.
- Egress sampling for Broadcast, Unknown unicast and Multicast (BUM) traffic is not supported because the **source-interface** field in the SFlow datagrams cannot be populated.

- Destination VLAN and Destination Priority fields are not populated in the case of Layer 3 forwarding.
- SFlow sampling is not supported on the output interface of an analyzer.
- SNMP MIB support for SFlow is not available.
- SFlow cannot be enabled on LAG interfaces, however, it can be enabled on LAG member interfaces individually.
- SFlow cannot be enabled on IRB interfaces.
- SFlow cannot be enabled on logical tunnel (lt-) and LSI interfaces.

**Related
Documentation**

- [Configuring sFlow Technology on page 567](#)

Understanding How to Use sFlow Technology for Network Monitoring

The sFlow technology is a monitoring technology for high-speed switched or routed networks. sFlow monitoring technology randomly samples network packets and sends the samples to a monitoring station called a *collector*. You can configure sFlow technology on a Juniper Networks router to continuously monitor traffic at wire speed on all interfaces simultaneously.

This topic describes:

- [Benefits of sFlow Technology on page 546](#)
- [Sampling Mechanism and Architecture of sFlow Technology on page 546](#)
- [Adaptive Sampling for Routers on page 548](#)
- [Adaptive Sampling for Switches on page 549](#)
- [sFlow Agent Address Assignment on page 550](#)
- [sFlow Limitations on Routers on page 551](#)
- [sFlow Limitations on Switches on page 551](#)

Benefits of sFlow Technology

- sFlow can be used by software tools like a network analyzer to continuously monitor tens of thousands of switch or router ports simultaneously.
- Since sFlow uses network sampling (forwarding one packet from 'n' number of total packets) for analysis, it is not resource intensive (for example processing, memory and more). The sampling is done at the hardware application-specific integrated circuits (ASICs) and hence it is simple and more accurate.

Sampling Mechanism and Architecture of sFlow Technology

sFlow technology uses the following two sampling mechanisms:

- Packet-based sampling—Samples one packet out of a specified number of packets from an interface enabled for sFlow technology. Only the first 128 bytes of each packet

are sent to the collector. Data collected include the Ethernet, IP, and TCP headers, along with other application-level headers (if present). Although this type of sampling might not capture infrequent packet flows, the majority of flows are reported over time, allowing the collector to generate a reasonably accurate representation of network activity. To configure packet-based sampling, you must specify a sample rate.

- Time-based sampling—Samples interface statistics at a specified interval from an interface enabled for sFlow technology. Statistics such as Ethernet interface errors are captured. To configure time-based sampling, you must specify a polling interval.

The sampling information is used to create a network traffic visibility picture. The Juniper Networks Junos operating system (Junos OS) fully supports the sFlow standard described in RFC 3176, *InMon Corporation's sFlow: A Method for Monitoring Traffic in Switched and Routed Networks* (see <http://faqs.org/rfcs/rfc3176.html>).



NOTE: On switches, sFlow technology samples only raw packet headers, that is, the complete Layer 2 network frame.

An sFlow monitoring system consists of an sFlow agent embedded in the router and a centralized collector. The sFlow agent's two main activities are random sampling and statistics gathering. It combines interface counters and flow samples and sends them across the network to the sFlow collector as UDP datagrams, directing those datagrams to the IP address and UDP destination port of the collector. Each datagram contains the following information:

- The IP address of the sFlow agent
- The number of samples
- The interface through which the packets entered the agent
- The interface through which the packets exited the agent
- The source and destination interface for the packets
- The source and destination VLAN for the packets



CAUTION: In case of dual VLAN, all fields may not be reported.

Routers and switches can adopt the distributed sFlow architecture. The sFlow agent has subagents. Each subagent is responsible for monitoring a set of network ports and has a unique ID that is used by the collector to identify the data source. A subagent has its own independent state and forwards its own sample messages to the sFlow agent. The sFlow agent is responsible for packaging the samples into datagrams and sending them to the sFlow collector. Because sampling is distributed across subagents, the protocol overhead associated with sFlow technology is significantly reduced at the collector.



NOTE: On the QFabric system, an sFlow collector must be reachable through the network. Because each Node device has all routes stored in the default routing instance, the collector IP address should be included in the default routing instance to ensure the collector's reachability from the Node device.



NOTE: You cannot configure sFlow monitoring on a link aggregation group (LAG), but you can configure it individually on a LAG member interface.

Infrequent sampling flows might not be reported in the sFlow information, but over time the majority of flows are reported. Based on a configured sampling rate N , 1 out of N packets is captured and sent to the collector. This type of sampling does not provide a 100 percent accurate result in the analysis, but it does provide a result with quantifiable accuracy. A user-configured polling interval defines how often sFlow data for a specific interface are sent to the collector, but an sFlow agent can also schedule polling.



NOTE: We recommend that you configure the same sample rate for all the ports in a line card. If you configure different sample rates, the lowest value is used for all ports on the line card.



NOTE: If the mastership assignment changes in a Virtual Chassis setup, sFlow technology continues to function.

Adaptive Sampling for Routers

To ensure sampling accuracy and efficiency, routers use adaptive sFlow sampling. Adaptive sampling monitors the overall incoming traffic rate on the device and provides feedback to the interfaces to dynamically adapt their sampling rate to traffic conditions. The sFlow agent reads the statistics on the interfaces every few seconds (once every 12 seconds for MX Series routers and once every 20 seconds for PTX Series routers).

On a Flexible PIC Concentrator (FPC), when the flow sample limit is reached because of sflow sample processing, a binary backoff algorithm is initiated. This reduces the sampling load on that FPC by half. The backoff algorithm achieves this by doubling the sampling rate on the FPC. This process is repeated until the CPU-load due to sflow on the given FPC comes down to an acceptable level.



NOTE: On the standalone routers, if you configure sFlow technology monitoring on multiple interfaces and with a high sampling rate, we recommend that you specify a collector that is on the data network instead of on the management network. Having a high volume of sFlow technology monitoring traffic on the management network might interfere with other management interface traffic.

Using adaptive sampling prevents overloading of the CPU and keeps the device operating at its optimum level even when there is a change in traffic patterns on the interfaces. The reduced sampling rate is used until the device is rebooted or when a new sampling rate is configured.



NOTE: sFlow technology on routers does not support graceful restart. When a graceful restart occurs, the adaptive sampling rate is set to the user-configured sampling rate.

Adaptive Sampling for Switches

To ensure sampling accuracy and efficiency, switches use adaptive sFlow sampling. Adaptive sampling monitors the overall incoming traffic rate on the device and provides feedback to the interfaces to dynamically adapt their sampling rate to traffic conditions. The sFlow agent reads the statistics on the interfaces every few seconds (12 seconds for EX Series switches and 5 seconds for QFX Series devices) and identifies five interfaces with the highest number of samples.

On a Flexible PIC Concentrator (FPC), when the CPU processing limit is reached because of sflow sample processing, a binary backoff algorithm is initiated. This reduces the sampling load, arriving through the top five sample-producing interfaces on that FPC by half. The algorithm achieves this by doubling the sampling rate on these five earmarked interfaces.

Using adaptive sampling prevents overloading of the CPU and keeps the device operating at its optimum level even when there is a change in traffic patterns on the interfaces. The reduced sampling rate is used until the device is rebooted or when a new sampling rate is configured.

However, when you use the backoff mechanism, if the number of samples increase due to a traffic spike, the adaptive sample rate does not revert to the previously configured adaptive sample rate even after traffic is stabilized. To address this issue, Starting in 18.3R1, Junos OS supports the *adaptive sampling fallback* feature, which uses a binary backup algorithm to back up and decrease the sampling rate without affecting normal traffic. Using this feature, you can configure and back up the sampling rate on the switch interface to the previously configured adaptive sample rate . The sampling rate is backed up when the number of samples generated is less than the **sample-limit-threshold** value.



NOTE: On a rate-selectable FPC (which supports multiple speeds), interfaces with the highest sample count are selected for adaptive sampling fallback. The backup algorithm selects those interfaces on which the adaptive sampling rate is increased the maximum number of times and then decreases the sampling rate on each of those interfaces every 5 seconds. However, on a single-rate FPC, only one sample rate is supported per FPC, and the adaptive sampling fallback mechanism backs up the sampling rate on all the interfaces of the FPC.

To enable this feature, include the **fallback** option in the **adaptive-sample-rate** statement and explicitly configure the threshold value as follows:

```
set protocols sflow adaptive-sample-rate fallback
```

```
set protocols sflow adaptive-sample-rate sample-limit-threshold (0..2400)
```

You configure adaptive sampling fallback at the **[edit protocols sflow]** hierarchy level. This feature is disabled by default.

On a QFabric system, sFlow technology monitors the interfaces on each node device as a group, and implements the binary backoff algorithm based on the traffic on that group of interfaces.



NOTE: On the QFX Series standalone switches, if you configure sFlow technology monitoring on multiple interfaces and with a high sampling rate, we recommend that you specify a collector that is on the data network instead of on the management network. Having a high volume of sFlow technology monitoring traffic on the management network might interfere with other management interface traffic.



NOTE: sFlow technology on EX Series switches does not support graceful restart. When a graceful restart occurs, the adaptive sampling rate is set to the user-configured sampling rate.

sFlow Agent Address Assignment

The sFlow collector uses the sFlow agent's IP address to determine the source of the sFlow data. You can configure the IP address of the sFlow agent to ensure that the agent ID of the sFlow agent remains constant. If you do not specify the IP address to be assigned to the agent, an IP address is automatically assigned to the agent based on the following order of priority of interfaces configured on the device:

Routers and EX Series Switches	QFX Series Devices
1. Virtual Management Ethernet (VME) interface	1. Management Ethernet interface me0 IP address
2. Management Ethernet interface	2. Any Layer 3 interface if the me0 IP address is not available

If a particular interface is not configured, the IP address of the next interface in the priority list is used as the IP address for the agent. Once an IP address is assigned to the agent, the agent ID is not modified until the sFlow service is restarted. At least one interface has to be configured for an IP address to be assigned to the agent. When the agent's IP address is assigned automatically, the IP address is dynamic and changes when the device reboots.

On the QFabric system, the following default values are used if the optional parameters are not configured:

- Agent ID is the management IP address of the default partition.
- Source IP is the management IP address of the default partition.

In addition, the QFabric system subagent ID (which is included in the sFlow datagrams) is the ID of the node group from which the datagram is sent to the collector.

sFlow data can be used to provide network traffic visibility information. You can explicitly configure the source IP address to be assigned to the sFlow datagrams. If you do not explicitly configure the IP address, the IP address of any of the configured Layer 3 network interfaces is used as the source IP address. If a Layer 3 IP address is not configured, then the agent IP address is used as the source IP address.

sFlow Limitations on Routers

On routers, limitations of sFlow traffic sampling include the following:

- Trio chipset cannot support different sampling rate for each family. Hence, only one sampling rate can be supported per FPC.
- Adaptive load balancing is applied per FPC and not for per interface under the FPC.
- True OIF (outgoing interface) is not supported with sFlow.

Routers support configuration of only one sampling rate (inclusive of ingress and egress rates) on an FPC. To support compatibility with the sflow configuration of other Juniper Networks products, the routers still accept multiple rate configuration on different interfaces of the same FPC. However, the router programs the lowest rate as the sampling rate for all the interfaces of that FPC. The (**show sflow interfaces**) command displays the configured rate and the actual (effective) rate. However, different rates on different FPCs is still supported on Juniper Networks routers.

sFlow Limitations on Switches

On the QFX Series, limitations of sFlow traffic sampling include the following:

- sFlow sampling on ingress interfaces does not capture CPU-bound traffic.
- sFlow sampling on egress interfaces does not support broadcast and multicast packets.
- Egress samples do not contain modifications made to the packet in the egress pipeline.
- If a packet is discarded because of a firewall filter, the reason code for discarding the packet is not sent to the collector.
- The out-priority field for a VLAN is always set to 0 (zero) on ingress and egress samples.
- On QFX5100 standalone switches and the QFX Series Virtual Chassis (including mixed QFX Series Virtual Chassis), egress firewall filters are not applied to sFlow sampling packets. On these platforms, the software architecture is different from that on other QFX Series devices—sFlow packets are sent by the Routing Engine (not the line card on the host) and do not transit the switch. Egress firewall filters affect data packets

that are transiting a switch, but do not affect packets sent by the Routing Engine. As a result, sFlow sampling packets are always sent to the sFlow collector.

EX9200 switches support configuration of only one sampling rate (inclusive of ingress and egress rates) on an FPC. To support compatibility with the sflow configuration of other Juniper Networks products, EX9200 switches still accept multiple rate configuration on different interfaces of the same FPC. However, the switch programs the lowest rate as the sampling rate for all the interfaces of that FPC. The (**show sflow interfaces**) command displays the configured rate and the actual (effective) rate. However, different rates on different FPCs is still supported on EX9200 switches.

Release History Table

Release	Description
18.3R1	Starting in 18.3R1, Junos OS supports the <i>adaptive sampling fallback</i> feature, which uses a binary backup algorithm to back up and decrease the sampling rate without affecting normal traffic.

Understanding How to Use sFlow Technology for Network Monitoring on an EX Series Switch

The sFlow technology is a monitoring technology for high-speed switched or routed networks. sFlow monitoring technology randomly samples network packets and sends the samples to a monitoring station. You can configure sFlow technology on a Juniper Networks EX Series Ethernet Switch to continuously monitor traffic at wire speed on all interfaces simultaneously.

This topic describes:

- [Sampling Mechanism and Architecture of sFlow Technology on EX Series Switches on page 552](#)
- [Adaptive Sampling on page 553](#)
- [sFlow Agent Address Assignment on page 554](#)

Sampling Mechanism and Architecture of sFlow Technology on EX Series Switches

sFlow technology uses the following two sampling mechanisms:

- **Packet-based sampling:** Samples one packet out of a specified number of packets from an interface enabled for sFlow technology.
- **Time-based sampling:** Samples interface statistics at a specified interval from an interface enabled for sFlow technology.

The sampling information is used to create a network traffic visibility picture. The Juniper Networks Junos operating system (Junos OS) fully supports the sFlow standard described in RFC 3176, *InMon Corporation's sFlow: A Method for Monitoring Traffic in Switched and Routed Networks*.



NOTE: sFlow technology on the switches samples only raw packet headers. A raw Ethernet packet is the complete Layer 2 network frame.

An sFlow monitoring system consists of an sFlow agent embedded in the switch and a centralized collector. The sFlow agent's two main activities are random sampling and statistics gathering. The sFlow agent combines interface counters and flow samples and sends them across the network to the sFlow collector in UDP datagrams, directing those datagrams to the IP address and UDP destination port of the collector. Each datagram contains the following information:

- The IP address of the sFlow agent
- The number of samples
- The interface through which the packets entered the agent
- The interface through which the packets exited the agent
- The source and destination interface for the packets
- The source and destination VLAN for the packets

EX Series switches adopt the distributed sFlow architecture. The sFlow agent has two separate sampling entities that are associated with each Packet Forwarding Engine. These sampling entities are known as subagents. Each subagent has a unique ID that is used by the collector to identify the data source. A subagent has its own independent state and forwards its own sample packets to the sFlow agent. The sFlow agent is responsible for packaging the samples into datagrams and sending them to the sFlow collector. Because sampling is distributed across subagents, the protocol overhead associated with sFlow technology is significantly reduced at the collector.



NOTE: You cannot configure sFlow monitoring on a link aggregation group (LAG), but you can configure it individually on a LAG member interface.



NOTE: If the mastership assignment changes in a Virtual Chassis setup, sFlow technology continues to function.

Adaptive Sampling

The switches use adaptive sampling to ensure both sampling accuracy and efficiency. Adaptive sampling is a process of monitoring the overall incoming traffic rate on the network device and providing intelligent feedback to interfaces to dynamically adapt the sampling rates on interfaces on the basis of traffic conditions. Interfaces on which incoming traffic exceeds the system threshold are checked so that all violations can be regulated without affecting the traffic on other interfaces. Every 12 seconds, the agent checks interfaces to get the number of samples, and interfaces are grouped on the basis of the slot that they belong to. The top five interfaces that produce the highest number of samples are selected. Using the binary backoff algorithm, the sampling load on these

interfaces is reduced by half and allotted to interfaces that have a lower sampling rate. Therefore, when the processor's sampling limit is reached, the sampling rate is adapted such that it does not load the processor any further. If the switch is rebooted, the adaptive sampling rate is reset to the user-configured sampling rate. Also, if you modify the sampling rate, the adaptive sampling rate changes.

The advantage of adaptive sampling is that the switch continues to operate at its optimum level even when there is a change in the traffic patterns in the interfaces. You do not need to make any changes. Because the sampling rate adapts dynamically to changing network conditions, the resources are utilized optimally resulting in a high-performance network.

Infrequent sampling flows might not be reported in the sFlow information, but over time, the majority of flows are reported. On the basis of the configured sampling rate N , 1 out of N packets is captured and sent to the collector. This type of sampling does not provide a result that is 100 percent accurate in the analysis, but it does provide a result of quantifiable accuracy. A user-configured polling interval defines how often the sFlow data for a specific interface are sent to the collector, but an sFlow agent can also schedule polling.



NOTE: sFlow technology on EX Series switches does not support graceful restart. When a graceful restart occurs, the adaptive sampling rate is set to the user-configured sampling rate.

sFlow Agent Address Assignment

The sFlow collector uses the sFlow agent's IP address to determine the source of the sFlow data. You can configure the IP address of the sFlow agent to ensure that the agent ID of the sFlow agent remains constant. If you do not configure the IP address of the sFlow agent, an IP address is automatically assigned to the agent. This is the IP address of one of the following interfaces configured on the switch taken in the given order of priority:

1. Virtual management Ethernet (VME) interface
2. Management Ethernet interface

If neither of the preceding interfaces has been configured, the IP address of any Layer 3 interface or the routed VLAN interface (RVI) is assigned to the agent. At least one interface must be configured on the switch for an IP address to be automatically assigned to the agent. When the agent's IP address is assigned automatically, the IP address is dynamic and changes when the switch reboots.

sFlow data can be used to provide network traffic visibility information. You can explicitly configure the IP address to be assigned to source data (sFlow datagrams). If you do not explicitly configure that address, the IP address of the configured Gigabit Ethernet interface, 10-Gigabit Ethernet interface, or the RVI is used as the source IP address.

Related Documentation

- [Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches on page 555](#)

- [Configuring sFlow Technology for Network Monitoring \(CLI Procedure\) on page 565](#)
- [Monitoring Interface Status and Traffic](#)

Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches

sFlow technology is a networking monitoring technology for high-speed switched or routed networks. It is a technology that is based on statistical sampling. You can configure sFlow technology to continuously monitor traffic at wire speed on all interfaces simultaneously. sFlow data can be used to provide network traffic visibility information. You can specify sampling rates for ingress and egress packets. Junos OS fully supports the sFlow standard described in RFC 3176, *InMon Corporation's sFlow: A Method for Monitoring Traffic in Switched and Routed Networks*.

This example describes how to configure and use sFlow technology to monitor network traffic.

- [Requirements on page 555](#)
- [Overview and Topology on page 555](#)
- [Configuration on page 556](#)
- [Verification on page 558](#)

Requirements

This example uses the following hardware and software components:

- One EX Series switch
- Junos OS Release 9.3 or later for EX Series switches

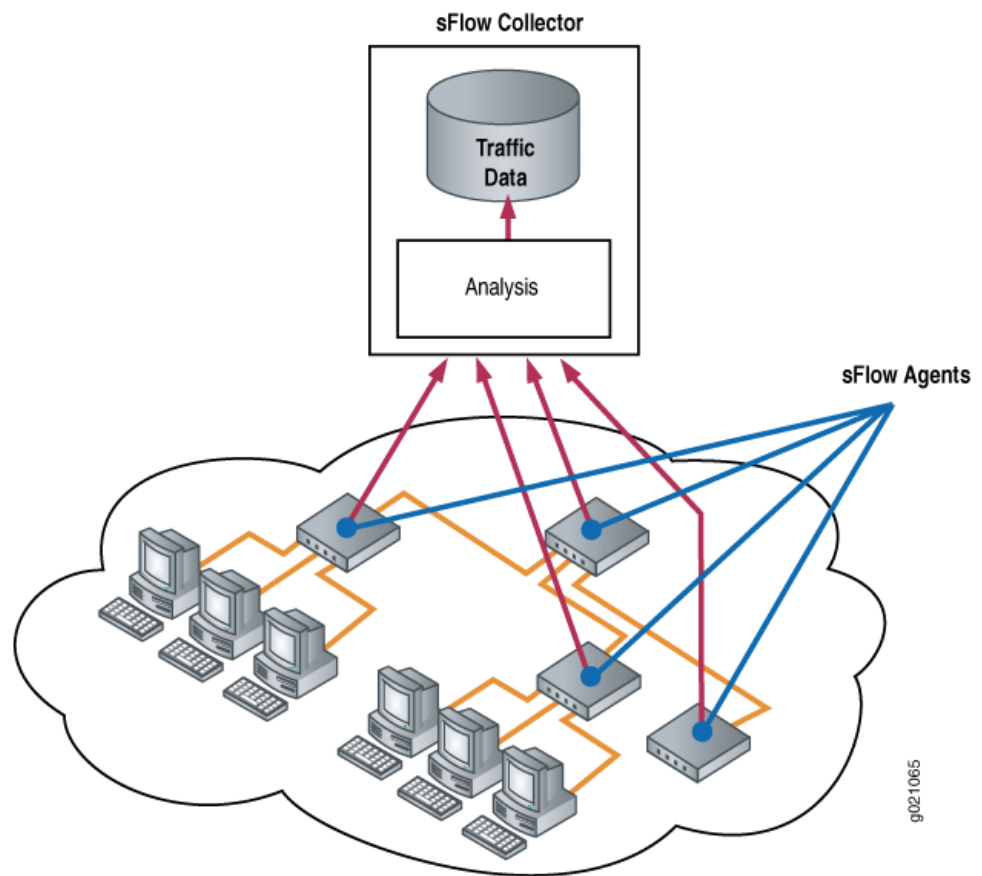
Overview and Topology

sFlow technology samples network packets and sends the samples to a monitoring station. You can specify sampling rates for ingress and egress packets. The information gathered is used to create a network traffic visibility picture.

An sFlow monitoring system consists of an sFlow agent embedded in the switch and a centralized collector. The sFlow agent runs on the switch. It combines interface counters and flow samples and sends them across the network to the sFlow collector.

[Figure 17 on page 556](#) depicts the basic elements of the sFlow system.

Figure 17: sFlow Technology Monitoring System



Configuration

To configure sFlow technology, perform the following tasks:

CLI Quick Configuration

To quickly configure sFlow technology, copy the following commands and paste them into the switch terminal window:

```
[edit protocols]
set sflow collector 10.204.32.46 udp-port 5600
set sflow interfaces ge-0/0/0
set sflow polling-interval 20
set sflow sample-rate egress 1000
```

Step-by-Step Procedure To configure sFlow technology:

1. Configure the IP address and UDP port of the collector:

```
[edit protocols]
user@switch# set sflow collector 10.204.32.46 udp-port 5600
```



NOTE: You can configure a maximum of 4 collectors.

The default UDP port is 6343.

2. Enable sFlow technology on a specific interface:

```
[edit protocols sflow]
user@switch# set interfaces ge-0/0/0
```



NOTE: You cannot enable sFlow technology on a Layer 3 VLAN-tagged interface.

You cannot enable sFlow technology on a link aggregation group (LAG) interface, but you can enable it on the member interfaces of a LAG.

3. Specify in seconds how often the sFlow agent polls the interface:

```
[edit protocols sflow]
user@switch# set polling-interval 20
```



NOTE: The polling interval can be specified as a global parameter also. Specify 0 if you do not want to poll the interface.

4. Specify the rate at which egress packets must be sampled:

```
[edit protocols sflow]
user@switch# set sample-rate egress 1000
```



NOTE: You can specify both egress and ingress sampling rates. If you set only the egress sampling rate, the ingress sampling rate will be disabled.



NOTE: We recommend that you configure the same sampling rates on all the ports on a line card. If you configure different sampling rates that are different, the lowest value is used for all ports. You could still configure different rates on different line cards.

Results Check the results of the configuration:

```
[edit protocols sflow]
user@switch# show
polling-interval 20;
sample-rate egress 1000;
collector 10.204.32.46 {
    udp-port 5600;
}
interfaces ge-0/0/0.0;
```

Verification

To confirm that the configuration is correct, perform these tasks:

- [Verifying That sFlow Technology Is Configured Properly on page 558](#)
- [Verifying That sFlow Technology Is Enabled on the Specified Interface on page 559](#)
- [Verifying the sFlow Collector Configuration on page 559](#)

Verifying That sFlow Technology Is Configured Properly

Purpose Verify that sFlow technology is configured properly.

Action Use the **show sflow** command:

```
user@switch> show sflow

sFlow: Enabled
Sample limit: 300 packets/second
Polling interval: 20 seconds
Sample rate egress: 1:1000: Enabled
Sample rate ingress: 1:2048: Disabled
Agent ID: 10.204.96.222
```



NOTE: The sampling limit cannot be configured and is set to 300 packets/second per FPC.

Meaning The output shows that sFlow technology is enabled and specifies the values for the sampling limit, polling interval, and the egress sampling rate.

Verifying That sFlow Technology Is Enabled on the Specified Interface

Purpose Verify that sFlow technology is enabled on the specified interfaces and display the sampling parameters.

Action Use the `show sflow interface` command:

```
user@switch> show sflow interface
```

Interface	Status		Sample rate		Adapted sample rate		Polling-interval
	Egress	Ingress	Egress	Ingress	Egress	Ingress	
ge-0/0/0.0	Enabled	Disabled	1000	2048	1000	2048	20

Meaning The output indicates that sFlow technology is enabled on the ge-0/0/0.0 interface with an egress sampling rate of 1000, a disabled ingress sampling rate, and a polling interval of 20 seconds.

Verifying the sFlow Collector Configuration

Purpose Verify the sFlow collector's configuration.

Action Use the `show sflow collector` command:

```
user@switch> show sflow collector
```

Collector address	Udp-port	No. of samples
10.204.32.46	5600	1000
10.204.32.76	3400	1000

Meaning The output displays the IP address of the collectors and the UDP ports. It also displays the number of samples.

Related Documentation

- [Configuring sFlow Technology for Network Monitoring \(CLI Procedure\) on page 565](#)
- [Understanding How to Use sFlow Technology for Network Monitoring on an EX Series Switch on page 552](#)

Example: Configuring sFlow Technology to Monitor Network Traffic on MX Series Routers

sFlow technology is a networking monitoring technology for high-speed switched or routed networks. It is a technology that is based on statistical sampling. You can configure sFlow technology to continuously monitor traffic at wire speed on all interfaces simultaneously. sFlow data can be used to provide network traffic visibility information. You can specify sampling rates for ingress and egress packets. Junos OS fully supports the sFlow standard described in RFC 3176, *InMon Corporation's sFlow: A Method for Monitoring Traffic in Switched and Routed Networks*.

This example describes how to configure and use sFlow technology to monitor network traffic.

- [Requirements on page 560](#)
- [Overview and Topology on page 560](#)
- [Configuration on page 561](#)
- [Verification on page 563](#)

Requirements

This example uses the following hardware and software components:

- One MX Series router
- Junos OS Release 18.1 or later for MX Series routers

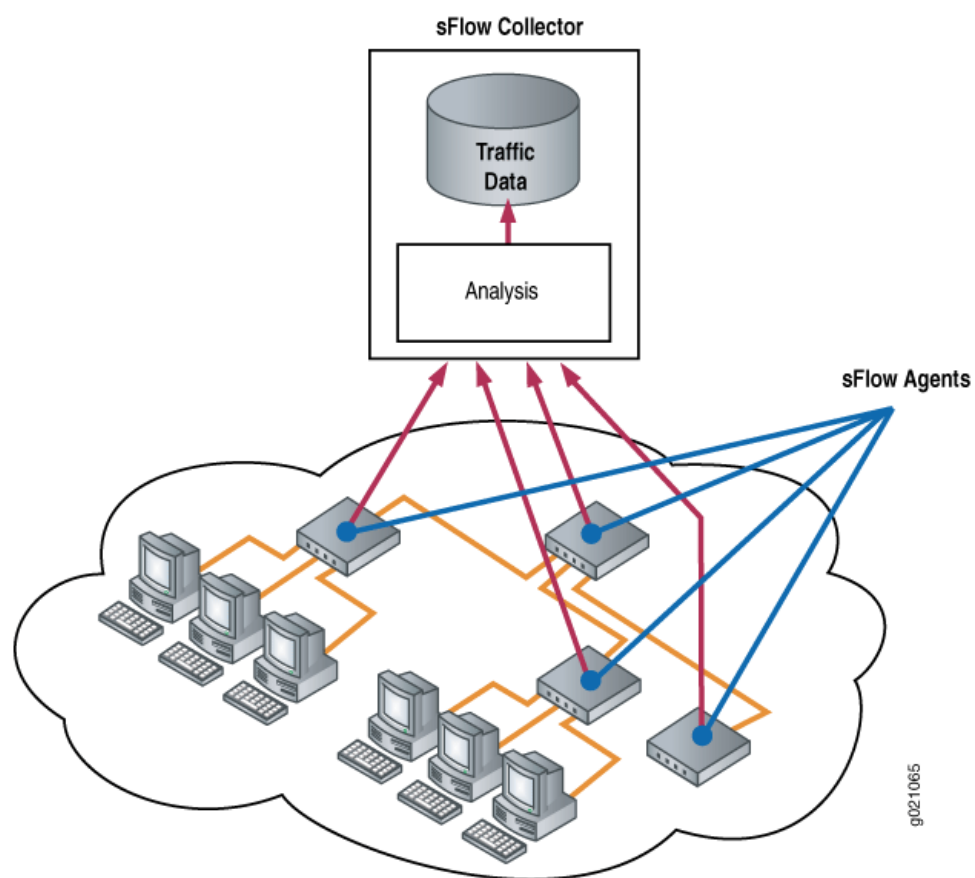
Overview and Topology

sFlow technology samples network packets and sends the samples to a monitoring station. You can specify sampling rates for ingress and egress packets. The information gathered is used to create a network traffic visibility picture.

An sFlow monitoring system consists of an sFlow agent embedded in the switch and a centralized collector. The sFlow agent runs on the switch. It combines interface counters and flow samples and sends them across the network to the sFlow collector.

[Figure 17 on page 556](#) depicts the basic elements of the sFlow system.

Figure 18: sFlow Technology Monitoring System



Configuration

To configure sFlow technology, perform the following tasks:

CLI Quick Configuration

To quickly configure sFlow technology, copy the following commands and paste them into the router terminal window:

```
[edit protocols]
set sflow collector 10.204.32.46 udp-port 5600
set sflow interfaces ge-0/0/0
set sflow polling-interval 20
set sflow sample-rate egress 1000
set sflow interfaces ge-0/0/1 polling-interval 10 sample-rate ingress 1000
```

**Step-by-Step
Procedure**

To configure sFlow technology:

1. Configure the IP address and UDP port of the collector:

```
[edit protocols]  
user@host# set sflow collector 10.204.32.46 udp-port 5600
```



NOTE: You can configure a maximum of 4 collectors.

The default UDP port is 6343.

2. Enable sFlow technology on a specific interface:

```
[edit protocols sflow]  
user@host# set interfaces ge-0/0/0
```



NOTE: You cannot enable sFlow technology on a Layer 3 VLAN-tagged interface.

You cannot enable sFlow technology on a link aggregation group (LAG) interface, but you can enable it on the member interfaces of a LAG.

3. Specify in seconds how often the sFlow agent polls the interface:

```
[edit protocols sflow]  
user@host# set polling-interval 20
```



NOTE: The polling interval can be specified as a global parameter also. Specify 0 if you do not want to poll the interface.

4. Specify the global rate at which egress packets must be sampled:

```
[edit protocols sflow]  
user@host# set sample-rate egress 1000
```




NOTE: You can specify both egress and ingress sampling rates. If you set only the egress sampling rate, the ingress sampling rate will be disabled.

5. Specify the interface level polling rate and sampling rate:

```
[edit protocols sflow]
user@host# set interfaces ge-0/0/1 polling-interval 10 sample-rate ingress 1000
```



NOTE: When you configure at both interface level and global level, former takes the precedence.



NOTE: We recommend that you configure the same sampling rates on all the ports on a line card. If you configure different sampling rates are different, the lowest value is used for all ports. You could still configure different rates on different line cards.

Results Check the results of the configuration:

```
[edit protocols sflow]
user@host# show
polling-interval 20;
sample-rate egress 1000;
collector 10.204.32.46 {
  udp-port 5600;
}
interfaces ge-0/0/0.0;
interfaces ge-0/0/1.0; {
  polling-interval 10;
  sample-rate egress 1000;
}
```

Verification

To confirm that the configuration is correct, perform these tasks:

- [Verifying That sFlow Technology Is Configured Properly on page 564](#)
- [Verifying That sFlow Technology Is Enabled on the Specified Interface on page 564](#)
- [Verifying the sFlow Collector Configuration on page 565](#)

Verifying That sFlow Technology Is Configured Properly

Purpose Verify that sFlow technology is configured properly.

Action Use the **show sflow** command:

```
user@host> show sflow
```

```
sFlow           : Enabled
Sample limit    : 300 packets/second
Polling interval : 20 second
Sample rate egress : 1:2048: Disabled
Sample rate ingress : 1:2048: Disabled
Agent ID        : 10.213.0.18
Agent ID IPv6    : fec0::a:0:0:4
Source IP address : 10.1.1.1
Source IPv6 address : fe80::200:ff:fe00:4
```



NOTE: The sampling limit cannot be configured and is set to 300 packets/second per FPC.

Meaning The output shows that sFlow technology is enabled and specifies the values for the sampling limit, polling interval, and the egress sampling rate.

Verifying That sFlow Technology Is Enabled on the Specified Interface

Purpose Verify that sFlow technology is enabled on the specified interfaces and display the sampling parameters.

Action Use the **show sflow interface** command:

```
user@host> show sflow interface
```

Interface	Status	Sample rate	Adapted sample rate	Polling-interval
	Egress	Ingress	Egress	Ingress
ge-0/0/0.0	Enabled	Disabled	1000	2048
ge-0/0/1.0	Enabled	Enabled	1000	1000

Meaning The output indicates that sFlow technology is enabled on the ge-0/0/0.0 interface with an egress sampling rate of 1000, a disabled ingress sampling rate, and a polling interval of 20 seconds. Similarly, sFlow is also enabled on the ge-0/0/1.0 interface with an egress sampling rate of 1000, an ingress sampling rate of 1000, and a polling interval of 10 seconds.

Verifying the sFlow Collector Configuration

Purpose Verify the sFlow collector's configuration.

Action Use the `show sflow collector` command:

```
user@host> show sflow collector
```

Collector address	Udp-port	No. of samples
10.204.32.46	5600	1000
10.204.32.76	3400	1000

Meaning The output displays the IP address of the collectors and the UDP ports. It also displays the number of samples.

Related Documentation

- [Understanding How to Use sFlow Technology for Network Monitoring on page 546](#)

Configuring sFlow Technology for Network Monitoring (CLI Procedure)

sFlow technology is a network monitoring technology for high-speed switched or routed networks. It is a technology that is based on statistical sampling. You can configure sFlow technology to continuously monitor traffic at wire speed on all interfaces simultaneously. Junos OS fully supports the sFlow standard described in RFC 3176, *InMon Corporation's sFlow: A Method for Monitoring Traffic in Switched and Routed Networks*.

To configure sFlow features:

1. Configure the IP address and the UDP port of the collector:

```
[edit protocols]
user@device# set sflow collector ip-address udp-port port-number
```

The default UDP port is 6343,

2. Enable sFlow technology on a specific interface:

```
[edit protocols sflow]
user@device# set interfaces interface-name
```



NOTE: You cannot enable sFlow technology on a Layer 3 VLAN-tagged interface.

You cannot enable sFlow technology on a link aggregation group (LAG), but you can enable it on the member interfaces of a LAG.

3. Specify in seconds how often the sFlow agent polls interfaces:

```
[edit protocols sflow]
user@device# set polling-interval seconds
```



NOTE: Specify 0 if you do not want to poll the interface.

4. Specify the rate at which packets must be sampled. You can specify either an egress or an ingress sampling rate, or both.



NOTE: We recommend that you configure the same sampling rates on all the ports on a line card. If you configure different sampling rates on different ports, the lowest value is used for all ports. You could still configure different rates on different line cards.

To specify an egress sampling rate:

```
[edit protocols sflow]
user@device# set sample-rate egress number
```

To specify an ingress sampling rate:

```
[edit protocols sflow]
user@device# set sample-rate ingress number
```

5. To configure the polling interval and the egress and ingress sampling rates at the interface level:

```
[edit protocols sflow interfaces interface-name]
user@device# set polling-interval seconds
```

```
[edit protocols sflow interfaces]
user@device# set sample-rate egress number
```

```
[edit protocols sflow interfaces]
user@device# set sample-rate ingress number
```



NOTE: The interface-level configuration overrides the global configuration.

6. To specify an IP address to be used as the agent ID for the sFlow agent:

```
[edit protocols sflow]
user@device# set agent-id ip-address
```

7. To specify the source IP address to be used for sFlow datagrams:

```
[edit protocols sflow]
```

```
user@device# set source-ip ip-address
```

8. (Optional) Set the **disable-sw-rate-limiter** configuration statement so that the sampling rate stays within the maximum hardware sampling rate.

```
[edit protocols sflow]
user@device# set disable-sw-rate-limiter
```

Packet-based sampling in sFlow is implemented in the hardware. If traffic levels are unusually high, the hardware generates more samples than it can handle, and the extra samples are dropped, producing inaccurate results. Enabling the **disable-sw-rate-limiter** statement disables the software rate-limiting algorithm and allows the hardware sampling rate to stay within the maximum sampling rate.

Related Documentation

- [Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches on page 555](#)
- [Understanding How to Use sFlow Technology for Network Monitoring on an EX Series Switch on page 552](#)
- [Example: Configuring sFlow Technology to Monitor Network Traffic on MX Series Routers on page 560](#)
- [Understanding How to Use sFlow Technology for Network Monitoring on page 546](#)

Configuring sFlow Technology

The sFlow technology is a monitoring technology for high-speed switched or routed networks. sFlow monitoring technology collects samples of network packets and sends them in a UDP datagram to a monitoring station called a *collector*. You can configure sFlow technology on a device to monitor traffic continuously at wire speed on all interfaces simultaneously. You must enable sFlow monitoring on each interface individually; you cannot globally enable sFlow monitoring on all interfaces with a single configuration statement. Junos OS supports the sFlow technology standard described in RFC 3176, *InMon Corporation's sFlow: A Method for Monitoring Traffic in Switched and Routed Networks*.

On the QFabric system, the sFlow monitoring global configuration that is defined on the Director device is distributed to Node groups that have sFlow sampling configured on the interfaces.

To configure sFlow features using the CLI:

1. Configure the IP address and UDP port of at least one collector:

```
[edit protocols sflow]
user@host# set collector ip-address udp-port port-number
```

The default UDP port assigned is 6343.

2. Enable sFlow technology on a specific interface:

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



NOTE: You cannot enable sFlow technology on a LAG interface (for example ae0), but you can enable sFlow technology on the member interfaces of the LAG (for example, xe-0/0/1).



NOTE: sFlow technology is not supported on a VXLAN interface.

3. Specify how often (in seconds) the sFlow agent polls all interfaces at the global level:

```
[edit protocols sflow]
user@host# set polling-interval seconds
```



NOTE: Specify 0 if you do not want to poll the interface.

4. Specify the rate at which packets are sampled at the global level. For example, configuring a **number** of 1000 sets a sample rate of 1 in 1000 packets.

```
[edit protocols sflow]
user@host# set sample-rate number
```



NOTE: On QFX10000 Series switches, the hardware might generate more samples that it can handle under heavy traffic loads. The extra samples are dropped by the software and can cause inaccurate results. You can use the *disable-sw-rate-limiter* configuration statement so that the hardware sampling rate stays within the maximum sampling rate of 1 out of 65,536 packets.

5. (Optional) You can also configure the polling interval and sample rate at the interface level:

```
[edit protocols sflow]
user@host# set interfaces interface-name polling-interval seconds sample-rate number
```



NOTE: The interface-level configuration overrides the global configuration for the specified interface.

- Related Documentation**
- [Overview of sFlow Technology on page 541](#)
 - [Example: Monitoring Network Traffic Using sFlow Technology on page 569](#)
 - *disable-sw-rate-limiter*

Example: Monitoring Network Traffic Using sFlow Technology

The sFlow technology is a monitoring technology for high-speed switched or routed networks. sFlow monitoring technology collects samples of network packets and sends them in a UDP datagram to a monitoring station called a *collector*. You can configure sFlow technology on a device to monitor traffic continuously at wire speed on all interfaces simultaneously. You must enable sFlow monitoring on each interface individually; you cannot globally enable sFlow monitoring on all interfaces with a single configuration statement. Junos OS supports the sFlow technology standard described in RFC 3176, *InMon Corporation's sFlow: A Method for Monitoring Traffic in Switched and Routed Networks*.

This example describes how to configure and use sFlow monitoring on a QFX3500 switch in standalone mode.

- [Requirements on page 569](#)
- [Overview on page 569](#)
- [Configuration on page 570](#)
- [Verification on page 572](#)

Requirements

This example uses the following hardware and software components:

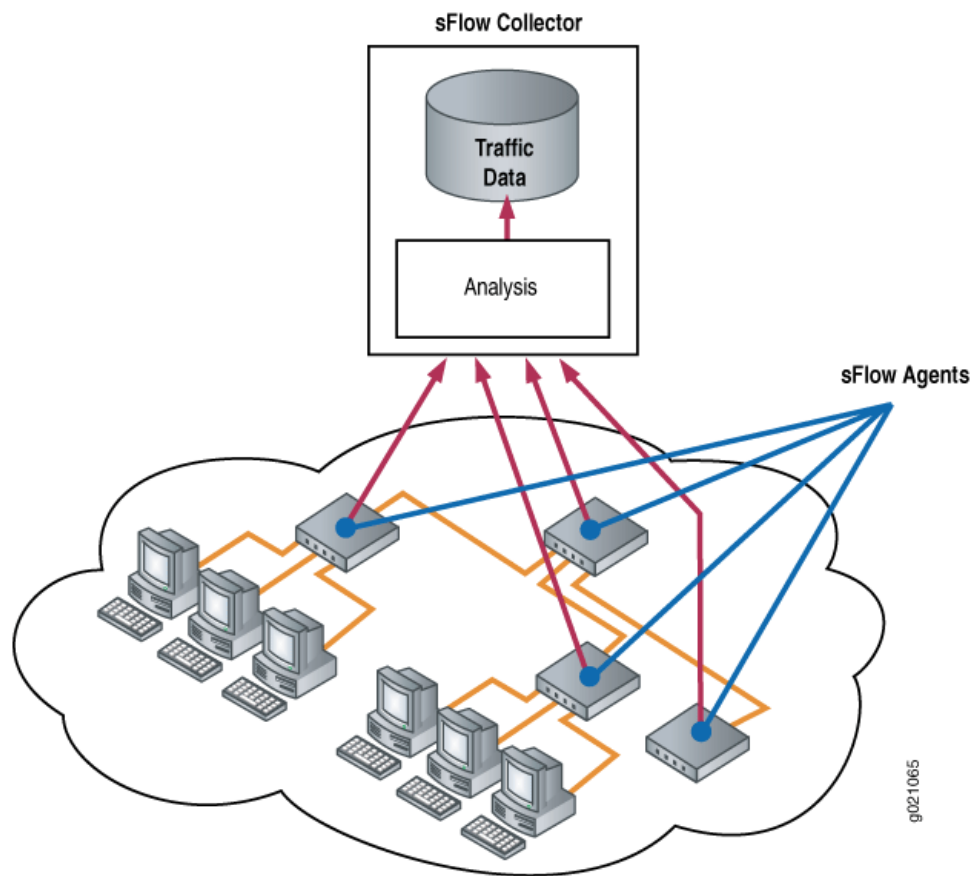
- Junos OS Release 11.3 or later
- One QFX3500 switch

Overview

An sFlow monitoring system consists of an sFlow agent embedded in the device and a centralized collector on the network. The two main activities of the sFlow agent are random sampling and statistics gathering. The sFlow agent combines interface counters and flow samples and sends them to the IP address and UDP destination port of the sFlow collector in UDP datagrams.

[Figure 17 on page 556](#) depicts the basic elements of an sFlow system.

Figure 19: sFlow Technology Monitoring System



Configuration

CLI Quick Configuration

To quickly configure sFlow technology, copy the following commands and paste them into the terminal window of the switch:

```
[edit protocols sflow]
set collector 10.204.32.46 udp-port 5600
set interfaces xe-0/0/1.0
set polling-interval 20
set sample-rate 1000
```

Step-by-Step Procedure

To configure sFlow features using the CLI:

1. Configure the IP address and UDP port of at least one collector:

```
[edit protocols sflow (QFX Series)]
user@switch# set collector 10.204.32.46 udp-port (QFX Series) 5600
```

The default UDP port assigned is 6343.

2. Enable sFlow technology on a specific interface:


```
[edit protocols sflow]
user@switch# set interfaces xe-0/0/1.0
```



NOTE: You cannot enable sFlow technology on a Layer 3 VLAN-tagged interface.

You cannot enable sFlow technology on a LAG interface (for example, ae0), but you can enable sFlow technology on the member interfaces of the LAG (for example, xe-0/0/1).

3. Specify how often (in seconds) the sFlow agent polls all interfaces at the global level:

```
[edit protocols sflow]
user@switch# set polling-interval (QFX Series) 20
```



NOTE: Specify 0 if you do not want to poll the interface.

4. Specify the rate at which packets must be sampled at the global level. The following example sets a sample rate of 1 in 1000 packets:

```
[edit protocols sflow]
user@switch# set sample-rate (QFX Series) 1000
```

Results Check the results of the configuration:

```
[edit]
user@switch# show protocols
sflow {
  collector 10.204.32.46 {
    udp-port 5600;
  }
  interfaces xe-0/0/1.0 {
    polling-interval 20;
    sample-rate 1000;
  }
}
```

Verification

To confirm that the configuration is correct, perform these tasks:

- [Verifying That sFlow Technology Has Been Configured Properly on page 572](#)
- [Verifying That sFlow Technology Is Enabled on an Interface on page 572](#)
- [Verifying the sFlow Collector Configuration on page 573](#)

Verifying That sFlow Technology Has Been Configured Properly

Purpose Verify that sFlow technology has been configured properly.

Action Enter the **show sflow** operational mode command:

```
user@switch> show sflow (QFX Series)

sFlow           : Enabled
Sample limit    : 300 packets/second
Polling interval : 20 second
Sample rate     : 1:1000
Agent ID        : 10.1.1.2
```



NOTE: The sample limit cannot be configured and is set to 300 packets per second.

Meaning The output shows that sFlow technology is enabled and specifies the values for the sampling limit, polling interval, and sampling rate.

Verifying That sFlow Technology Is Enabled on an Interface

Purpose Verify that sFlow technology is enabled on interfaces and display the sampling parameters.

Action Enter the **show sflow interface** operational mode command:

```
user@switch> show sflow interface (QFX Series)

Interface      Status      Sample   Polling
                rate      interval
xe-0/0/1.0     Enabled     1000     20
```

Meaning The output indicates that sFlow technology is enabled on the **Node1:xe-0/0/1.0** interface on the Node device with a sampling rate of 1000 and a polling interval of 20 seconds.

Verifying the sFlow Collector Configuration

Purpose Verify the sFlow collector configuration.

Action Enter the **show sflow collector** operational mode command:

```
user@switch> show sflow collector
```

Collector address	Udp-port	No. of samples
10.204.32.46	5600	7516

Meaning The output displays the IP address of the collector, the UDP port, and the number of samples collected.

Related Documentation

- [Configuring sFlow Technology on page 567](#)
- [Overview of sFlow Technology on page 541](#)

Packet Flow Accelerator Diagnostics Software

- [Understanding Packet Flow Accelerator Diagnostics Software and Other Utilities on page 575](#)
- [Installing Ethernet and PTP Scripts on page 597](#)
- [Installing Packet Flow Accelerator Diagnostics Software on page 599](#)

Understanding Packet Flow Accelerator Diagnostics Software and Other Utilities

You can use Packet Flow Accelerator Diagnostics software to validate the integrity of the QFX-PFA-4Q module and the QFX5100-24Q-AA switch. The Packet Flow Accelerator Diagnostics software contains standard diagnostics, orchestration diagnostics, Precision Time Protocol (PTP) and synchronization diagnostics, and other utilities. The Packet Flow Accelerator Diagnostics software runs in a guest virtual machine (VM) on the QFX5100-24Q-AA switch and requires that you configure guest VM options in the Junos OS CLI.

The QFX-PFA-4Q module contains four 40-Gigabit Ethernet QSFP+ interfaces, an FPGA module, and timing input and output interfaces to support Precision Time Protocol applications. The FPGA module contains logic that you can customize for processing compute-intensive, latency-sensitive, high-volume transactions.

Before you can run the Packet Flow Accelerator Diagnostics software and utilities, make sure you have performed the following tasks:

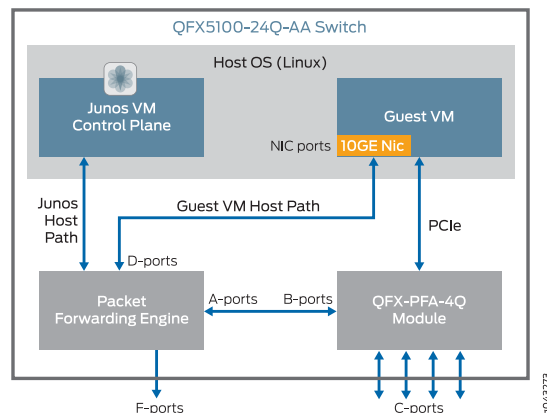
- Verify that you have installed the QFX-PFA-4Q module installed on the QFX5100-24Q-AA switch. For more information, see *Installing an Expansion Module in a QFX5100 Device*
- Make sure you have Junos OS Release 14.1X53-D27 with enhanced automation installed on the QFX5100-24Q-AA switch. For more information, see *Installing Software Packages on QFX Devices*.

- Install the Packet Flow Accelerator Diagnostics software. For more information, see [“Installing Packet Flow Accelerator Diagnostics Software” on page 599](#).
- [Understanding External and Internal Ports and Network Interface Card Ports on page 576](#)
- [Understanding Packet Flow Accelerator Diagnostics Software Tests and Scripts on page 577](#)
- [Understanding the ikondiag Command on page 578](#)
- [Understanding Basic Functionality Tests on page 578](#)
- [Understanding and Running Ethernet Tests and Scripts on page 580](#)
- [Understanding and Using Stress Tests on page 585](#)
- [Understanding and Running PTP Tests on page 585](#)
- [Understanding QFX-PFA-4Q Module LED Tests on page 587](#)
- [Understanding Packet Flow Accelerator Diagnostics Utilities on page 587](#)
- [Sample Output for Packet Accelerator Diagnostics Software on page 591](#)

Understanding External and Internal Ports and Network Interface Card Ports

Packet Flow Accelerator Diagnostics software and utilities validate the data paths between the external and internal ports on the QFX5100-24Q-AA switch and QFX-PFA-4Q module. [Figure 20 on page 576](#) illustrates the names of the ports on the QFX5100-24Q-AA switch and QFX-PFA-4Q module and how they connect.

Figure 20: Ports on the QFX5100-24Q-AA switch and QFX-PFA-4Q module



[Table 65 on page 576](#) provides information on the external and internal ports and NIC ports on the QFX5100-24Q-AA switch and QFX-PFA-4Q module.

Table 65: External and Internal Ports on the QFX5100-24Q-AA Switch and the QFX-PFA-4Q Module

A-ports	Interfaces xe-0/0/24 through xe-0/0/39 on the Packet Forwarding Engine (PFE) of the QFX5100-24Q-AA switch connect to the B-ports on the FPGA module on the QFX-PFA-4Q expansion module. A-ports require corresponding B-ports on the FPGA module. You can manage these interfaces through the Junos OS.
---------	---

Table 65: External and Internal Ports on the QFX5100-24Q-AA Switch and the QFX-PFA-4Q Module (continued)

B-ports	Internal 10-Gigabit Ethernet ports connect to the FPGA module on the QFX-PFA-4Q module, which then connect to the A-ports on the PFE of the QFX5100-24Q-AA switch. The naming convention for these ports is determined by the guest VM. The guest VM controls the FPGA module.
C-ports	Four, front-facing 40-Gigabit Ethernet ports on the QFX-PFA-4Q module connect to the FPGA module running on the QFX5100-24Q-AA switch and the F-ports on the QFX5100-24Q-AA switch. The guest VM controls the FPGA module.
D-ports	Two 10-Gigabit Ethernet internal ports on the Packet Forwarding Engine of the QFX5100-24Q-AA switch connect to the Ethernet NIC on the QFX5100-24Q-AA switch. The naming convention for these ports is the same one used for the F-ports. You can manage these ports through the Junos OS.
F-ports	Twenty four front-facing 40-Gigabit Ethernet ports on the QFX5100-24Q-AA switch. These ports contain an "et" prefix when in 40-Gigabit Ethernet mode. If you channelize these interfaces, the prefix is "xe." You can manage these ports through the Junos OS.
NIC ports	Internal interfaces xe-0/0/40 and xe-0/0/41 on the QFX5100-24Q-AA switch connect to the PFE for use on the guest VM. The NIC ports perform the same functions as any other Linux OS NIC port. The NIC ports do not work unless the QFX-PFA-4Q module is installed.

Understanding Packet Flow Accelerator Diagnostics Software Tests and Scripts

You can run Packet Flow Accelerator Diagnostics software to test the following subsystems on the QFX-PFA-4Q module:

- FPGA
- QDR SRAM memory
- DRAM memory
- DRAM SPDs
- FPGA-connected PCI Express links
- FPGA-connected Ethernet data (QSFP interfaces)
- QSFP I2C I/O
- PTP I/O

Before you can run any test or script, you need to connect to the console connection of the guest VM. For more information, see [“Installing Packet Flow Accelerator Diagnostics Software” on page 599](#).

The following test sets are available:

- quick-test—Allows you to perform a basic test of all FPGA-attached functionality. These tests take one or two minutes to complete.
- burn-in—Allows you to exercise all FPGA-attached functionality. These tests take several hours to complete.
- individual test mode—Allows you to test a single subsystem with extra configuration options.

Understanding the ikonddiag Command

To run any of the tests, issue the **ikonddiag** command with the following arguments:



NOTE: Before you can run the tests, you need to connect to the console connection of the guest VM. For more information, see [“Installing Packet Flow Accelerator Diagnostics Software” on page 599](#).

- -t (quick-test | burn-in | <test name>)

This argument identifies the test.

- -h

This argument provides usage details for the test.

- -V

This argument provides verbose output for the tests.

For example, to run the PTP test, issue the **ikonddiag -t PTP** command at the guest VM prompt:

ikonddiag -t PTP

```
[2015-05-07 03:12:20][BEGIN TEST - PTP]

*****

PTP PHY interrupt: PASS

1G Ethernet PHY packet loopback test: PASS

PTP clock generation/check: PASS

UART (ToD) loopback: PASS

*****

[2015-05-07 03:13:30][END TEST PTP RESULT PASS]
```

Understanding Basic Functionality Tests

You can test basic functionality on the PCI Express interface and memory components. [Table 66 on page 579](#) lists the names of the tests and their functions.

Table 66: Base Tests

Test Name	Description	Details	Optional Arguments	Test Sets	Failure Behavior
FPGABasic	Tests basic FPGA operation.	Configures the FPGA and reads some simple registers over PCI Express.	None.	quick-test and burn-in	Any failures in this test cause the ikonddiag command to generate normal test status and error messages, and then to abort with another error message. You cannot continue testing because all tests rely on the functionality tested by this one.
PCIe	Verifies functionality and stability of bulk transfers of PCIe data.	Repeatedly loops back pseudo random data generated on the CPU to the FPGA and then back to the CPU. Returned data is verified on the CPU.	-i <n> number of repetitions (default = 1 quick-test, 10,000 burn-in) -j <n> size of individual transfer in Megabytes (default = 100 MiB).	quick-test and burn-in	This test reports erroneous data values and offsets in data transfer. Any failures in this test will cause the ikonddiag command to output normal test status and error messages and then abort with a further error. You cannot continue further testing because all tests rely on functionality tested by this test.
DIMM	Checks SPD query functionality and verifies that correct DIMMs are installed.	Reads data from SPD device on DIMM modules ,reports contents, and checks for erroneous values and verifies: <ul style="list-style-type: none"> DIMM part data against expected part data. SPD temperature is in nominal operating range. 	None.	quick-test and burn-in	If any values are unexpected, the test reports erroneous values and provides expected values and ranges.
DRAMMemory	Tests data transfer functionality and stability of FPGA-attached DRAM memory devices.	<ul style="list-style-type: none"> Checks that PHYs are initialized correctly. Repeatedly does the following tasks: <ul style="list-style-type: none"> Writes to memory from the FPGA <ul style="list-style-type: none"> Each pass switches data between: zeros, ones, counter, random, zeros, random, ones, random. Loops back memory inside the FPGA (simultaneous reads and writes). Verifies memory from the FPGA 	-i <n> vary number of iterations) default = 1 for quick-test, 500 for burn-in)	quick-test and burn-in	This test reports the number of errors during verification. Number of errors are specified as an accumulated number of errors per byte-lane and DIMM module.

Understanding and Running Ethernet Tests and Scripts

The Ethernet tests and scripts test C-ports and traffic between A- and B-ports. The traffic between A- and B-ports is tested by passing the data on the F-ports. For the C-ports, you need to loop back the traffic sent on the C-ports. You can use physical copper loopback cables for this purpose. For the F-ports, you need to loop back the traffic sent on the F-ports. You can use copper loopback cables for this purpose. Include the F-ports in a VLAN. You can use the python PFAD_exec.py -t 1 script as well as the tests below. The python PFAD_exec.py -t 1 script verifies end-to-end L2 traffic on the external QSFP ports and checks the statistics on the interfaces in Junos OS and the statistics on the interfaces in the Packet Flow Diagnostics software VM. This test will fail if traffic loss is seen on any of the interfaces. There is also a provision to test all the combinations of QSFP ports as well.

Table 67 on page 580 lists the names of the Ethernet tests and their functions. For information on how to install the script, see “Installing Packet Flow Accelerator Diagnostics Software” on page 599.

Table 67: Ethernet Tests and Scripts

Test Name	Description	Details	Optional Arguments	Test Sets	Failure Behavior
QSFPEthernet	Verifies functionality of Ethernet (QSFP) links.	Generates, receives, and verifies Ethernet frames are at line-rate through the FPGA module. The contents and lengths of packets consist of pseudo-random data. During operation, QSFP connections are all channelized to use 10 Gigabit Ethernet with all 32 Ethernet channels operating in parallel in full-duplex mode.	-i <n> varied number of iterations (default = 1,000 for quick-test, 1e9 for burn-in)	quick-test and burn-in	If the number of packets sent or received correctly are verified as not being equal, this test is considered a failure and the discrepancies between these quantities are reported. This test fails if the external Ethernet connections are not configured for loopback.
QSFPI2C	Checks if there is access to the four QSFP modules located on the front of the QFX-PFA-4Q module.	Performs reads of registers in the I2C modules and verifies that the results are as expected. For this test to pass, QSFP media must be inserted into all four ports on the QFX-PFA-4Q module. Any kind of external media can be used (for example, DAC cables, copper loopback, modules, and optical modules).	None.	quick-test and burn-in	This test fails if it cannot detect the presence of a QSFP module or if the values it reads back are unexpected.

Before you can run the Ethernet tests and script successfully, you need to perform the following tasks:

- Externally loop back all of the Ethernet connections (QSFP) on the QFX-PFA-4Q module.

To loop back the QSFP interfaces on the QFX-PFA-4Q module, attach copper loopback modules on the four QSFP+ interfaces installed on the QFX-PFA-4Q module.

Attach copper loopback modules on the QSFP+ interfaces (ports 10 through port 13) installed on the QFX5100-24Q-AA switch.

- Channelize ports 10 through 13 on the QFX5100-24Q-AA switch.
- Pair each of the 16 ikonDiag lanes using the equivalent Junos OS interface names with each of the corresponding Junos OS interfaces that were channelized from ports 10 through 13 on the QFX5100-24Q-AA switch.



NOTE: Each VLAN must be independent contain exactly two associated ports—one 10-Gigabit Ethernet port that is an F-port, and one 10-Gigabit Ethernet port that is an A-port.

Table 68 on page 581 shows the mappings for the 10-Gigabit Ethernet channels on the QFX-PFA-4Q module F-ports.

Table 68: 10-Gigabit Ethernet Channel Mappings on the QFX-PFA-4Q module F-ports

ikondiag Names	Description
JDFE_XE32_10G	xe-0/0/32
JDFE_XE33_10G	xe-0/0/33
JDFE_XE34_10G	xe-0/0/34
JDFE_XE35_10G	xe-0/0/35
JDFE_XE24_10G	xe-0/0/24
JDFE_XE25_10G	xe-0/0/25
JDFE_XE26_10G	xe-0/0/26
JDFE_XE27_10G	xe-0/0/27
JDFE_XE28_10G	xe-0/0/28
JDFE_XE29_10G	xe-0/0/29
JDFE_XE30_10G	xe-0/0/30
JDFE_XE31_10G	xe-0/0/31
JDFE_XE36_10G	xe-0/0/36

Table 68: 10-Gigabit Ethernet Channel Mappings on the QFX-PFA-4Q module F-ports (continued)

ikondiag Names	Description
JDFE_XE37_10G	xe-0/0/37
JDFE_XE38_10G	xe-0/0/38
JDFE_XE39_10G	xe-0/0/39

[Table 69 on page 582](#) shows the mappings for the 10-Gigabit Ethernet channels on the QFX-PFA-4Q module C-ports.

Table 69: 10-Gigabit Ethernet Channel Mappings on the QFX-PFA-4Q module C-ports

ikondiag Names	Description
JDFE_QSFP0_10G_PORT0	QSFP port #0 10G sub-channel 0
JDFE_QSFP0_10G_PORT1	QSFP port #0 10G sub-channel 1
JDFE_QSFP0_10G_PORT2	QSFP port #0 10G sub-channel 2
JDFE_QSFP0_10G_PORT3	QSFP port #0 10G sub-channel 3
JDFE_QSFP1_10G_PORT0	QSFP port #1 10G sub-channel 0
JDFE_QSFP1_10G_PORT1	QSFP port #1 10G sub-channel 1
JDFE_QSFP1_10G_PORT2	QSFP port #1 10G sub-channel 2
JDFE_QSFP1_10G_PORT3	QSFP port #1 10G sub-channel 3
JDFE_QSFP2_10G_PORT0	QSFP port #2 10G sub-channel 0
JDFE_QSFP2_10G_PORT1	QSFP port #2 10G sub-channel 1
JDFE_QSFP2_10G_PORT2	QSFP port #2 10G sub-channel 2
JDFE_QSFP2_10G_PORT3	QSFP port #2 10G sub-channel 3
JDFE_QSFP3_10G_PORT0	QSFP port #3 10G sub channel 0
JDFE_QSFP3_10G_PORT1	QSFP port #3 10G sub-channel 1
JDFE_QSFP3_10G_PORT2	QSFP port #3 10G sub-channel 2
JDFE_QSFP3_10G_PORT3	QSFP port #3 10G sub-channel 3

[Table 70 on page 583](#) provides exact connectivity between the C-ports and A-ports.

Table 70: Exact Connectivity Between C-Ports and A-Ports

QSFP Port Number	Channel Number	Junos OS Interface
QSFP port #0	channel 0	xe-0/0/32
QSFP port #0	channel 1	xe-0/0/33
QSFP port #0	channel 2	xe-0/0/34
QSFP port #0	channel 3	xe-0/0/35
QSFP port #1	channel 0	xe-0/0/24
QSFP port #1	channel 1	xe-0/0/25
QSFP port #1	channel 2	xe-0/0/26
QSFP port #1	channel 3	xe-0/0/27
QSFP port #2	channel 0	xe-0/0/28
QSFP port #2	channel 1	xe-0/0/29
QSFP port #2	channel 2	xe-0/0/30
QSFP port #2	channel 3	xe-0/0/31
QSFP port #3	channel 0	xe-0/0/36
QSFP port #3	channel 1	xe-0/0/37
QSFP port #3	channel 2	xe-0/0/38
QSFP port #3	channel 3	xe-0/0/39

- Add these interfaces to a VLAN.

Channelize ports 10 through 13 using the Junos CLI.

1. Configure ports 10 through 13 on PIC 1 to operate as 10-Gigabit Ethernet ports.

```
[edit chassis fpc 0 pic 1]
user@switch# set port-range 10 13 channel-speed 10g
```

2. Review your configuration and issue the **commit** command.

```
[edit]
user@switch# commit
commit complete
```

Add the 16 channelized interfaces you just configured to 16 VLANs.

To add the 16 channelized interfaces:

1. Create 16 VLANs.

```
[edit vlans]
user@switch# set v0_0 vlan-id 10
user@switch# set v0_1 vlan-id 11
user@switch# set v0_2 vlan-id 12
user@switch# set v0_3 vlan-id 13
user@switch# set v1_0 vlan-id 14
user@switch# set v1_1 vlan-id 15
user@switch# set v1_2 vlan-id 16
user@switch# set v1_3 vlan-id 17
user@switch# set v2_0 vlan-id 18
user@switch# set v2_1 vlan-id 19
user@switch# set v2_2 vlan-id 20
user@switch# set v2_3 vlan-id 21
user@switch# set v3_0 vlan-id 22
user@switch# set v3_1 vlan-id 23
user@switch# set v3_2 vlan-id 24
user@switch# set v3_3 vlan-id 25
```

2. Add the channelized interfaces to the VLANs.

```
[edit interfaces]
user@switch# set xe-0/0/24 unit 0 family ethernet-switching vlan members v0_0
user@switch# set xe-0/0/25 unit 0 family ethernet-switching vlan members v0_1
user@switch# set xe-0/0/10:0 unit 0 family ethernet-switching vlan members v0_1
user@switch# set xe-0/0/10:1 unit 0 family ethernet-switching vlan members v0_1
user@switch# set xe-0/0/10:2 unit 0 family ethernet-switching vlan members v0_2
user@switch# set xe-0/0/10:3 unit 0 family ethernet-switching vlan members v0_3
user@switch# set xe-0/0/11:0 unit 0 family ethernet-switching vlan members v1_0
user@switch# set xe-0/0/11:1 unit 0 family ethernet-switching vlan members v1_1
user@switch# set xe-0/0/11:2 unit 0 family ethernet-switching vlan members v1_2
user@switch# set xe-0/0/11:3 unit 0 family ethernet-switching vlan members v1_3
user@switch# set xe-0/0/12:0 unit 0 family ethernet-switching vlan members v2_0
user@switch# set xe-0/0/12:1 unit 0 family ethernet-switching vlan members v2_1
user@switch# set xe-0/0/12:2 unit 0 family ethernet-switching vlan members v2_2
user@switch# set xe-0/0/12:3 unit 0 family ethernet-switching vlan members v2_3
user@switch# set xe-0/0/13:0 unit 0 family ethernet-switching vlan members v3_0
user@switch# set xe-0/0/13:1 unit 0 family ethernet-switching vlan members v3_1
user@switch# set xe-0/0/13:2 unit 0 family ethernet-switching vlan members v3_2
user@switch# set xe-0/0/13:3 unit 0 family ethernet-switching vlan members v3_3
```

3. Review your configuration and issue the **commit** command.

```
[edit]
user@switch# commit
commit complete
```

Understanding and Using Stress Tests

The stress tests exercise all high-speed I/Os in parallel. The stress tests require the same external media as you used for the Ethernet tests. [Table 71 on page 585](#) lists the name of the test and its functions.

Table 71: Stress Tests

Test Name	Description	Details	Optional Arguments	Test Sets	Failure Behavior
Stress	Exercises all high-speed I/Os in parallel.	<p>Exercise all of the high-speed I/Os attached to the FPGA in parallel, including:</p> <ul style="list-style-type: none"> • DRAM • QDR • Ethernet <p>Each test subsystem is exercised in a similar fashion to the individual tests as previously described.</p>	-i <n> varied number of iterations) default = 1 for quick-test, 1,000 for burn-in)	quick-test and burn-in	<p>If any one sub-system fails, the test is stopped. The first sub-system detected to have failed is reported.</p> <p>NOTE: If multiple subsystems fail, only the first failed subsystem is reported.</p>

Understanding and Running PTP Tests

You can run PTP for hardware used with PTP. These tests are helpful if you are creating timing applications. To run the tests, you need to connect SubMiniature version B (SMB) cables, Ethernet loopback cables, and ToD loopback cables for the clocking I/O, ToD serial port, and 1-Gigabit Ethernet connectors. You must connect the SMB, Ethernet, ToD loopback cables between the 10M and PPS output and input connectors. The ToD loopback cable is a standard RJ45 cable with Pin 3 (Tx Data) connected to Pin 6 (Rx Data). In addition to the PTP tests, you can run scripts included the Packet Flow Accelerator Diagnostics software to test PTP. See [Table 73 on page 586](#) for information on the PTP scripts. The PTP scripts require you to have a Junos OS image with Enhanced Automation installed on the QFX5100-24Q-AA switch. For information on how to install the scripts, see [“Installing Packet Flow Accelerator Diagnostics Software” on page 599](#).

[Table 72 on page 586](#) lists the names of the PTP tests and their functions:

Table 72: PTP Tests

Test Name	Description	Details	Optional Arguments	Test Sets	Failure Behavior
PTP	Checks functionality of various FPGA-attached time-synchronizing features of the QFX-PFA-4Q module.	<p>Performs various tests on time-synchronizing functionality of the QFX-PFA-4Q module.</p> <p>Subtests covered by this test include:</p> <ul style="list-style-type: none"> • Verification of PFE-attached communications. • Testing of the PTP PHY <ul style="list-style-type: none"> • Basic configuration. • FPGA-attached interrupt line. • 1-Gigabit Ethernet loopback (requires external loopback media). • QFX-PFA-4Q module time-syncing related clock generators and feedback routing. • ToD UART port (requires external loop-back media). 	None.	quick-test and burn-in	A failure in any of the subsystems above causes the entire test to fail and generates a report at the end of the test that indicates the pass and fail status of the sub-tests.

[Table 73 on page 586](#) lists the name of the script and its function. This script is not part of the **ikonddiag** command. You can run this command Junos OS.

Table 73: PTP Script

Script Name	Description	Details	Optional Arguments	Test Sets	Failure Behavior
<code>./run_ptp_test</code>	Checks functionality of various FPGA-attached time-syncing features of the QFX-PFA-4Q module.	<p>Performs various tests on time-syncing functionality of the QFX-PFA-4Q module.</p> <p>Sub tests covered by this test include:</p> <ul style="list-style-type: none"> • Verification of PFE attached communications. • Testing of the PTP PHY <ul style="list-style-type: none"> • Basic configuration. • FPGA-attached interrupt line. • 1-Gigabith Ethernet loop-back (requires external loop-back media). • QFX-PFA-4Q module time-syncing related clock generators and feedback routing. • ToD UART port (requires external loop-back media). 	None.	None. This test must be run manually.	A failure in any of the subsystems above causes the entire test to fail and generates a report at the end of the test that indicates the pass and fail status of the sub-tests.

Understanding QFX-PFA-4Q Module LED Tests

The LED tests examine the LEDs on the QFX-PFA-4Q module.

To run the LED test, issue the **ikon_led_toggle** command. The test might take a few seconds to start because the FPGA is being configured. When you see the message **Toggling LEDs. Send SIGINT (^C) to exit**, the test begins. To terminate the test, type Ctrl-C. [Table 74 on page 587](#) lists the name of the test and its function.

Table 74: QFX-PFA-4Q Module LED Test

Test Name	Description	Details	Optional Arguments	Test Sets	Failure Behavior
ikon_led_toggle	Flashes the LEDs on the QFX-PFA-4Q module for visual inspection.	<p>The following LEDs on the QFX-PFA-4Q module will repeatedly cycle through the following patterns:</p> <p>NOTE: The AL and ST LEDs are not included in this test.</p> <ul style="list-style-type: none"> The sixteen bicolor LEDs for QSFP status cycle through green, orange, and off. S0 and S1 LEDs cycle through green and off. Bottom-left RJ-45 PTP status LED cycles through green, orange, and off. Bottom-right RJ-45 PTP status LED cycles through green and off rapidly. Alarm LEDs cycle through orange, red, and off. 	None.	None. This test must be run manually.	LEDs might not flash.

Understanding Packet Flow Accelerator Diagnostics Utilities

In addition to the Packet Flow Accelerator Diagnostic software tests, there are utilities included in the Packet Flow Accelerator Diagnostics software that you can use to further diagnose issues on the QFX-PFA-4Q module.



NOTE: Before you can run the utilities, you need to connect to the console of the guest VM. For more information on how to access the guest VM, see [“Installing Packet Flow Accelerator Diagnostics Software” on page 599](#).

[Table 75 on page 588](#) lists the name of the utility and its function.

Table 75: Utilities

Test Name	Descriptions	Details	Expected Output and Behavior
maxtop	Reports FPGA status.	Displays information about the currently configured status of the FPGA module and whether the module is in operation. Checks to make sure very basic driver and FPGA PCI Express link operations are working correctly. If this utility exits with error(s), it is very unlikely that any further FPGA operations will work.	Output should be similar to that shown below. If this output is not shown, there might be a critical failure in the diagnostic software environment, or the PCI Express link to the FPGA is nonfunctional. MaxTop Tool 2015.1 Found 1 card(s) running MaxelerOS 2015.1 Card 0: QFX-PFA-4Q (P/N: 241124) S/N: 96362301684266423 Mem: 24GB Load average: 0.00, 0.00, 0.00 DFE %BUSY TEMP MAXFILE PID USER TIME COMMAND 0 0.0% - 2fcf249cc7... - - - -
ikon_snake	Enables snake connectivity between all 10-Gigabit Ethernet channels.	Connects the Rx channel of all 32 x 10-Gigabit Ethernet channels on the FPGA module (QSFP interfaces) to the Tx channel of the respective neighboring connection. This allows all 32 channels to be tested using just a 10-Gigabit Ethernet interface external packet generator, copper loopback modules, and a QSFP <-> 4xSFP breakout cable.	After issuing this test, all Ethernet data will be forwarded after the message 'Snake tool loaded. hit 'enter' to exit.' is displayed. NOTE: During the time before the operating message is printed, the FPGA module might be in the process of being configured, so no data is forwarded. Pressing 'enter' will exit the utility. After the test has finished, packet data continues to be forwarded until another Ethernet utility or test is run.

Table 75: Utilities (continued)

Test Name	Descriptions	Details	Expected Output and Behavior
ikon_eth_util all --digitalloopback	Enables digital-loopback on all 10-Gigabit Ethernet interfaces on the Enables 'snake' connectivity between all QFX-PFA-4Q module 10-Gigabit Ethernet channels.	Connects the Rx side of all 32x 10-Gigabit Ethernet channels on the FPGA module (QSFP) to the Tx side of the same channel.	<p>After issuing this test, all Ethernet data will be forwarded as described after the message 'running press return key to exit' is displayed.</p> <p>NOTE: Before the operating message is displayed, the FPGA module might be in the process of being configured, and no data will be forwarded. Pressing Enter exits the utility.</p> <p>After the test has finished, packet data continues to be forwarded until another Ethernet utility or test is run.</p>
ikon_eth_util	Enables data to pas -through QFX-PFA-4Q module QSFP ports.	<p>Allows data to pass through the QFX-PFA-4Q module QSFP ports on the QFX-PFA-4Q module.</p> <p>NOTE: Because all of the QSFP ports are channelized to 10-Gigabit Ethernet, you must use SFP breakout cables when connecting external media.</p>	<p>After issuing this test, all Ethernet data is forwarded as described after the message ' running press return key to exit ' is displayed.</p> <p>NOTE: Before the operating message is displayed, the the FPGA module might be in the process of being configured, and no data will be forwarded. Pressing 'enter' will exit the utility.</p> <p>After the test has finished, packet data will continue to be forwarded until another Ethernet utility or test is run.</p>

Table 75: Utilities (continued)

Test Name	Descriptions	Details	Expected Output and Behavior
maxnet -v link show	Dumps FPGA packet statistics.	<p>Displays statistics about packets sent and received on all (QSFP) links from the MAC and PHY IP cores in the FPGA. Using the 'v' option provides verbose output.</p> <p>Here are some important items to note:</p> <ul style="list-style-type: none"> Packet statistics are reset whenever the Altera FPGA is reconfigured; that is, when running different applications that make use of the FPGA. The tool only displays data for Ethernet links that are included in the FPGA design. As such, if the FPGA module has not yet been configured, or it is configured with an application that does not use some of the Ethernet links, reduced link details might be displayed. 	<p>Sample output for a single 10-Gigabit Ethernet link is as follows:</p> <pre> MaxTop Tool 2015.1 Found 1 card(s) running MaxelerOS 2015.1 Card 0: QFX-PFA-4Q (P/N: 241124) S/N: 96362301684266423 Mem: 24GB Load average: 0.00, 0.00, 0.00 DFE %BUSY TEMP MAXFILE PID USER TIME COMMAND 0 0.0% - 2fcf249cc7... - - - - - </pre>
host2mem <filename> -o <filename> -t <DDR QDRO QDRPARITY0 QDR1 QDRPARITY1>	Writes and then reads arbitrary data from QDR SRAM or DRAM.	<p>Operates by streaming the contents of a binary file to one of the memory resources on the QFX-PFA-4Q module through the FPGA, and then streams the same data back from the memory to another file.</p> <p>NOTE: You cannot only read back data from RAM because the contents are not preserved between running multiple tests.</p>	Reports PASSED or FAILED depending on whether the returned data matches the input data.

Table 76 on page 590 lists the command-line arguments for the host2mem utility.

Table 76: Command-Line Arguments

Argument	Description
-- help -h	Print out usage and exit.
-i <input file>	Input data file.

Table 76: Command-Line Arguments (continued)

Argument	Description
-o <output file>	Output data file.
-- test -t <test name>	Test resource. See Table 77 on page 591 for information regarding resources.
-- verbose -v	Enable verbose mode.

The file format for input and output files is identical. Data is packed consecutively as words based on the width specified in the test mode table below. The size of an input file might be less but must not exceed the total size of the resource being tested. The size of the output file is the same as the input file and, provided there are no errors, has the same content.

Table 77: File Format Details

Test Mode	Resource	Word Width	Size of Test Data
DDR	DDR SDRAM	192 B	24 GB
QDR0	QDR0 Data	16 B	32 MB
QDRPARITY0	QDR0 Parity bits	2 B	4 MB
QDR1	QDR1 Data	16 B	32 MB
QDRPARITY1	QDR1 Parity bits	2 B	4 MB

The dynamic random-access memory (DRAM) on the QFX-PFA-4Q module contains three dual in-line memory modules (DIMM3, DIMM4, DIMM6), and each data word is split across all three DIMMs. [Table 78 on page 591](#) lists the allocation of Bytes to DIMMs.

Table 78: Dual In-Line Memory Modules

0	DIMM3	63	64	DIMM4	127	128	DIMM6	191
---	-------	----	----	-------	-----	-----	-------	-----

Sample Output for Packet Accelerator Diagnostics Software

This section provides some sample output for base tests, Ethernet tests, PTP tests, and utilities.

- `ikonddiag -t FPGABasic`

```
[2015-05-07 03:00:17][BEGIN TEST - FPGABasic]
[2015-05-07 03:00:17][END TEST FPGABasic RESULT PASSED]
```

- `ikonddiag -t DIMM`

```
[2015-05-07 03:01:09][BEGIN TEST - DIMM]
[2015-05-07 03:01:09][END TEST DIMM RESULT PASSED]
```

- ikonddiag -t QSFPEthernet

```
[2015-05-07 03:02:33][BEGIN TEST - QSFPEthernet]
```

```
*****
```

Test Failed:

QSFP0_10G_PORT0: FAIL - packets received = 0/1000

QSFP0_10G_PORT1: FAIL - packets received = 0/1000

QSFP0_10G_PORT2: FAIL - packets received = 0/1000

QSFP0_10G_PORT3: FAIL - packets received = 0/1000

QSFP1_10G_PORT0: FAIL - packets received = 0/1000

QSFP1_10G_PORT1: FAIL - packets received = 0/1000

QSFP1_10G_PORT2: FAIL - packets received = 0/1000

QSFP1_10G_PORT3: FAIL - packets received = 0/1000

QSFP2_10G_PORT0: FAIL - packets received = 0/1000

QSFP2_10G_PORT1: FAIL - packets received = 0/1000

QSFP2_10G_PORT2: FAIL - packets received = 0/1000

QSFP2_10G_PORT3: FAIL - packets received = 0/1000

QSFP3_10G_PORT0: FAIL - packets received = 0/1000

QSFP3_10G_PORT1: FAIL - packets received = 0/1000

QSFP3_10G_PORT2: FAIL - packets received = 0/1000

QSFP3_10G_PORT3: FAIL - packets received = 0/1000

QSFP4_10G_PORT0: PASS - packets received = 1000/1000

```
QSF4_10G_PORT1: PASS - packets received = 1000/1000
```

```
QSF4_10G_PORT2: PASS - packets received = 1000/1000
```

```
QSF4_10G_PORT3: PASS - packets received = 1000/1000
```

```
QSF5_10G_PORT0: PASS - packets received = 1000/1000
```

```
QSF5_10G_PORT1: PASS - packets received = 1000/1000
```

```
QSF5_10G_PORT2: PASS - packets received = 1000/1000
```

```
QSF5_10G_PORT3: PASS - packets received = 1000/1000
```

```
QSF6_10G_PORT0: PASS - packets received = 1000/1000
```

```
QSF6_10G_PORT1: PASS - packets received = 1000/1000
```

```
QSF6_10G_PORT2: PASS - packets received = 1000/1000
```

```
QSF6_10G_PORT3: PASS - packets received = 1000/1000
```

```
QSF7_10G_PORT0: PASS - packets received = 1000/1000
```

```
QSF7_10G_PORT1: PASS - packets received = 1000/1000
```

```
QSF7_10G_PORT2: PASS - packets received = 1000/1000
```

```
QSF7_10G_PORT3: PASS - packets received = 1000/1000
```

```
*****
```

```
[2015-05-07 03:02:41][END TEST QSFPEthernet RESULT PASSED]
```

- `ikonddiag -t DRAMMemory -i 3`

```
[2015-05-07 03:03:37][BEGIN TEST - DRAMMemory]
```

```
[2015-05-07 03:04:21][END TEST DRAMMemory RESULT PASSED]
```

- ikonddiag -t QDRMemory -p -i 3

```
[2015-05-07 03:10:38][BEGIN TEST - QDRMemory]
```

```
[2015-05-07 03:10:45][END TEST QDRMemory RESULT PASSED]
```

- ikonddiag -t Stress -p -i 10

```
[2015-05-07 03:11:24][BEGIN TEST - Stress]
```

```
*****
```

Test Failed:

```
QSFP0_10G_PORT0: PASS - packets received = 650000/650000
```

```
QSFP0_10G_PORT1: PASS - packets received = 650000/650000
```

```
QSFP0_10G_PORT2: PASS - packets received = 650000/650000
```

```
QSFP0_10G_PORT3: PASS - packets received = 650000/650000
```

```
QSFP1_10G_PORT0: PASS - packets received = 650000/650000
```

```
QSFP1_10G_PORT1: PASS - packets received = 650000/650000
```

```
QSFP1_10G_PORT2: PASS - packets received = 650000/650000
```

```
QSFP1_10G_PORT3: PASS - packets received = 650000/650000
```

```
QSFP2_10G_PORT0: PASS - packets received = 650000/650000
```

```
QSFP2_10G_PORT1: PASS - packets received = 650000/650000
```

```
QSFP2_10G_PORT2: PASS - packets received = 650000/650000
```

```
QSFP2_10G_PORT3: PASS - packets received = 650000/650000
```

```
QSFP3_10G_PORT0: PASS - packets received = 650000/650000
```



```

QSP3_10G_PORT1: PASS - packets received = 650000/650000

QSP3_10G_PORT2: PASS - packets received = 650000/650000

QSP3_10G_PORT3: PASS - packets received = 650000/650000

QSP4_10G_PORT0: PASS - packets received = 650000/650000

QSP4_10G_PORT1: PASS - packets received = 650000/650000

QSP4_10G_PORT2: PASS - packets received = 650000/650000
QSP4_10G_PORT3: PASS - packets received = 650000/650000

QSP5_10G_PORT0: PASS - packets received = 650000/650000

QSP5_10G_PORT1: PASS - packets received = 650000/650000

QSP5_10G_PORT2: PASS - packets received = 650000/650000

QSP5_10G_PORT3: PASS - packets received = 650000/650000

QSP6_10G_PORT0: PASS - packets received = 650000/650000

QSP6_10G_PORT1: PASS - packets received = 650000/650000
QSP6_10G_PORT2: PASS - packets received = 650000/650000

QSP6_10G_PORT3: PASS - packets received = 650000/650000

QSP7_10G_PORT0: PASS - packets received = 650000/650000

QSP7_10G_PORT1: PASS - packets received = 650000/650000

QSP7_10G_PORT2: PASS - packets received = 650000/650000

QSP7_10G_PORT3: PASS - packets received = 650000/650000

*****

```

- ikonddiag -t PTP

```
[2015-05-07 03:12:20][BEGIN TEST - PTP]

*****

PTP PHY interrupt: PASS

1G Ethernet PHY packet loopback test: PASS

PTP clock generation/check: PASS

UART (ToD) loopback: PASS

*****

[2015-05-07 03:13:30][END TEST PTP RESULT PASS]
```

- ikondiag -t Application -i 2

```
iterations = 2

[2015-05-07 03:14:11][BEGIN TEST - Application Test]

[2015-05-07 03:17:33][END TEST Application Test RESULT PASSED]
```

- maxtop

```
MaxTop Tool 2015.1
Found 1 card(s) running MaxelerOS 2015.1
Card 0: (P/N: 241124) S/N: 96362301684266423 Mem: 24GB

Load average: 0.00, 0.00, 0.00

DFE  %BUSY  TEMP  MAXFILE      PID  USER      TIME  COMMAND
0    0.0%   -      7e2198e5c0...  -    -         -      -
```

- ikon_eth_util --all-pass-through

```
Ikon Ethernet Pass Through Utility
setting portConnect_QSFP4_10G_PORT0_QSFP0_10G_PORT0 to 1
setting portConnect_QSFP4_10G_PORT1_QSFP0_10G_PORT1 to 1
setting portConnect_QSFP4_10G_PORT2_QSFP0_10G_PORT2 to 1
setting portConnect_QSFP4_10G_PORT3_QSFP0_10G_PORT3 to 1
```

```

setting portConnect_QSFP1_10G_PORT0_QSFP5_10G_PORT0 to 1
setting portConnect_QSFP1_10G_PORT1_QSFP5_10G_PORT1 to 1
setting portConnect_QSFP1_10G_PORT2_QSFP5_10G_PORT2 to 1
setting portConnect_QSFP1_10G_PORT3_QSFP5_10G_PORT3 to 1
setting portConnect_QSFP2_10G_PORT0_QSFP6_10G_PORT0 to 1
setting portConnect_QSFP2_10G_PORT1_QSFP6_10G_PORT1 to 1
setting portConnect_QSFP2_10G_PORT2_QSFP6_10G_PORT2 to 1
setting portConnect_QSFP2_10G_PORT3_QSFP6_10G_PORT3 to 1
setting portConnect_QSFP3_10G_PORT0_QSFP7_10G_PORT0 to 1
setting portConnect_QSFP3_10G_PORT1_QSFP7_10G_PORT1 to 1
setting portConnect_QSFP3_10G_PORT2_QSFP7_10G_PORT2 to 1
setting portConnect_QSFP3_10G_PORT3_QSFP7_10G_PORT3 to 1
running press return key to exit

```

- Related Documentation**
- [Installing Packet Flow Accelerator Diagnostics Software on page 599](#)
 - [Installing Ethernet and PTP Scripts on page 597](#)
 - [Installing an Expansion Module in a QFX5100 Device](#)

Installing Ethernet and PTP Scripts

Installing Ethernet and PTP Scripts

You can use Ethernet and PTP scripts that are included in the Packet Flow Accelerator Diagnostics software to test Ethernet and PTP functionality. Before you can install the scripts, you need to perform the following tasks:

- Make sure the QFX-PFA-4Q module is installed in the QFX5100 switch. See *Installing an Expansion Module in a QFX5100 Device*.
- Install Junos OS Release 14.1X53-D27 software or later with enhanced automation for the QFX5100 switch. See *Installing Software Packages on QFX Devices*.
- Enable SSH and Telnet services on the switch. See *Configuring SSH Service for Remote Access to the Router or Switch* and *Configuring Telnet Service for Remote Access to a Switch*.
- Install the Packet Flow Accelerator Diagnostics Software. See [“Installing Packet Flow Accelerator Diagnostics Software” on page 599](#).

To install the scripts:

1. Log into the guest VM using the **request app-engine virtual-machine-shell *guest-VM-name***. The maximum length for the guest VM name is 255 characters. Make sure you are logged in as root when you enter this command.


```
root> request app-engine virtual-machine-shell diagnostics
```
2. Enter a valid username and password combination for the guest VM.
3. Enter the **guest-util diag-install *guest VM IP address*** command at the shell prompt.

Use the same IP address you used for configuring the local management address for the guest VM.

```
[root@localhost ~] guest-util diag-install 192.168.1.10
```

4. Change directories to /var/tmp to edit the PFAD_params.cfg file.

```
[root@localhost ~] cd /var/tmp
```

5. Open the PFAD_params.cfg file using an editor of your choice.

Here is an example of what is contained in the file:

```
[params]

# log level
LOGLEVEL = 'TRACE'

# my variables
VLAN1_NAME    = 'VLAN100'
VLAN1_ID      = '100'
JUNOS_USERNAME = 'test'
ROOT_USERNAME  = 'root'
JUNOS_PSWD     = 'juniper123'
GUEST_PSWD     = 'diag'
ROOT_PSWD      = 'root123'

# my duts
DUTS = {
    'R0': "10.204.43.170",
}

TOPOLOGY = 'IF1 = 'et-0/0/2'
                                IF2 = 'et-0/0/3'

PFAD_params.cfg: unmodified: line 1
```

6. Configure the management IP address.

```
DUTS = {
    'R0': "10.204.43.170",
}
```

7. Configure the PTP interfaces.

IF1 is the primary source, and IF2 is the secondary source.

Configure IF1 as et-0/0/2, and IF2 as et-0/0/3.

```
IF1 = '2' <<<<< Change it
IF2 = '3' <<<<< Change it
```

8. Save the changes you made to the PFAD_params.cfg file.
9. Run the scripts by issuing one of the following commands at the guest VM prompt.
 - To test traffic orchestration:


```
python PFAD_exec.py -t 1
```
 - To test PTP:


```
./run_ptp_test
```
 - To test Broadsync:


```
./run_broadsync_test
```

Related Documentation

- [Understanding Packet Flow Accelerator Diagnostics Software and Other Utilities on page 575](#)
- *Installing an Expansion Module in a QFX5100 Device*
- [Installing Packet Flow Accelerator Diagnostics Software on page 599](#)
- *Launching a Guest Virtual Machine (VM) to Run a Third Party Application on Junos OS Release 13.2X51-D20 and Later*
- *Installing Software Packages on QFX Devices*

Installing Packet Flow Accelerator Diagnostics Software

Installing Packet Flow Accelerator Diagnostics Software

You can use Packet Flow Accelerator Diagnostics software to test the FPGA module in the QFX-PFA-4Q module installed on the QFX5100-24Q-AA switch as well as the data paths between the FPGA module and the QFX5100-24Q-AA switch. The Packet Flow Accelerator Diagnostics software contains standard diagnostics, orchestration diagnostics, and Precision Time Protocol (PTP) and synchronization diagnostics. See “[Understanding Packet Flow Accelerator Diagnostics Software and Other Utilities](#)” on page 575. In addition to the Packet Flow Accelerator Diagnostics software tests, there are utilities included in the Packet Flow Accelerator Diagnostics software that you can use to further diagnose issues on the QFX-PFA-4Q module. For information on how to install the QFX-PFA-4Q module, see *Installing an Expansion Module in a QFX5100 Device*.

To run the orchestration diagnostics, PTP and synchronization diagnostics, and utilities contained in the Packet Flow Accelerator Diagnostics software, you need to have a Junos OS Release 14.1X53-D27 software or later with enhanced automation installed on your QFX5100 switch. For information on how to download and install Junos OS software, see *Installing Software Packages on QFX Devices*.

The Packet Flow Accelerator Diagnostics software runs in a guest VM on the switch and requires that you configure guest VM options in the Junos OS CLI.

Verifying That the QFX-PFA-4Q Expansion Module Is Installed

Before you install the Packet Flow Accelerator Diagnostics software, verify that the QFX-PFA-4Q module is installed.

From the CLI prompt, issue the **show chassis hardware** command.

```
{master:0}
root> show chassis hardware
```

Hardware inventory:				
Item	Version	Part number	Serial number	Description
Chassis			VX3715020024	QFX5100-24Q-AA
Pseudo CB 0				
Routing Engine 0		BUILTIN	BUILTIN	QFX Routing Engine
FPC 0	REV 02	650-057155	VX3715020024	QFX5100-24Q-AA
CPU		BUILTIN	BUILTIN	FPC CPU
PIC 0		BUILTIN	BUILTIN	24x 40G-QSFP-AA
Xcvr 6	REV 01	740-032986	QD334902	QSFP+-40G-SR4
PIC 1	REV 01	711-060247	VY3115060052	QFX-PFA-4Q
Power Supply 0	REV 03	740-041741	1GA24082731	JPSU-650W-AC-AFO
Power Supply 1	REV 03	740-041741	1GA24082726	JPSU-650W-AC-AFO
Fan Tray 0				QFX5100 Fan Tray 0, Front
to Back Airflow - AFO				
Fan Tray 1				QFX5100 Fan Tray 1, Front
to Back Airflow - AFO				
Fan Tray 2				QFX5100 Fan Tray 2, Front
to Back Airflow - AFO				
Fan Tray 3				QFX5100 Fan Tray 3, Front
to Back Airflow - AFO				
Fan Tray 4				QFX5100 Fan Tray 4, Front
to Back Airflow - AFO				

From the CLI output, you can see that the four QSFP+ interfaces (4x40G QSFP+) contained in the QFX-PFA-4Q module, are installed.

Downloading the Packet Flow Diagnostics Software



NOTE: To access the download site, you must have a service contract with Juniper Networks and an access account. If you need help obtaining an account, complete the registration form at the Juniper Networks website <https://www.juniper.net/registration/Register.jsp>.

To download the Packet Flow Diagnostics software package from the Juniper Networks Support website, go to <https://www.juniper.net/support/>:

1. Using a Web browser, navigate to <https://www.juniper.net/support>.
2. Click **Download Software**.

3. In the Switching box, click **Junos OS Platforms**.
4. In the QFX Series section, click the name of the platform for which you want to download software.
5. Click the Software tab and select the release number from the Release drop-down list.
6. In the Install Package section on the Software tab, select the Install Package for the release.

A login screen appears.
7. Enter your name and password and press Enter.
8. Read the End User License Agreement, click the **I agree** radio button, and then click **Proceed**.
9. Save the **pfadiag_vm-rXXXXX.img.gz** file on your computer.
10. Open or save the Packet Flow Diagnostics software package either to the local system in the **var/tmp** directory or to a remote location. If you are saving the installation package to a remote system, make sure that you can access it using HTTP, TFTP, FTP, or scp.

Copying the Packet Flow Diagnostics Software Package to the Switch

To copy the packet flow diagnostics software package to the switch:

1. Copy the packet flow diagnostics package to the switch using any file transfer protocol:

For example:

```
root% scp //hostname/pathname/pfadiag_vm-rXXXXX.img.gz /var/tmp
```

Install the Packet Flow Diagnostics Software on the Switch

To install the packet flow diagnostics software package on the switch:

1. Install the Packet Flow Diagnostics software on the switch.

This might take a few minutes.

If the Packet Flow Diagnostics software resides locally on the switch, issue the following command:

```
{master:0}  
root> request system software add virtual-machine-package  
/var/tmp/pfadiag_vm-rXXXXX.img.gz
```

```
Installing virtual-machine package..  
Copying virtual-machine package..  
Uncompressing virtual-machine package..  
Finished virtual-machine package installation.
```

2. Issue the **show version** command to verify that the installation was successful.

```
{master:0}  
root> show version  
fpc0:  
  
-----  
  
Hostname: switch  
  
Model: qfx5100-24q-aa  
  
Junos: 14.1X53-D27_vjunos.62  
  
JUNOS Base OS Software Suite [14.1X53-D26_vjunos.62]  
  
JUNOS Base OS boot [14.1X53-D27_vjunos.62]  
  
JUNOS Crypto Software Suite [14.1X53-D27_vjunos.62]  
  
JUNOS Online Documentation [14.1X53-D27_vjunos.62]  
  
JUNOS Kernel Software Suite [14.1X53-D27_vjunos.62]  
  
JUNOS Packet Forwarding Engine Support (qfx-ex-x86-32) [14.1X53-D27_vjunos.62]  
  
JUNOS Routing Software Suite [14.1X53-D27_vjunos.62]  
  
JUNOS Enterprise Software Suite [14.1X53-D27_vjunos.62]  
  
JUNOS py-base-i386 [14.1X53-D27_vjunos.62]  
  
JUNOS py-extensions-i386 [14.1X53-D27_vjunos.62]  
  
JUNOS Host Software [14.1X53-D27_vjunos.62]  
  
Junos for Automation Enhancement
```



```
JUNOS GUEST-VM Software [pfadiag_vm-rXXXXX-ve]
```

```
{master:0}
```

The CLI output shows that the Packet Flow Accelerator Diagnostics software was installed.

Configure the Guest VM Options to Launch the Guest VM on the Host

To configure the guest VM options:

1. Configure the following options for guest VM support in the Junos OS CLI at the [edit] hierarchy.
 - Compute cluster name
 - Compute node name
 - VM instance name
 - Dedicated management interface for guest VM
 - Third-party package name
 - Internal IP address of the guest VM

2. Configure the name of the compute cluster and compute node.

The name of the compute cluster must be default-cluster, and the name of the name of the compute node must be default-node; otherwise, launching the guest VM fails.

```
{master:0}
root# set services app-engine compute-cluster default-cluster compute-node default-node
hypervisor
```

3. Configure the name of the VM instance and the name of the third party application.

```
{master:0}
root# set services app-engine virtual-machines instance instance-name package
package-name
```



NOTE: The package names in the show app-engine virtual-machine-package command and the show version command should match.

```
{master:0}
root# set services app-engine virtual-machines instance diagnostics package
pfadiag_vm-rXXXXX-ve
```

4. Associate the VM instance with the configured compute cluster and compute node.

```
{master:0}  
root# set services app-engine virtual-machines instance instance-name compute-cluster  
name compute-node name
```

```
{master:0}  
root# set services app-engine virtual-machines instance diagnostics compute-cluster  
default-cluster compute-node default-node
```



NOTE: The name of the compute cluster must be default-cluster, and the name of the compute node must be default-node; otherwise, launching the guest VM fails.

5. Configure the local management IP address.

This IP address is used for the internal bridging interface. The host uses this IP address to check the availability of the guest VM.



NOTE: Do not use 192.168.1.1 and 192.168.1.2 as IP addresses because they are used by the Host-OS and Junos OS respectively.

```
{master:0}  
root# set services app-engine virtual-machines instance instance-name local-management  
family inet address 192.168.1.X
```

```
{master:0}  
root# set services app-engine virtual-machines instance diagnostics local-management  
family inet address 192.168.1.10
```

6. Configure the management interface for the guest VM.

This management interface is separate from the one used for Junos OS.

```
{master:0}  
root # set services app-engine virtual-machines instance diagnostics management-interface  
em1
```



NOTE: The management interface name must be either em0 or em1. The configuration will fail if you do not configure a management interface and then commit the configuration.

The new management interface is provisioned for the guest VM.

7. Commit the configuration.

```
{master:0}  
root# commit
```

Here are the results of the configuration:

```
services {
  app-engine {
    compute-cluster default-cluster {
      compute-node default-node {
        hypervisor;
      }
    }
  }
  virtual-machines {
    instance diagnostics {
      package pfadiag_vm-rXXXXXX-ve;
      local-management {
        family inet {
          address 192.168.1.10;
        }
      }
      compute-cluster default-cluster {
        compute-node default-node;
      }
      management-interface em1;
    }
  }
}
```

Verifying That the Guest VM is Working

To verify that the guest VM is working:

1. Issue the following **show** commands to verify that everything is working correctly:

- root> **show app-engine status**

```
Compute cluster: default-cluster
Compute Node: default-node, Online
```

The status should be Online.

- root> **show app-engine virtual-machine instance**

VM name	Compute cluster	VM status
diagnostics	default-cluster	ACTIVE

The VM status should be active.

- root> **show app-engine virtual-machine package**

```
VM package: pfdiag_vm-rXXXXX-ve
Compute cluster          Package download status
default-cluster          DOWNLOADED
```

Accessing the Guest VM

To access the guest VM:

1. Log into the guest VM.
 - Specify the guest VM name using the **request app-engine virtual-machine-shell *guest-VM-name*** command. The maximum length for the guest VM name is 255 characters. Make sure you are logged in as root when you enter this command.

```
root> request app-engine virtual-machine-shell diagnostics
```

- Enter a valid username and password combination for the guest VM.



NOTE: The first time you log in, the username is root. There is no password. After you log in, you will be prompted to create a password.

For example:

```
Maxeler Ikon Diagnostics VM r44702

diagnostics login: root
You are required to change your password immediately (root enforced)
New password:
Retype new password:
```

2. Issue the **ifconfig -a** command to see the names of the management interface that is used to access the guest VM from outside of the network, name of the management interface that is used for internal use, and the NIC ports used in the diagnostics VM.

In this example, the **heartbeat** address is the IP address that is used for internal use, the **management** interface is used for external communications, and the **xe-0/0/40** and **xe-0/0/41** interfaces are the NIC ports used in the diagnostics VM. The **heartbeat** is configured by default. The IP address of the **heartbeat** is the same as the IP address you configured for Junos OS.

You can associate one of the interfaces to the guest VM by issuing the **set services app-engine virtual-machines instance *name* management-interface *interface-name*** command. Use the same IP address as the one you configured using the **set services app-engine virtual-machines instance test local-management family inet address 192.168.1.10**. The MAC addresses associated with these interfaces are used for internal bridging.

```
[root@ikondiag ~]# ifconfig -a
```

```
heartbeat Link encap:Ethernet HWaddr 52:54:00:5D:DB:01
  inet addr:192.168.1.10 Bcast:0.0.0.0 Mask:255.255.255.0
  inet6 addr: fe80::5054:ff:fe5d:db01/64 Scope:Link
  UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
  RX packets:282 errors:0 dropped:0 overruns:0 frame:0
  TX packets:266 errors:0 dropped:0 overruns:0 carrier:0
  collisions:0 txqueuelen:1000
  RX bytes:24955 (24.3 KiB) TX bytes:24232 (23.6 KiB)

lo        Link encap:Local Loopback
  inet addr:127.0.0.1 Mask:255.0.0.0
  inet6 addr: ::1/128 Scope:Host
  UP LOOPBACK RUNNING MTU:16436 Metric:1
  RX packets:0 errors:0 dropped:0 overruns:0 frame:0
  TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
  collisions:0 txqueuelen:0
  RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)

management Link encap:Ethernet HWaddr 52:54:00:76:B3:C4
  inet6 addr: fe80::5054:ff:fe76:b3c4/64 Scope:Link
  UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
  RX packets:6 errors:0 dropped:0 overruns:0 frame:0
  TX packets:10 errors:0 dropped:0 overruns:0 carrier:0
```

```

collisions:0 txqueuelen:1000
RX bytes:438 (438.0 b) TX bytes:1836 (1.7 KiB)

xe-0-0-40 Link encap:Ethernet HWaddr EA:8B:BB:75:56:FE
inet6 addr: fe80::e88b:bbff:fe75:56fe/64 Scope:Link
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:2 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:0 (0.0 b) TX bytes:140 (140.0 b)

xe-0-0-41 Link encap:Ethernet HWaddr 3E:1A:00:94:ED:5B
inet6 addr: fe80::3c1a:ff:fe94:ed5b/64 Scope:Link
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:3 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:0 (0.0 b) TX bytes:230 (230.0 b)

```

Verifying That the FPGA Module Is Working

You can use the following utilities to verify that the FPGA module on the QFX-PFA-4Q module is working.

To verify that the FPGA module is working:

1. Issue the **lspci |grep "RAM memory"** command at the guest VM login prompt.

```

[root@ikondiag ~]# lspci |grep "RAM memory"
00:09.0 RAM memory: Juniper Networks Device 0078

```

The output shows that Juniper Networks Device 0078 is working.

2. Issue the **lspci |grep Co-processor** command at the guest VM login prompt:

```

[root@ikondiag ~]# lspci |grep Co-processor
:0a.0 Co-processor: Maxeler Technologies Ltd. Device 0006

```

The output shows that Maxeler Technologies Ltd. Device 0006 is working.

3. Issue the **maxtop** command at the guest VM login prompt:



NOTE: If there are errors in the command output, relaunch the guest VM.

```

[root@ikondiag ~]# maxtop
MaxTop Tool 2015.1
Found 1 card(s) running MaxelerOS 2015.1
Card 0: QFX-PFA-4Q (P/N: 241124) S/N: 96362301684266423 Mem: 24GB

```

```
Load average: 0.00, 0.00, 0.00
```

```
DFE  %BUSY  TEMP  MAXFILE      PID  USER      TIME  COMMAND
0    0.0%   -      2fcf249cc7...  -    -          -      -
```

Validating Connections Between QFX5100-24Q-AA Switch Network Ports and QFX-PFA-4Q Module Ports

You can use the **ikon_eth_util --all-pass-through** utility to validate the connections between the QFX5100-24Q-AA switch network ports and the QFX-PFA-4Q module ports.

In this example, the **ikon_eth_util --all-pass-through** utility will validate the following connections between the F-ports, A-ports, B-ports, and C-ports. [Figure 20 on page 576](#) provides the ports that are validated in this example.

Table 79: Validating Ports

F-Ports	A-Ports	B-Ports	C-Ports
xe-0/0/10:2	xe-0/0/32	JDFE_XE32_10G	JDFE_QSFPO_10G_PORT0 [External Port 0-0]
This interface is one of the 10-Gigabit Ethernet ports on the QFX5100-24Q-AA switch. You can manage these ports through the Junos OS.	This interface connects the PFE of the QFX5100-24Q-AA switch to the B-ports on the FPGA module on the QFX-PFA-4Q module.	This interface is an Internal 10-Gigabit Ethernet port on the FPGA module on the QFX-PFA-4Q module and connects to the A-ports on the PFE of the QFX5100-24Q-AA switch.	This interface is one of the front-facing 40-Gigabit Ethernet ports on the QFX-PFA-4Q module and connects to the guest VM running on the QFX5100-24Q-AA switch and the F-ports on the QFX5100-24Q-AA switch.

To validate the connections between the QFX5100-24Q-AA switch network ports and the QFX-PFA-4Q module ports:

1. Configure a VLAN and VLAN ID:

```
[edit vlans]
user@switch # set VLAN_TEST vlan-id 100
```

2. Associate the F-port and A-port in this VLAN so that the FPGA and PFE can communicate:

```
[edit interfaces]
user@switch # set xe-0/0/10:2 unit 0 family ethernet-switching vlan members VLAN_TEST
user@switch # set xe-0/0/32 unit 0 family ethernet-switching vlan members VLAN_TEST
```

3. Commit the configuration:

```
[edit]
user@switch # commit synchronize
```

4. Verify that the VLAN has been created.

```
[edit]
```

```
user@switch # run show vlans
```

Routing instance	VLAN name	Tag	Interfaces
default-switch	VLAN_TEST	100	xe-0/0/10:2.0*
default-switch	default	1	xe-0/0/32.0*

5. Issue the **ikon_eth_util --all-pass-through** command at the guest VM login prompt:

```
[root@ikondiag ~]# ikon_eth_util --all-pass-through
```

```
Ikon Ethernet Pass Through Utility
```

```
setting portConnect_JDFE_QSFP0_10G_PORT0_JDFE_XE32_10G to 1
setting portConnect_JDFE_QSFP0_10G_PORT1_JDFE_XE33_10G to 1
setting portConnect_JDFE_QSFP0_10G_PORT2_JDFE_XE34_10G to 1
setting portConnect_JDFE_QSFP0_10G_PORT3_JDFE_XE35_10G to 1
setting portConnect_JDFE_XE24_10G_JDFE_QSFP1_10G_PORT0 to 1
setting portConnect_JDFE_XE25_10G_JDFE_QSFP1_10G_PORT1 to 1
setting portConnect_JDFE_XE26_10G_JDFE_QSFP1_10G_PORT2 to 1
setting portConnect_JDFE_XE27_10G_JDFE_QSFP1_10G_PORT3 to 1
setting portConnect_JDFE_XE28_10G_JDFE_QSFP2_10G_PORT0 to 1
setting portConnect_JDFE_XE29_10G_JDFE_QSFP2_10G_PORT1 to 1
setting portConnect_JDFE_XE30_10G_JDFE_QSFP2_10G_PORT2 to 1
setting portConnect_JDFE_XE31_10G_JDFE_QSFP2_10G_PORT3 to 1
setting portConnect_JDFE_XE36_10G_JDFE_QSFP3_10G_PORT0 to 1
setting portConnect_JDFE_XE37_10G_JDFE_QSFP3_10G_PORT1 to 1
setting portConnect_JDFE_XE38_10G_JDFE_QSFP3_10G_PORT2 to 1
setting portConnect_JDFE_XE39_10G_JDFE_QSFP3_10G_PORT3 to 1
running press return key to exit
```

6. Send traffic to xe-0/0/10:2 on the QFX5100-24Q-AA switch and receive traffic on the front panel port 0-0 on the QFX-PFA-4Q module.
7. Send traffic to the front panel port 0-0 on the QFX-PFA-4Q module and receive traffic on xe-0/0/10:2 on the QFX5100-24Q-AA switch.
8. Verify the statistics for the xe-0/0/10:2 and xe-0/0/32 interfaces by issuing the **show interfaces xe-0/0/10:2 extensive** and **show interfaces xe-0/0/32 extensive** commands.
9. Verify the statistics for the JDFE_XE32_10G and JDFE_QSFP0_10G_PORT0 interfaces by issuing the **maxnet link** commands at the guest VM prompt for the Packet Flow Accelerator Diagnostics software.

```
[root@ikondiag ~]# maxnet link show JDFE_XE32_10G
```

```
JDFE_XE32_10G:
```

```
Link Up: true
MAC address: 00:11:22:33:44:55
RX Enabled: true
RX Frames: 1 ok
           0 error
```



```

0 CRC error
0 invalid/errored
1 total
TX Enabled: true
TX Frames: 0 ok
0 error
0 CRC error
0 invalid/errored
0 total

```

```
[root@ikondiag ~]# maxnet link show JDFE_QSFP0_10G_PORT0
```

```

JDFE_QSFP0_10G_PORT0:
  Link Up: true
  MAC address: 00:11:22:33:44:55
  RX Enabled: true
  RX Frames: 0 ok
0 error
0 CRC error
0 invalid/errored
0 total
TX Enabled: true
TX Frames: 1 ok
0 error
0 CRC error
0 invalid/errored
1 total

```

Uninstalling the Guest VM

To remove the guest VM:

1. Delete the configuration statements and uninstall the Packet Flow Accelerator Diagnostics software package.

For example, to remove the **app-engine** statement:

```
root # delete services app-engine
```

2. Commit the configuration.

```
root# commit
```

3. (Optional) Issue the **show version** command to learn the name of the Packet Flow Accelerator Diagnostics software package.

```
{master:0}
root> show version
```

```
fpc0:
```

```
-----

Hostname: switch
```

```

Model: qfx5100-24q-aa

Junos: 14.1X53-D27_vjunos.62

JUNOS Base OS Software Suite [14.1X53-D27_vjunos.62]

JUNOS Base OS boot [14.1X53-D27_vjunos.62]

JUNOS Crypto Software Suite [14.1X53-D27_vjunos.62]

JUNOS Online Documentation [14.1X53-D27_vjunos.62]

JUNOS Kernel Software Suite [14.1X53-D27_vjunos.62]

JUNOS Packet Forwarding Engine Support (qfx-ex-x86-32) [14.1X53-D26_vjunos.62]

JUNOS Routing Software Suite [14.1X53-D27_vjunos.62]

JUNOS Enterprise Software Suite [14.1X53-D27_vjunos.62]

JUNOS py-base-i386 [14.1X53-D27_vjunos.62]

JUNOS py-extensions-i386 [14.1X53-D27_vjunos.62]

JUNOS Host Software [14.1X53-D27_vjunos.62]

Junos for Automation Enhancement

JUNOS GUEST-VM Software [pfadiag_vm-rXXXXX-ve]

{master:0}

```

4. Issue the **request system software delete virtual-machine-package <package-name>** command to uninstall the Packet Flow Accelerator Diagnostics software.

```

root> request system software delete virtual-machine-package pfadiag_vm-rXXXXX-ve
fpc0:
-----

```

```
Deleted virtual-machine package dpfadiag_vm-rXXXXX-ve ...
```

**Related
Documentation**

- [Understanding Packet Flow Accelerator Diagnostics Software and Other Utilities on page 575](#)
- *Installing an Expansion Module in a QFX5100 Device*
- [Installing Ethernet and PTP Scripts on page 597](#)
- *Launching a Guest Virtual Machine (VM) to Run a Third Party Application on Junos OS Release 13.2X51-D20 and Later*
- *Installing Software Packages on QFX Devices*

PART 8

Monitoring Common Security Features

- [Displaying Real-Time Information from Device to Host on page 617](#)
- [Monitoring Security Policies on page 623](#)
- [Monitoring Application Layer Gateways Features on page 649](#)
- [Monitoring Interfaces and Switching Functions on page 675](#)
- [Monitoring NAT on page 695](#)
- [Monitoring Events, Services and System on page 707](#)
- [Monitoring Unified Threat Management Features on page 717](#)
- [Monitoring VPNs on page 731](#)

Displaying Real-Time Information from Device to Host

- [Displaying Real-Time Monitoring Information on page 617](#)
- [Displaying Multicast Path Information on page 619](#)

Displaying Real-Time Monitoring Information

To display real-time monitoring information about each device between the device and a specified destination host, enter the **traceroute monitor** command with the following syntax:

```
user@host> traceroute monitor host <count number> <inet | inet6> <interval seconds>
<no-resolve> <size bytes> <source source-address> <summary>
```

[Table 80 on page 617](#) describes the **traceroute monitor** command options.

Table 80: CLI traceroute monitor Command Options

Option	Description
<i>host</i>	Sends traceroute packets to the hostname or IP address you specify.
<i>count number</i>	(Optional) Limits the number of ping requests, in packets, to send in summary mode. If you do not specify a count, ping requests are continuously sent until you press Q.
<i>inet</i>	(Optional) Forces the traceroute packets to an IPv4 destination.
<i>inet6</i>	(Optional) Forces the traceroute packets to an IPv6 destination.
<i>interval seconds</i>	(Optional) Sets the interval between ping requests, in seconds. The default value is 1 second.
<i>no-resolve</i>	(Optional) Suppresses the display of the hostnames of the hops along the path.
<i>size bytes</i>	(Optional) Sets the size of the ping request packet. The size can be from 0 through 65,468 bytes. The default packet size is 64 bytes.
<i>source address</i>	(Optional) Uses the source address that you specify, in the traceroute packet.

Table 80: CLI traceroute monitor Command Options (continued)

Option	Description
summary	(Optional) Displays the summary traceroute information.

To quit the **traceroute monitor** command, press Q.

The following is sample output from a **traceroute monitor** command:

```
user@host> traceroute monitor host2
```

My traceroute [v0.69]									
host (0.0.0.0)(tos=0x0 psize=64 bitpattern=0x00)									
Wed Mar 14 23:14:11 2007									
Keys: Help Display mode Restart statistics Order of fields quit									
Pings								Packets	
Host								Loss%	Snt
Last	Avg	Best	Wrst	StDev					
1.	173.24.232.66								
9.4	8.6	4.8	9.9	2.1					
2.	173.24.232.66								
7.9	17.2	7.9	29.4	11.0					
3.	173.24.232.66								
9.9	9.3	8.7	9.9	0.5					
4.	173.24.232.66								
9.9	9.8	9.5	10.0	0.2					

Table 81 on page 618 summarizes the output fields of the display.

Table 81: CLI traceroute monitor Command Output Summary

Field	Description
host	Hostname or IP address of the device issuing the traceroute monitor command.
psize <i>size</i>	Size of ping request packet, in bytes.
Keys	
Help	Displays the Help for the CLI commands. Press H to display the Help.
Display mode	Toggles the display mode. Press D to toggle the display mode
Restart statistics	Restarts the traceroute monitor command. Press R to restart the traceroute monitor command.

Table 81: CLI `traceroute monitor` Command Output Summary (continued)

Field	Description
Order of fields	Sets the order of the displayed fields. Press O to set the order of the displayed fields.
quit	Quits the <code>traceroute monitor</code> command. Press Q to quit the <code>traceroute monitor</code> command.
Packets	
number	Number of the hop (device) along the route to the final destination host.
Host	Hostname or IP address of the device at each hop.
Loss%	Percent of packet loss. The number of ping responses divided by the number of ping requests, specified as a percentage.
Pings	
Snt	Number of ping requests sent to the device at this hop.
Last	Most recent round-trip time, in milliseconds, to the device at this hop.
Avg	Average round-trip time, in milliseconds, to the device at this hop.
Best	Shortest round-trip time, in milliseconds, to the device at this hop.
Wrst	Longest round-trip time, in milliseconds, to the device at this hop.
StDev	Standard deviation of round-trip times, in milliseconds, to the device at this hop.

Related Documentation • [Displaying Log and Trace Files on page 1194](#)

Displaying Multicast Path Information

To display information about a multicast path from a source to the device, enter the `mtrace from-source` command with the following syntax:

```
user@host> mtrace from-source source host <extra-hops number> <group address>
<interval seconds> <max-hops number> <max-queries number> <response host>
<routing-instance routing-instance-name> <ttl number> <wait-time seconds> <loop>
<multicast-response | unicast-response> <no-resolve> <no-router-alert> <brief |
detail>
```

[Table 82 on page 620](#) describes the `mtrace from-source` command options.

Table 82: CLI *mtrace from-source* Command Options

Option	Description
source host	Traces the path to the specified hostname or IP address.
extra-hops number	(Optional) Sets the number of extra hops to trace past nonresponsive devices. Specify a value from 0 through 255 .
group address	(Optional) Traces the path for the specified group address. The default value is 192.0.2.0 .
interval seconds	(Optional) Sets the interval between statistics gathering. The default value is 10 .
max-hops number	(Optional) Sets the maximum number of hops to trace toward the source. Specify a value from 0 through 255 . The default value is 32 .
max-queries number	(Optional) Sets the maximum number of query attempts for any hop. Specify a value from 1 through 32 . The default value is 3 .
response host	(Optional) Sends the response packets to the specified hostname or IP address. By default, the response packets are sent to the device.
routing-instance routing-instance-name	(Optional) Traces the routing instance you specify.
ttl number	(Optional) Sets the time-to-live (TTL) value in the IP header of the query packets. Specify a hop count from 0 through 255 . The default value for local queries to the all routers multicast group is 1 . Otherwise, the default value is 127 .
wait-time seconds	(Optional) Sets the time to wait for a response packet. The default value is 3 seconds.
loop	(Optional) Loops indefinitely, displaying rate and loss statistics. To quit the mtrace command, press Ctrl-C.
multicast-response	(Optional) Forces the responses to use multicast.
unicast-response	(Optional) Forces the response packets to use unicast.
no-resolve	(Optional) Does not display hostnames.
no-router-alert	(Optional) Does not use the device alert IP option in the IP header.
brief	(Optional) Does not display packet rates and losses.
detail	(Optional) Displays packet rates and losses if a group address is specified.

The following is sample output from the **mtrace from-source** command:

```

user@host> mtrace from-source source 192.1.4.1 group 224.1.1.1

Mtrace from 192.1.4.1 to 192.1.30.2 via group 224.1.1.1 Querying full reverse
path... * * 0 ? (192.1.30.2) -1 ? (192.1.30.1) PIM thresh^ 1 -2
routerC.mycompany.net (192.1.40.2) PIM thresh^ 1 -3 hostA.mycompany.net
(192.1.4.1) Round trip time 22 ms; total ttl of 2 required. Waiting to accumulate
statistics...Results after 10 seconds:
Source Response Dest Overall
Packet Statistics For Traffic From 192.1.4.1 192.1.30.2 Packet
192.1.4.1 To 224.1.1.1 v _/ rtt 16 ms Rate Lost/Sent =
Pct Rate 192.168.195.37 192.1.40.2 routerC.mycompany.net v ^
ttl 2 0/0 = -- 0 pps 192.1.40.1 192.1.30.1
? v \ ttl 3 ?/0
0 pps 192.1.30.2 192.1.30.2 Receiver Query Source

```

Each line of the trace display is usually in the following format (depending on the options selected and the responses from the devices along the path):

```

hop-number host (ip-address) protocolttl

```

Table 83 on page 621 summarizes the output fields of the display.



NOTE: The packet statistics gathered from Juniper Networks devices and routing nodes always display as 0.

Table 83: CLI mtrace from-source Command Output Summary

Field	Description
hop-number	Number of the hop (device) along the path.
host	Hostname, if available, or IP address of the device. If the no-resolve option was entered in the command, the hostname is not displayed.
ip-address	IP address of the device.
protocol	Protocol used.
ttl	TTL threshold.
Round trip time milliseconds ms	Total time between the sending of the query packet and the receiving of the response packet.
total ttl of number required	Total number of hops required to reach the source.
Source	Source IP address of the response packet.
Response Dest	Response destination IP address.
Overall	Average packet rate for all traffic at each hop.

Table 83: CLI mtrace from-source Command Output Summary (continued)

Field	Description
Packet Statistics For Traffic From	Number of packets lost, number of packets sent, percentage of packets lost, and average packet rate at each hop.
Receiver	IP address receiving the multicast packets.
Query Source	IP address of the host sending the query packets.

Related Documentation • [Monitoring Overview on page 15](#)

Monitoring Security Policies

- [Monitoring Security Policy Statistics on page 623](#)
- [Monitoring Routing Information on page 624](#)
- [Monitoring Security Events by Policy on page 631](#)
- [Monitoring Security Features on page 633](#)

Monitoring Security Policy Statistics

Purpose Monitor and record traffic that Junos OS permits or denies based on previously configured policies.

Action To monitor traffic, enable the count and log options.

Count—Configurable in an individual policy. If count is enabled, statistics are collected for sessions that enter the device for a given policy, and for the number of packets and bytes that pass through the device in both directions for a given policy. For counts (only for packets and bytes), you can specify that alarms be generated whenever the traffic exceeds specified thresholds. See [count \(Security Policies\)](#).

Log—Logging capability can be enabled with security policies during session initialization (**session-init**) or session close (**session-close**) stage. See [log \(Security Policies\)](#).

- To view logs from denied connections, enable log on **session-init**.
- To log sessions after their conclusion/tear-down, enable log on **session-close**.



NOTE: Session log is enabled at real time in the flow code which impacts the user performance. If both **session-close** and **session-init** are enabled, performance is further degraded as compared to enabling **session-init** only.

For details about information collected for session logs, see *Information Provided in Session Log Entries for SRX Series Services Gateways*.

Monitoring Routing Information

This section contains the following topics:

- [Monitoring Route Information on page 624](#)
- [Monitoring RIP Routing Information on page 626](#)
- [Monitoring OSPF Routing Information on page 627](#)
- [Monitoring BGP Routing Information on page 629](#)

Monitoring Route Information

Purpose View information about the routes in a routing table, including destination, protocol, state, and parameter information.

Action Select **Monitor>Routing>Route Information** in the J-Web user interface, or enter the following CLI commands:

- **show route terse**
- **show route detail**



NOTE: When you use an HTTPS connection in the Microsoft Internet Explorer browser to save a report from this page in the J-Web interface, the error message "Internet Explorer was not able to open the Internet site" is displayed. This problem occurs because the Cache-Control: no cache HTTP header is added on the server side and Internet Explorer does not allow you to download the encrypted file with the Cache-Control: no cache HTTP header set in the response from the server.

As a workaround, refer to Microsoft Knowledge Base article 323308, which is available at this URL: <http://support.microsoft.com/kb/323308>. Also, you can alternatively use HTTP in the Internet Explorer browser or use HTTPS in the Mozilla Firefox browser to save a file from this page.

[Table 84 on page 624](#) describes the different filters, their functions, and the associated actions.

[Table 85 on page 625](#) summarizes key output fields in the routing information display.

Table 84: Filtering Route Messages

Field	Function	Your Action
Destination Address	Specifies the destination address of the route.	Enter the destination address.
Protocol	Specifies the protocol from which the route was learned.	Enter the protocol name.

Table 84: Filtering Route Messages (continued)

Field	Function	Your Action
Next hop address	Specifies the network layer address of the directly reachable neighboring system (if applicable) and the interface used to reach it.	Enter the next hop address.
Receive protocol	Specifies the dynamic routing protocol using which the routing information was received through a particular neighbor.	Enter the routing protocol.
Best route	Specifies only the best route available.	Select the view details of the best route.
Inactive routes	Specifies the inactive routes.	Select the view details of inactive routes.
Exact route	Specifies the exact route.	Select the view details of the exact route.
Hidden routes	Specifies the hidden routes.	Select the view details of hidden routes.
Search	Applies the specified filter and displays the matching messages.	To apply the filter and display messages, click Search .
Reset	Resets selected options to default	To reset the filter, click Reset .

Table 85: Summary of Key Routing Information Output Fields

Field	Values	Additional Information
Static Route Addresses	The list of static route addresses.	—
Protocol	Protocol from which the route was learned: Static , Direct , Local , or the name of a particular protocol.	—
Preference	The preference is the individual preference value for the route.	The route preference is used as one of the route selection criteria.
Next-Hop	Network Layer address of the directly reachable neighboring system (if applicable) and the interface used to reach it.	<p>If a next hop is listed as Discard, all traffic with that destination address is discarded rather than routed. This value generally means that the route is a static route for which the discard attribute has been set.</p> <p>If a next hop is listed as Reject, all traffic with that destination address is rejected. This value generally means that the address is unreachable. For example, if the address is a configured interface address and the interface is unavailable, traffic bound for that address is rejected.</p> <p>If a next hop is listed as Local, the destination is an address on the host (either the loopback address or Ethernet management port 0 address, for example).</p>

Table 85: Summary of Key Routing Information Output Fields (continued)

Field	Values	Additional Information
Age	How long the route has been active.	—
State	Flags for this route.	There are many possible flags.
AS Path	<p>AS path through which the route was learned. The letters of the AS path indicate the path origin:</p> <ul style="list-style-type: none"> • I—IGP. • E—EGP. • ?—Incomplete. Typically, the AS path was aggregated. 	—

- See Also**
- [Monitoring RIP Routing Information on page 626](#)
 - [Monitoring OSPF Routing Information on page 627](#)
 - [Monitoring BGP Routing Information on page 629](#)

Monitoring RIP Routing Information

Purpose View RIP routing information, including a summary of RIP neighbors and statistics.

Action Select **Monitor>Routing>RIP Information** in the J-Web user interface, or enter the following CLI commands:

- **show rip statistics**
- **show rip neighbors**

[Table 86 on page 626](#) summarizes key output fields in the RIP routing display in the J-Web user interface.

Table 86: Summary of Key RIP Routing Output Fields

Field	Values	Additional Information
RIP Statistics		
Protocol Name	The RIP protocol name.	—
Port number	The port on which RIP is enabled.	—
Hold down time	The interval during which routes are neither advertised nor updated.	—
Global routes learned	Number of RIP routes learned on the logical interface.	—

Table 86: Summary of Key RIP Routing Output Fields (continued)

Field	Values	Additional Information
Global routes held down	Number of RIP routes that are not advertised or updated during the hold-down interval.	—
Global request dropped	Number of requests dropped.	—
Global responses dropped	Number of responses dropped.	—
RIP Neighbors		
Details	Tab used to view the details of the interface on which RIP is enabled.	—
Neighbor	Name of the RIP neighbor.	This value is the name of the interface on which RIP is enabled. Click the name to see the details for this neighbor.
State	State of the RIP connection: Up or Dn (Down).	—
Source Address	Local source address.	This value is the configured address of the interface on which RIP is enabled.
Destination Address	Destination address.	This value is the configured address of the immediate RIP adjacency.
Send Mode	The mode of sending RIP messages.	—
Receive Mode	The mode in which messages are received.	—
In Metric	Value of the incoming metric configured for the RIP neighbor.	—

- See Also**
- [Monitoring Route Information on page 624](#)
 - [Monitoring OSPF Routing Information on page 627](#)
 - [Monitoring BGP Routing Information on page 629](#)

Monitoring OSPF Routing Information

Purpose View OSPF routing information, including a summary of OSPF neighbors, interfaces, and statistics.

Action Select **Monitor>Routing>OSPF Information** in the J-Web user interface, or enter the following CLI commands:

- **show ospf neighbors**
- **show ospf interfaces**
- **show ospf statistics**

Table 87 on page 628 summarizes key output fields in the OSPF routing display in the J-Web user interface.

Table 87: Summary of Key OSPF Routing Output Fields

Field	Values	Additional Information
OSPF Interfaces		
Details	Tab used to view the details of the selected OSPF.	–
Interface	Name of the interface running OSPF.	–
State	State of the interface: BDR , Down , DR , DROther , Loop , PtToPt , or Waiting .	The Down state, indicating that the interface is not functioning, and PtToPt state, indicating that a point-to-point connection has been established, are the most common states.
Area	Number of the area that the interface is in.	–
DR ID	ID of the area's designated device.	–
BDR ID	ID of the area's backup designated device.	–
Neighbors	Number of neighbors on this interface.	–
OSPF Statistics		
Packets tab		
Sent	Displays the total number of packets sent.	–
Received	Displays the total number of packets received.	–
Details tab		
Flood Queue Depth	Number of entries in the extended queue.	–
Total Retransmits	Number of retransmission entries enqueued.	–
Total Database Summaries	Total number of database description packets.	–
OSPF Neighbors		
Address	Address of the neighbor.	–
Interface	Interface through which the neighbor is reachable.	–

Table 87: Summary of Key OSPF Routing Output Fields (continued)

Field	Values	Additional Information
State	State of the neighbor: Attempt , Down , Exchange , ExStart , Full , Init , Loading , or 2way .	Generally, only the Down state, indicating a failed OSPF adjacency, and the Full state, indicating a functional adjacency, are maintained for more than a few seconds. The other states are transitional states that a neighbor is in only briefly while an OSPF adjacency is being established.
ID	ID of the neighbor.	–
Priority	Priority of the neighbor to become the designated router.	–
Activity Time	The activity time.	–
Area	Area that the neighbor is in.	–
Options	Option bits received in the hello packets from the neighbor.	–
DR Address	Address of the designated router.	–
BDR Address	Address of the backup designated router.	–
Uptime	Length of time since the neighbor came up.	–
Adjacency	Length of time since the adjacency with the neighbor was established.	–

- See Also**
- [Monitoring Route Information on page 624](#)
 - [Monitoring RIP Routing Information on page 626](#)
 - [Monitoring BGP Routing Information on page 629](#)

Monitoring BGP Routing Information

- Purpose** Monitor BGP routing information on the routing device, including a summary of BGP routing and neighbor information.
- Action** Select **Monitor>Routing>BGP Information** in the J-Web user interface, or enter the following CLI commands:
- **show bgp summary**
 - **show bgp neighbor**

Table 88 on page 630 summarizes key output fields in the BGP routing display in the J-Web user interface.

Table 88: Summary of Key BGP Routing Output Fields

Field	Values	Additional Information
BGP Peer Summary		
Total Groups	Number of BGP groups.	–
Total Peers	Number of BGP peers.	–
Down Peers	Number of unavailable BGP peers.	–
Unconfigured Peers	Address of each BGP peer.	–
RIB Summary tab		
RIB Name	Name of the RIB group.	–
Total Prefixes	Total number of prefixes from the peer, both active and inactive, that are in the routing table.	–
Active Prefixes	Number of prefixes received from the EBGP peers that are active in the routing table.	–
Suppressed Prefixes	Number of routes received from EBGP peers currently inactive because of damping or other reasons.	–
History Prefixes	History of the routes received or suppressed.	–
Dumped Prefixes	Number of routes currently inactive because of damping or other reasons. These routes do not appear in the forwarding table and are not exported by routing protocols.	–
Pending Prefixes	Number of pending routes.	–
State	Status of the graceful restart process for this routing table: BGP restart is complete, BGP restart in progress, VPN restart in progress, or VPN restart is complete.	–
BGP Neighbors		
Details	Click this button to view the selected BGP neighbor details.	–
Peer Address	Address of the BGP neighbor.	–
Autonomous System	AS number of the peer.	–

Table 88: Summary of Key BGP Routing Output Fields (continued)

Field	Values	Additional Information
Peer State	<p>Current state of the BGP session:</p> <ul style="list-style-type: none"> • Active—BGP is initiating a TCP connection in an attempt to connect to a peer. If the connection is successful, BGP sends an open message. • Connect—BGP is waiting for the TCP connection to become complete. • Established—The BGP session has been established, and the peers are exchanging BGP update messages. • Idle—This is the first stage of a connection. BGP is waiting for a Start event. • OpenConfirm—BGP has acknowledged receipt of an open message from the peer and is waiting to receive a keepalive or notification message. • OpenSent—BGP has sent an open message and is waiting to receive an open message from the peer. 	<p>Generally, the most common states are Active, which indicates a problem establishing the BGP connection, and Established, which indicates a successful session setup. The other states are transition states, and BGP sessions normally do not stay in those states for extended periods of time.</p>
Elapsed Time	Elapsed time since the peering session was last reset.	—
Description	Description of the BGP session.	—

- See Also**
- [Monitoring Route Information on page 624](#)
 - [Monitoring RIP Routing Information on page 626](#)
 - [Monitoring OSPF Routing Information on page 627](#)

- Related Documentation**
- [Monitoring Overview on page 15](#)
 - [Monitoring Interfaces on page 680](#)

Monitoring Security Events by Policy

Purpose Monitor security events by policy and display logged event details with the J-Web user interface.

Action To monitor security events by policy:

1. Select one of the following in the J-Web user interface:
 - If you are using SRX5400, SRX5600, or SRX5800 platforms, select **Monitor>Events and Alarms>Security Events**.

- Select **Monitor>Alarms>Policy Log**.

The View Policy Log pane appears. [Table 89 on page 632](#) describes the content of this pane.

Table 89: View Policy Log Fields

Field	Value
Log file name	Name of the event log files to search.
Policy name	Name of the policy of the events to be retrieved.
Source address	Source address of the traffic that triggered the event.
Destination address	Destination address of the traffic that triggered the event.
Event type	Type of event that was triggered by the traffic.
Application	Application of the traffic that triggered the event.
Source port	Source port of the traffic that triggered the event.
Destination port	Destination port of the traffic that triggered the event.
Source zone	Source zone of the traffic that triggered the event.
Destination zone	Destination zone of the traffic that triggered the event.
Source NAT rule	Source NAT rule of the traffic that triggered the event.
Destination NAT rule	Destination NAT rule of the traffic that triggered the event.
Is global policy	Specifies that the policy is a global policy.

If your device is not configured to store session log files locally, the Create log configuration button is displayed in the lower-right portion of the View Policy Log pane.

- To store session log files locally, click **Create log configuration**.

If session logs are being sent to an external log collector (stream mode has been configured for log files), a message appears indicating that event mode must be configured to view policy logs.



NOTE: Reverting to event mode will discontinue event logging to the external log collector.

- To reset the **mode** option to **event**, enter the **set security log** command.
2. Enter one or more search fields in the View Policy Log pane and click **Search** to display events matching your criteria.

For example, enter the event type **Session Close** and the policy **pol1** to display event details from all Session Close logs that contain the specified policy. To reduce search results further, add more criteria about the particular event or group of events that you want displayed.

The Policy Events Detail pane displays information from each matching session log. [Table 90 on page 633](#) describes the contents of this pane.

Table 90: Policy Events Detail Fields

Field	Value
Timestamp	Time when the event occurred.
Policy name	Policy that triggered the event.
Record type	Type of event log providing the data.
Source IP/Port	Source address (and port, if applicable) of the event traffic.
Destination IP/Port	Destination address (and port, if applicable) of the event traffic.
Service name	Service name of the event traffic.
NAT source IP/Port	NAT source address (and port, if applicable) of the event traffic.
NAT destination IP/Port	NAT destination address (and port, if applicable) of the event traffic.

- Related Documentation**
- [Monitoring Overview on page 15](#)
 - [Monitoring Interfaces on page 680](#)
 - [Monitoring Alarms on page 478](#)
 - [Monitoring Events on page 707](#)

Monitoring Security Features

This section contains the following topics:

- [Monitoring Policies on page 634](#)
- [Checking Policies on page 636](#)
- [Monitoring Screen Counters on page 639](#)
- [Monitoring IDP Status on page 642](#)

- [Monitoring Flow Gate Information on page 643](#)
- [Monitoring Firewall Authentication Table on page 644](#)
- [Monitoring Firewall Authentication History on page 646](#)
- [Monitoring 802.1x on page 647](#)

Monitoring Policies

Purpose Display, sort, and review policy activity for every activated policy configured on the device. Policies are grouped by Zone Context (the from and to zones of the traffic) to control the volume of data displayed at one time. From the policy list, select a policy to display statistics and current network activity.

Action To review policy activity:

1. Select **Monitor>Security>Policy>Activities** in the J-Web user interface. The Security Policies Monitoring page appears and lists the policies from the first Zone Context. See [Table 91 on page 634](#) for field descriptions.
2. Select the **Zone Context** of the policy you want to monitor, and click **Filter**. All policies within the zone context appear in match sequence.
3. Select a policy, and click **Clear Statistics** to set all counters to zero for the selected policy.

Table 91: Security Policies Monitoring Output Fields

Field	Value	Additional Information
Zone Context (Total #)	Displays a list of all from and to zone combinations for the configured policies. The total number of active policies for each context is specified in the Total # field. By default, the policies from the first Zone Context are displayed.	To display policies for a different context, select a zone context and click Filter . Both inactive and active policies appear for each context. However, the Total # field for a context specifies the number of active policies only.
Default Policy action	Specifies the action to take for traffic that does not match any of the policies in the context: <ul style="list-style-type: none"> • permit-all—Permit all traffic that does not match a policy. • deny-all—Deny all traffic that does not match a policy. 	—
From Zone	Displays the source zone to be used as match criteria for the policy.	—
To Zone	Displays the destination zone to be used as match criteria for the policy.	—
Name	Displays the name of the policy.	—

Table 91: Security Policies Monitoring Output Fields (continued)

Field	Value	Additional Information
Source Address	Displays the source addresses to be used as match criteria for the policy. Address sets are resolved to their individual names. (In this case, only the names are given, not the IP addresses).	—
Destination Address	Displays the destination addresses (or address sets) to be used as match criteria for the policy. Addresses are entered as specified in the destination zone's address book.	—
Source Identity	Displays the name of the source identities set for the policy.	To display the value of the source identities, hover the mouse on this field. Unknown source identities are also displayed.
Application	Displays the name of a predefined or custom application signature to be used as match criteria for the policy.	—
Dynamic App	<p>Displays the dynamic application signatures to be used as match criteria if an application firewall rule set is configured for the policy.</p> <p>For a network firewall, a dynamic application is not defined.</p>	<p>The rule set appears in two lines. The first line displays the configured dynamic application signatures in the rule set. The second line displays the default dynamic application signature.</p> <p>If more than two dynamic application signatures are specified for the rule set, hover over the output field to display the full list in a tooltip.</p>
Action	<p>Displays the action portion of the rule set if an application firewall rule set is configured for the policy.</p> <ul style="list-style-type: none"> • permit—Permits access to the network services controlled by the policy. A green background signifies permission. • deny—Denies access to the network services controlled by the policy. A red background signifies denial. 	The action portion of the rule set appears in two lines. The first line identifies the action to be taken when the traffic matches a dynamic application signature. The second line displays the default action when traffic does not match a dynamic application signature.
NW Services	<p>Displays the network services permitted or denied by the policy if an application firewall rule set is configured. Network services include:</p> <ul style="list-style-type: none"> • gprs-gtp-profile—Specify a GPRS Tunneling Protocol profile name. • idp—Perform intrusion detection and prevention. • redirect-wx—Set WX redirection. • reverse-redirect-wx—Set WX reverse redirection. • uac-policy—Enable unified access control enforcement of the policy. 	—

Table 91: Security Policies Monitoring Output Fields (continued)

Field	Value	Additional Information
Policy Hit Counters Graph	Provides a representation of the value over time for a specified counter. The graph is blank if Policy Counters indicates no data. As a selected counter accumulates data, the graph is updated at each refresh interval.	To toggle a graph on and off, click the counter name below the graph.
Policy Counters	<p>Lists statistical counters for the selected policy if Count is enabled. The following counters are available for each policy:</p> <ul style="list-style-type: none"> • input-bytes • input-byte-rate • output-bytes • output-byte-rate • input-packets • input-packet-rate • output-packets • output-packet-rate • session-creations • session-creation-rate • active-sessions 	To graph or to remove a counter from the Policy Hit Counters Graph, toggle the counter name. The names of enabled counters appear below the graph.

- See Also**
- [Checking Policies on page 636](#)
 - [Monitoring Screen Counters on page 639](#)

Checking Policies

Purpose Enter match criteria and conduct a policy search. The search results include all policies that match the traffic criteria in the sequence in which they will be encountered.

Because policy matches are listed in the sequence in which they would be encountered, you can determine whether a specific policy is being applied correctly or not. The first policy in the list is applied to all matching traffic. Policies listed after this one remain in the “shadow” of the first policy and are never encountered by this traffic.

By manipulating the traffic criteria and policy sequence, you can tune policy application to suit your needs. During policy development, you can use this feature to establish the appropriate sequence of policies for optimum traffic matches. When troubleshooting, use this feature to determine if specific traffic is encountering the appropriate policy.

- Action**
1. Select **Monitor>Security>Policy>Shadow Policies** in the J-Web user interface. The Check Policies page appears. [Table 92 on page 637](#) explains the content of this page.
 2. In the top pane, enter the From Zone and To Zone to supply the context for the search.

3. Enter match criteria for the traffic, including the source address and port, the destination address and port, and the protocol of the traffic.
4. Enter the number of matching policies to display.
5. Click **Search** to find policies matching your criteria. The lower pane displays all policies matching the criteria up to the number of policies you specified.
 - The first policy will be applied to all traffic with this match criteria.
 - Remaining policies will not be encountered by any traffic with this match criteria.
6. To manipulate the position and activation of a policy, select the policy and click the appropriate button:
 - **Move**—Moves the selected policy up or down to position it at a more appropriate point in the search sequence.
 - **Move to**—Moves the selected policy by allowing you to drag and drop it to a different location on the same page.

Table 92: Check Policies Output

Field	Function
Check Policies Search Input Pane	
From Zone	Name or ID of the source zone. If a From Zone is specified by name, the name is translated to its ID internally.
To Zone	Name or ID of the destination zone. If a To Zone is specified by name, the name is translated to its ID internally.
Source Address	Address of the source in IP notation.
Source Port	Port number of the source.
Destination Address	Address of the destination in IP notation.
Destination Port	Port number of the destination.
Source Identity	Name of the source identity.

Table 92: Check Policies Output (continued)

Field	Function
Protocol	Name or equivalent value of the protocol to be matched. ah —51 egp —8 esp —50 gre —47 icmp —1 igmp —2 igp —9 ipip —94 ipv6 —41 ospf —89 pgm —113 pim —103 rdp —27 rsvp —46 sctp —132 tcp —6 udp —17 vrrp —112
Result Count	(Optional) Number of policies to display. Default value is 1. Maximum value is 16.
Check Policies List	
From Zone	Name of the source zone.
To Zone	Name of the destination zone.
Total Policies	Number of policies retrieved.
Default Policy action	The action to be taken if no match occurs.
Name	Policy name

Table 92: Check Policies Output (continued)

Field	Function
Source Address	Name of the source address (not the IP address) of a policy. Address sets are resolved to their individual names.
Destination Address	Name of the destination address or address set. A packet's destination address must match this value for the policy to apply to it.
Source Identity	Name of the source identity for the policy.
Application	Name of a preconfigured or custom application of the policy match.
Action	Action taken when a match occurs as specified in the policy.
Hit Counts	Number of matches for this policy. This value is the same as the Policy Lookups in a policy statistics report.
Active Sessions	Number of active sessions matching this policy.

Alternatively, to list matching policies using the CLI, enter the **show security match-policies** command and include your match criteria and the number of matching policies to display.

- See Also**
- [Monitoring Policies on page 634](#)
 - [Monitoring Screen Counters on page 639](#)

Monitoring Screen Counters

Purpose View screen statistics for a specified security zone.

Action Select **Monitor>Security>Screen Counters** in the J-Web user interface, or enter the following CLI command:

```
show security screen statistics zone zone-name
```

[Table 93 on page 639](#) summarizes key output fields in the screen counters display.

Table 93: Summary of Key Screen Counters Output Fields

Field	Values	Additional Information
Zones		
ICMP Flood	Internet Control Message Protocol (ICMP) flood counter.	An ICMP flood typically occurs when ICMP echo requests use all resources in responding, such that valid network traffic can no longer be processed.

Table 93: Summary of Key Screen Counters Output Fields (continued)

Field	Values	Additional Information
UDP Flood	User Datagram Protocol (UDP) flood counter.	UDP flooding occurs when an attacker sends IP packets containing UDP datagrams with the purpose of slowing down the resources, such that valid connections can no longer be handled.
TCP Winnuke	Number of Transport Control Protocol (TCP) WinNuke attacks.	WinNuke is a denial-of-service (DoS) attack targeting any computer on the Internet running Windows.
TCP Port Scan	Number of TCP port scans.	The purpose of this attack is to scan the available services in the hopes that at least one port will respond, thus identifying a service to target.
ICMP Address Sweep	Number of ICMP address sweeps.	An IP address sweep can occur with the intent of triggering responses from active hosts.
IP Tear Drop	Number of teardrop attacks.	Teardrop attacks exploit the reassembly of fragmented IP packets.
TCP SYN Attack	Number of TCP SYN attacks.	—
IP Spoofing	Number of IP spoofs.	IP spoofing occurs when an invalid source address is inserted in the packet header to make the packet appear to come from a trusted source.
ICMP Ping of Death	ICMP ping of death counter.	Ping of death occurs when IP packets are sent that exceed the maximum legal length (65,535 bytes).
IP Source Route	Number of IP source route attacks.	—
TCP Land Attack	Number of land attacks.	Land attacks occur when attacker sends spoofed SYN packets containing the IP address of the victim as both the destination and source IP address.
TCP SYN Fragment	Number of TCP SYN fragments.	—
TCP No Flag	Number of TCP headers without flags set.	A normal TCP segment header has at least one control flag set.
IP Unknown Protocol	Number of unknown Internet protocols.	—
IP Bad Options	Number of invalid options.	—
IP Record Route Option	Number of packets with the IP record route option enabled.	This option records the IP addresses of the network devices along the path that the IP packet travels.

Table 93: Summary of Key Screen Counters Output Fields (continued)

Field	Values	Additional Information
IP Timestamp Option	Number of IP timestamp option attacks.	This option records the time (in Universal Time) when each network device receives the packet during its trip from the point of origin to its destination.
IP Security Option	Number of IP security option attacks.	–
IP Loose route Option	Number of IP loose route option attacks.	This option specifies a partial route list for a packet to take on its journey from source to destination.
IP Strict Source Route Option	Number of IP strict source route option attacks.	This option specifies the complete route list for a packet to take on its journey from source to destination.
IP Stream Option	Number of stream option attacks.	This option provides a way for the 16-bit SATNET stream identifier to be carried through networks that do not support streams.
ICMP Fragment	Number of ICMP fragments.	Because ICMP packets contain very short messages, there is no legitimate reason for ICMP packets to be fragmented. If an ICMP packet is so large that it must be fragmented, something is amiss.
ICMP Large Packet	Number of large ICMP packets.	–
TCP SYN FIN Packet	Number of TCP SYN FIN packets.	–
TCP FIN without ACK	Number of TCP FIN flags without the acknowledge (ACK) flag.	–
TCP SYN-ACK-ACK Proxy	Number of TCP flags enabled with SYN-ACK-ACK.	To prevent flooding with SYN-ACK-ACK sessions, you can enable the SYN-ACK-ACK proxy protection screen option. After the number of connections from the same IP address reaches the SYN-ACK-ACK proxy threshold, Junos OS rejects further connection requests from that IP address.
IP Block Fragment	Number of IP block fragments.	–

See Also

- [Monitoring Policies on page 634](#)
- [Checking Policies on page 636](#)

Monitoring IDP Status

Purpose View detailed information about the IDP Status, Memory, Counters, Policy Rulebase Statistics, and Attack table statistics.

Action To view Intrusion Detection and Prevention (IDP) table information, do one of the following:

- If you are using SRX5400, SRX5600, or SRX5800 platforms, select **Monitor>Security>IDP>Status** in the J-Web user interface, or enter the following CLI commands:

show security idp status

show security idp memory

- Select **Monitor>Security>IPS>Status** in the J-Web user interface.

[Table 94 on page 642](#) summarizes key output fields in the IDP display.

Table 94: Summary of IDP Status Output Fields

Field	Values	Additional Information
IDP Status		
Status of IDP	Displays the status of the current IDP policy.	—
Up Since	Displays the time from when the IDP policy first began running on the system.	—
Packets/Second	Displays the number of packets received and returned per second.	—
Peak	Displays the maximum number of packets received per second and the time when the maximum was reached.	—
Kbits/Second	Displays the aggregated throughput (kilobits per second) for the system.	—
Peak Kbits	Displays the maximum kilobits per second and the time when the maximum was reached.	—
Latency (Microseconds)	Displays the delay, in microseconds, for a packet to receive and return by a node .	—
Current Policy	Displays the name of the current installed IDP policy.	—
IDP Memory Status		
IDP Memory Statistics	Displays the status of all IDP data plane memory.	—

Table 94: Summary of IDP Status Output Fields (continued)

Field	Values	Additional Information
PIC Name	Displays the name of the PIC.	—
Total IDP Data Plane Memory (MB)	Displays the total memory space, in megabytes, allocated for the IDP data plane.	—
Used (MB)	Displays the used memory space, in megabytes, for the data plane.	—
Available (MB)	Displays the available memory space, in megabytes, for the data plane.	—

See Also • *Monitoring Flow Session Statistics*

Monitoring Flow Gate Information

Purpose View information about temporary openings known as pinholes or gates in the security firewall.

Action Select **Monitor>Security>Flow Gate** in the J-Web user interface, or enter the **show security flow gate** command.

Table 95 on page 643 summarizes key output fields in the flow gate display.

Table 95: Summary of Key Flow Gate Output Fields

Field	Values	Additional Information
Flow Gate Information		
Hole	Range of flows permitted by the pinhole.	—
Translated	Tuples used to create the session if it matches the pinhole: <ul style="list-style-type: none"> • Source address and port • Destination address and port 	—
Protocol	Application protocol, such as UDP or TCP.	—
Application	Name of the application.	—
Age	Idle timeout for the pinhole.	—
Flags	Internal debug flags for pinhole.	—
Zone	Incoming zone.	—

Table 95: Summary of Key Flow Gate Output Fields (continued)

Field	Values	Additional Information
Reference count	Number of resource manager references to the pinhole.	—
Resource	Resource manager information about the pinhole.	—

- See Also**
- *Monitoring Flow Session Statistics*
 - *Monitoring Firewall Authentication*

Monitoring Firewall Authentication Table

Purpose View information about the authentication table, which divides firewall authentication user information into multiple parts.

Action Select **Monitor>Security>Firewall Authentication>Authentication Table** in the J-Web user interface. To view detailed information about the user with a particular identifier, select the ID on the Authentication Table page. To view detailed information about the user at a particular source IP address, select the Source IP on the Authentication Table page.

Alternatively, enter the following CLI **show** commands:

- **show security firewall-authentication users**
- **show security firewall-authentication users address *ip-address***
- **show security firewall-authentication users identifier *identifier***

Table 96 on page 644 summarizes key output fields in firewall authentication table display.

Table 96: Summary of Key Firewall Authentication Table Output Fields

Field	Values	Additional Information
Firewall authentication users		
Total users in table	Number of users in the authentication table.	—
Authentication table		
ID	Authentication identification number.	—
Source Ip	IP address of the authentication source.	—
Age	Idle timeout for the user.	—
Status	Status of authentication (success or failure).	—
user	Name of the user.	—

Table 96: Summary of Key Firewall Authentication Table Output Fields (continued)

Field	Values	Additional Information
Detailed report per ID selected: ID		
Source Zone	Name of the source zone.	—
Destination Zone	Name of the destination zone.	—
profile	Name of the profile.	Users information.
Authentication method	Path chosen for authentication.	—
Policy Id	Policy Identifier.	—
Interface name	Name of the interface.	—
Bytes sent by this user	Number of packets in bytes sent by this user.	—
Bytes received by this user	Number of packets in bytes received by this user.	—
Client-groups	Name of the client group.	—
Detailed report per Source Ip selected		
Entries from Source IP	IP address of the authentication source.	—
Source Zone	Name of the source zone.	—
Destination Zone	Name of the destination zone.	—
profile	Name of the profile.	—
Age	Idle timeout for the user.	—
Status	Status of authentication (success or failure).	—
user	Name of the user.	—
Authentication method	Path chosen for authentication.	—
Policy Id	Policy Identifier.	—
Interface name	Name of the interface.	—
Bytes sent by this user	Number of packets in bytes sent by this user.	—
Bytes received by this user	Number of packets in bytes received by this user.	—
Client-groups	Name of the client group.	—

Monitoring Firewall Authentication History

Purpose View information about the authentication history, which is divided into multiple parts.

Action Select **Monitor>Security>Firewall Authentication>Authentication History** in the J-Web user interface. To view the detailed history of the authentication with this identifier, select the ID on the Firewall Authentication History page. To view a detailed authentication history of this source IP address, select the Source IP on the Firewall Authentication History page.

Alternatively, enter the following CLI **show** commands:

- **show security firewall-authentication history**
- **show security firewall-authentication history address *ip-address***
- **show security firewall-authentication history identifier *identifier***

[Table 97 on page 646](#) summarizes key output fields in firewall authentication history display.

Table 97: Summary of Key Firewall Authentication History Output Fields

Field	Values	Additional Information
History of Firewall Authentication Data		
Total authentications	Number of authentication.	—
History Table		
ID	Identification number.	—
Source Ip	IP address of the authentication source.	—
Start Date	Authentication date.	—
Start Time	Authentication time.	—
Duration	Authentication duration.	—
Status	Status of authentication (success or failure).	—
User	Name of the user.	—
Detail history of selected Id: <i>ID</i>		
Authentication method	Path chosen for authentication.	—
Policy Id	Security policy identifier.	—
Source zone	Name of the source zone.	—

Table 97: Summary of Key Firewall Authentication History Output Fields (continued)

Field	Values	Additional Information
Destination Zone	Name of the destination zone.	—
Interface name	Name of the interface.	—
Bytes sent by this user	Number of packets in bytes sent by this user.	—
Bytes received by this user	Number of packets in bytes received by this user.	—
Client-groups	Name of the client group.	—
Detail history of selected Source Ip:Source Ip		
User	Name of the user.	—
Start Date	Authentication date.	—
Start Time	Authentication time.	—
Duration	Authentication duration.	—
Status	Status of authentication (success or failure).	—
Profile	Name of the profile.	—
Authentication method	Path chosen for authentication.	—
Policy Id	Security policy identifier.	—
Source zone	Name of the source zone.	—
Destination Zone	Name of the destination zone.	—
Interface name	Name of the interface.	—
Bytes sent by this user	Number of packets in bytes sent by this user.	—
Bytes received by this user	Number of packets in bytes received by this user.	—
Client-groups	Name of the client group.	—

Monitoring 802.1x

Purpose View information about 802.1X properties.

Action Select **Monitor>Security>802.1x** in the J-Web user interface, or enter the following CLI commands:

- **show dot1x interfaces *interface-name***
- **show dot1x authentication-failed-users**

[Table 98 on page 648](#) summarizes the Dot1X output fields.

Table 98: Summary of Dot1X Output Fields

Field	Values	Additional Information
Select Port	List of ports for selection.	–
Number of connected hosts	Total number of hosts connected to the port.	–
Number of authentication bypassed hosts	Total number of authentication-bypassed hosts with respect to the port.	–
Authenticated Users Summary		
MAC Address	MAC address of the connected host.	–
User Name	Name of the user.	–
Status	Information about the host connection status.	–
Authentication Due	Information about host authentication.	–
Authentication Failed Users Summary		
MAC Address	MAC address of the authentication-failed host.	–
User Name	Name of the authentication-failed user.	–

See Also • [Monitoring Application Firewalls](#)

Related Documentation • [Monitoring Overview on page 15](#)
 • [Monitoring Interfaces on page 680](#)

Monitoring Application Layer Gateways Features

- [Monitoring H.323 ALG Information on page 649](#)
- [Monitoring MGCP ALGs on page 650](#)
- [Monitoring SCCP ALGs on page 653](#)
- [Monitoring SIP ALGs on page 656](#)
- [Monitoring Voice ALG H.323 on page 660](#)
- [Monitoring Voice ALG MGCP on page 662](#)
- [Monitoring Voice ALG SCCP on page 665](#)
- [Monitoring Voice ALG SIP on page 668](#)
- [Monitoring Voice ALG Summary on page 673](#)

Monitoring H.323 ALG Information

Purpose View the H.323 ALG counters information.

Action Select **Monitor>ALGs>H323** in the J-Web user interface, or enter the **show security alg h323 counters** command.

[Table 99 on page 649](#) summarizes key output fields in the H.323 counters display.

Table 99: Summary of Key H.323 Counters Output Fields

Field	Values	Additional Information
H.323 Counters Information		
Packets received	Number of H.323 ALG packets received.	—
Packets dropped	Number of H.323 ALG packets dropped.	—
RAS message received	Number of incoming RAS (Endpoint Registration, Admission, and Status) messages per second per gatekeeper received and processed.	—

Table 99: Summary of Key H.323 Counters Output Fields (continued)

Field	Values	Additional Information
Q.931 message received	Counter for Q.931 message received.	—
H.245 message received	Counter for H.245 message received.	—
Number of calls	Total number of H.323 ALG calls.	—
Number of active calls	Number of active H.323 ALG calls.	This counter displays the number of call legs and might not display the exact number of voice calls that are active. For instance, for a single active voice call between two endpoints, this counter might display a value of 2.
H.323 Error Counters		
Decoding errors	Number of decoding errors.	—
Message flood dropped	Error counter for message flood dropped.	—
NAT errors	H.323 ALG Network Address Translation (NAT) errors.	—
Resource manager errors	H.323 ALG resource manager errors.	—

- Related Documentation**
- [Monitoring Overview on page 15](#)
 - [Monitoring Interfaces on page 680](#)

Monitoring MGCP ALGs

This section contains the following topics:

- [Monitoring MGCP ALG Calls on page 650](#)
- [Monitoring MGCP ALG Counters on page 651](#)
- [Monitoring MGCP ALG Endpoints on page 652](#)

Monitoring MGCP ALG Calls

Purpose View information about MGCP ALG calls.

Action Select **Monitor>ALGs>MGCP>Calls** in the J-Web user interface. To view detailed information, select the endpoint on the MGCP calls page.

Alternatively, enter the **show security alg mgcp calls** command.

[Table 100 on page 651](#) summarizes key output fields in the MGCP calls display.

Table 100: Summary of Key MGCP Calls Output Fields

Field	Values	Additional Information
MGCP Calls Information		
Endpoint@GW	Endpoint name.	—
Zone	<ul style="list-style-type: none"> trust—Trust zone. untrust—Untrust zone. 	—
Call ID	Call identifier for ALG MGCP.	—
RM Group	Resource manager group ID.	—
Call Duration	Duration for which connection is active.	—
Connection Id	Connection identifier for MGCP ALG calls.	—
Calls Details: Endpoint		
Local SDP	IP address of the MGCP ALG local call owner, as per the Session Description Protocol (SDP).	—
Remote SDP	Remote IP address of the MGCP ALG remote call owner, as per the Session Description Protocol (SDP).	—

Monitoring MGCP ALG Counters

Purpose View MGCP ALG counters information.

Action Select **Monitor>ALGs>MGCP>Counters** in the J-Web user interface, or enter the **show security alg mgcp counters** command.

[Table 101 on page 651](#) summarizes key output fields in the MGCP counters display.

Table 101: Summary of Key MGCP Counters Output Fields

Field	Values	Additional Information
MGCP Counters Information		
Packets received	Number of MGCP ALG packets received.	—
Packets dropped	Number of MGCP ALG packets dropped.	—

Table 101: Summary of Key MGCP Counters Output Fields (continued)

Field	Values	Additional Information
Message received	Number of MGCP ALG messages received.	—
Number of connections	Number of MGCP ALG connections.	—
Number of active connections	Number of active MGCP ALG connections.	—
Number of calls	Number of MGCP ALG calls.	—
Number of active calls	Number of MGCP ALG active calls.	—
Number of active transactions	Number of active transactions.	—
Number of re-transmission	Number of MGCP ALG retransmissions.	—
Error Counters		
Unknown-method	MGCP ALG unknown method errors.	—
Decoding error	MGCP ALG decoding errors.	—
Transaction error	MGCP ALG transaction errors.	—
Call error	MGCP ALG counter errors.	—
Connection error	MGCP ALG connection errors.	—
Connection flood drop	MGCP ALG connection flood drop errors.	—
Message flood drop	MGCP ALG message flood drop errors.	—
IP resolve error	MGCP ALG IP address resolution errors.	—
NAT error	MGCP ALG Network Address Translation (NAT) errors.	—
Resource manager error	MGCP ALG resource manager errors.	—

Monitoring MGCP ALG Endpoints

Purpose View information about MGCP ALG endpoints.

Action Select **Monitor>ALGs>MGCP>Endpoints** in the J-Web user interface. To view detailed information, select the gateway on the MGCP endpoints page.

Alternatively, enter the **show security alg mgcp endpoints** command.

[Table 102 on page 653](#) summarizes key output fields in the MGCP endpoints display.

Table 102: Summary of Key MGCP Endpoints Output Fields

Field	Values	Additional Information
MGCP Endpoints		
Gateway	IP address of the gateway.	—
Zone	<ul style="list-style-type: none"> • trust—Trust zone. • untrust—Untrust zone. 	—
IP	IP address.	—
Endpoints: Gateway name		
Endpoint	Endpoint name.	—
Transaction #	Transaction identifier.	—
Call #	Call identifier.	—
Notified Entity	The certificate authority (CA) currently controlling the gateway.	—

- Related Documentation**
- [Monitoring Overview on page 15](#)
 - [Monitoring Interfaces on page 680](#)

Monitoring SCCP ALGs

This section contains the following topics:

- [Monitoring SCCP ALG Calls on page 653](#)
- [Monitoring SCCP ALG Counters on page 654](#)

Monitoring SCCP ALG Calls

Purpose View information about SCCP ALG calls.

Action Select **Monitor>ALGs>SCCP>Calls** in the J-Web user interface. To view detailed information, select the client IP address on the SCCP calls page.

Alternatively, enter the **show security alg sccp calls** command.

[Table 103 on page 654](#) summarizes key output fields in the SCCP calls display.

Table 103: Summary of Key SCCP Calls Output Fields

Field	Values	Additional Information
SCCP Calls Information		
Client IP	IP address of the client.	—
Zone	Client zone identifier.	—
Call Manager	IP address of the call manager.	—
Conference ID	Conference call identifier.	—
RM Group	Resource manager group identifier.	—

Monitoring SCCP ALG Counters

Purpose View SCCP ALG counters information.

Action Select **Monitor > ALGs > SCCP > Count** in the J-Web user interface, or enter the **show security alg sccp counters** command.

[Table 104 on page 654](#) summarizes key output fields in the SCCP counters display.

Table 104: Summary of Key SCCP Counters Output Fields

Field	Values	Additional Information
SCCP Counters Information		
Clients currently registered	Number of SCCP ALG clients currently registered.	—
Active calls	Number of active SCCP ALG calls.	—
Total calls	Total number of SCCP ALG calls.	—
Packets received	Number of SCCP ALG packets received.	—
PDUs processed	Number of SCCP ALG protocol data units (PDUs) processed.	—
Current call rate	Number of calls per second.	—
Error counters		

Table 104: Summary of Key SCCP Counters Output Fields (continued)

Field	Values	Additional Information
Packets dropped	Number of packets dropped by the SCCP ALG.	—
Decode errors	SCCP ALG decoding errors.	—
Protocol errors	Number of protocol errors.	—
Address translation errors	Number of Network Address Translation (NAT) errors encountered by SCCP ALG.	—
Policy lookup errors	Number of packets dropped because of a failed policy lookup.	—
Unknown PDUs	Number of unknown protocol data units (PDUs).	—
Maximum calls exceed	Number of times the maximum SCCP calls limit was exceeded.	—
Maximum call rate exceed	Number of times the maximum SCCP call rate exceeded.	—
Initialization errors	Number of initialization errors.	—
Internal errors	Number of internal errors.	—
Unsupported feature	Number of unsupported feature errors.	—
Non specific error	Number of nonspecific errors.	—

- Related Documentation**
- [Monitoring Overview on page 15](#)
 - [Monitoring Interfaces on page 680](#)

Monitoring SIP ALGs

This section contains the following topics:

- [Monitoring SIP ALG Calls on page 656](#)
- [Monitoring SIP ALG Counters on page 656](#)
- [Monitoring SIP ALG Rate Information on page 658](#)
- [Monitoring SIP ALG Transactions on page 659](#)

Monitoring SIP ALG Calls

Purpose View information about SIP ALG calls.

Action Select **Monitor>ALGs>SIP>Calls** in the J-Web user interface. To view detailed information, select the Call Leg on the SIP calls page.

Alternatively, enter the **show security alg sip calls detail** command.

[Table 105 on page 656](#) summarizes key output fields in the SIP calls display.

Table 105: Summary of Key SIP Calls Output Fields

Field	Values	Additional Information
SIP Calls Information		
Call Leg	Call length identifier.	—
Zone	Client zone identifier.	—
RM Group	Resource manager group identifier.	—
Local Tag	Local tag for the SIP ALG User Agent server.	—
Remote Tag	Remote tag for the SIP ALG User Agent server.	—

Monitoring SIP ALG Counters

Purpose View SIP ALG counters information.

Action Select **Monitor>ALGs>SIP>Count** in the J-Web user interface, or enter the **show security alg sip counters** command.

[Table 106 on page 657](#) summarizes key output fields in the SIP counters display.

Table 106: Summary of Key SIP Counters Output Fields

Field	Values	Additional Information
SIP Counters Information		
INVITE	Number of INVITE requests sent.	An INVITE request is sent to invite another user to participate in a session.
CANCEL	Number of CANCEL requests sent.	A user can send a CANCEL request to cancel a pending INVITE request. A CANCEL request has no effect if the SIP server processing the INVITE had sent a final response for the INVITE before it received the CANCEL.
ACK	Number of ACK requests sent.	The user from whom the INVITE originated sends an ACK request to confirm reception of the final response to the INVITE request.
BYE	Number of BYE requests sent.	A user sends a BYE request to abandon a session. A BYE request from either user automatically terminates the session.
REGISTER	Number of REGISTER requests sent.	A user sends a REGISTER request to a SIP registrar server to inform it of the current location of the user. A SIP registrar server records all the information it receives in REGISTER requests and makes this information available to any SIP server attempting to locate a user.
OPTIONS	Number of OPTIONS requests sent.	An OPTION message is used by the User Agent (UA) to obtain information about the capabilities of the SIP proxy. A server responds with information about what methods, session description protocols, and message encoding it supports.
INFO	Number of INFO requests sent.	An INFO message is used to communicate mid-session signaling information along the signaling path for the call.
MESSAGE	Number of MESSAGE requests sent.	SIP messages consist of requests from a client to a server and responses to the requests from a server to a client with the purpose of establishing a session (or a call).
NOTIFY	Number of NOTIFY requests sent.	A NOTIFY message is sent to inform subscribers of changes in state to which the subscriber has a subscription.
REFER	Number of REFER requests sent.	A REFER request is used to refer the recipient (identified by the Request-URI) to a third party by the contact information provided in the request.
SUBSCRIBE	Number of SUBSCRIBE requests sent.	A SUBSCRIBE request is used to request current state and state updates from a remote node.

Table 106: Summary of Key SIP Counters Output Fields (continued)

Field	Values	Additional Information
UPDATE	Number of UPDATE requests sent.	An UPDATE request is used to create a temporary opening in the firewall (pinhole) for new or updated Session Description Protocol (SDP) information. The following header fields are modified: Via, From, To, Call-ID, Contact, Route, and Record-Route.
SIP Error Counters		
Total Pkt-in	SIP ALG total packets received.	—
Total Pkt dropped on error	Number of packets dropped by the SIP ALG.	—
Transaction error	SIP ALG transaction errors.	—
Call error	SIP ALG call errors.	—
IP resolve error	SIP ALG IP address resolution errors.	—
NAT error	SIP ALG NAT errors.	—
Resource manager error	SIP ALG resource manager errors.	—
RR header exceeded max	Number of times the SIP ALG RR (Record-Route) headers exceeded the maximum limit.	—
Contact header exceeded max	Number of times the SIP ALG contact header exceeded the maximum limit.	—
Call dropped due to limit	SIP ALG calls dropped because of call limits.	—
SIP stack error	SIP ALG stack errors.	—

Monitoring SIP ALG Rate Information

Purpose View SIP ALG rate information.

Action Select **Monitor>ALGs>SIP>Rate** in the J-Web user interface, or enter the **show security alg sip rate** command.

Table 107 on page 659 summarizes key output fields in the SIP rate display.

Table 107: Summary of Key SIP Rate Output Fields

Field	Values	Additional Information
SIP Rate Information		
CPU ticks per microseconds is	SIP ALG CPU ticks per microsecond.	—
Time taken for the last message in microseconds is	Time, in microseconds, that the last SIP ALG message needed to transit the network.	—
Number of messages in 10 minutes	Total number of SIP ALG messages transiting the network in 10 minutes.	—
Time taken by the messages in 10 minutes	Total time, in microseconds, during an interval of less than 10 minutes for the specified number of SIP ALG messages to transit the network.	—
Rate	Number of SIP ALG messages per second transiting the network.	—

Monitoring SIP ALG Transactions

Purpose View information about SIP ALG transactions.

Action Select **Monitor>ALGs>SIP>Transactions** in the J-Web user interface, or enter the **show security alg sip transactions** command.

Table 108 on page 659 summarizes key output fields in the SIP transactions display.

Table 108: Summary of Key SIP Transactions Output Fields

Field	Values	Additional Information
SIP Transactions Information		
Transaction Name	<ul style="list-style-type: none"> • UAS—SIP ALG User Agent server transaction name. • UAC—SIP ALG User Agent client transaction name. 	—

Table 108: Summary of Key SIP Transactions Output Fields (continued)

Field	Values	Additional Information
Method	<p>The method to be performed on the resource. Possible methods:</p> <ul style="list-style-type: none"> • INVITE—Initiate call • ACK—Confirm final response • BYE—Terminate and transfer call • CANCEL—Cancel searches and “ringing” • OPTIONS—Features support by the other side • REGISTER—Register with location service 	—

Related Documentation

- [Monitoring Overview on page 15](#)
- [Monitoring Interfaces on page 680](#)

Monitoring Voice ALG H.323

Purpose Use the monitoring functionality to view the ALG H.323 page.

Action To monitor ALG H.323 select **Monitor>Security>Voice ALGs>H.323** in the J-Web user interface.

Meaning [Table 109 on page 660](#) summarizes key output fields in the ALG H.323 page.

Table 109: ALG H.323 Monitoring Page

Field	Value	Additional Information
Virtual Chassis Member	Display the list of virtual chassis member.	Select one of the virtual chassis members listed.
Refresh Interval (30 sec)	Displays the time interval set for page refresh.	Select the time interval from the drop-down list.
Refresh	Displays the option to refresh the page.	—
Clear	Provides an option to clear the monitor summary.	Click clear to clear the monitor summary.

H.323 Counter Summary

Table 109: ALG H.323 Monitoring Page (continued)

Field	Value	Additional Information
Category	Displays the following categories: <ul style="list-style-type: none"> • Packets received—Number of ALG H.323 packets received. • Packets dropped—Number of ALG H.323 packets dropped. • RAS message received—Number of incoming RAS (Registration, Admission, and Status) messages per second per gatekeeper received and processed. • Q.931 message received—Counter for Q.931 message received. • H.245 message received—Counter for H.245 message received. • Number of calls—Total number of ALG H.323 calls. • Number of active calls—Number of active ALG H.323 calls. • Number of DSCP Marked—Number of DSCP Marked on ALG H.323 calls. 	—
Count	Provides count of response codes for each H.323 counter summary category.	—
H.323 Error Counter		
Category	Displays the following categories: <ul style="list-style-type: none"> • Decoding errors—Number of decoding errors. • Message flood dropped—Error counter for message flood dropped. • NAT errors—H.323 ALG NAT errors. • Resource manager errors—H.323 ALG resource manager errors. • DSCP Marked errors—H.323 ALG DSCP marked errors. 	—
Count	Provides count of response codes for each H.323 error counter category.	—
Counter Summary Chart		
Packets Received	Provides the graphical representation of the packets received.	—
H.323 Message Counter		

Table 109: ALG H.323 Monitoring Page (continued)

Field	Value	Additional Information
Category	Displays the following categories: <ul style="list-style-type: none"> • RRQ—Registration Request message counter. • RCF—Registration Confirmation Message. • ARQ—Admission Request message counter. • ACF—Admission Confirmation • URQ—Unregistration Request. • UCF—Unregistration Confirmation. • DRQ—Disengage Request. • DCF—Disengage Confirmation. • Oth RAS—Other incoming Registration, Admission, and Status messages message counter. • Setup—Timeout value, in seconds, for the response of the outgoing setup message. • Alert—Alert message type. • Connect—Connect setup process. • CallProd—Number of call production messages sent. • Info—Number of info requests sent. • RelCmpl—Number of Rel Cmpl message ssent. • Facility—Number of facility messages sent. • Empty—Empty capabilities to the support message counter. • OLC—Open Local Channel message counter. • OLC ACK—Open Local Channel Acknowledge message counter. • Oth H245—Other H.245 message counter 	—
Count	Provides count of response codes for each H.323 message counter category.	—

- Related Documentation**
- [Monitoring Voice ALG Summary on page 673](#)
 - [Monitoring Voice ALG MGCP on page 662](#)
 - [Monitoring Voice ALG SCCP on page 665](#)
 - [Monitoring Voice ALG SIP on page 668](#)

Monitoring Voice ALG MGCP

Purpose Use the monitoring functionality to view the voice ALG MGCP page.

Action To monitor ALG MGCP, select **Monitor>Security>Voice ALGs>MGCP** in the J-Web user interface.

Meaning Table 110 on page 663 summarizes key output fields in the voice ALG MGCP page.

Table 110: Voice ALG MGCP Monitoring Page

Field	Value	Additional Information
Virtual Chassis Member	Displays the list of virtual chassis member.	Select one of the virtual chassis members listed.
Refresh Interval (30 sec)	Displays the time interval set for page refresh.	Select the time interval from the drop-down list.
Refresh	Displays the option to refresh the page.	—
Clear	Provides an option to clear the monitor summary.	Click Clear to clear the monitor summary.
Counters		
MGCP Counters Summary		
Category	Displays the following categories: <ul style="list-style-type: none"> • Packets Received—Number of ALG MGCP packets received. • Packets Dropped— Number of ALG MGCP packets dropped. • Message received— Number of ALG MGCP messages received. • Number of connections— Number of ALG MGCP connections. • Number of active connections— Number of active ALG MGCP connections. • Number of calls— Number of ALG MGCP calls. • Number of active calls— Number of active ALG MGCP calls. • Number of active transactions— Number of active transactions. • Number of transactions— Number of transactions. • Number of re-transmission—Number of ALG MGCP retransmissions. • Number of active endpoints— Number of MGCP active endpoints. • Number of DSCP marked— Number of MGCP DSCPs marked. 	—
Count	Provides the count of response codes for each MGCP counter summary category.	—
MGCP Error Counter		

Table 110: Voice ALG MGCP Monitoring Page (continued)

Field	Value	Additional Information
Category	Displays the following categories: <ul style="list-style-type: none"> • Unknown-method— MGCP ALG unknown method errors. • Decoding error— MGCP ALG decoding errors. • Transaction error— MGCP ALG transaction errors. • Call error— MGCP ALG call ounter errors. • Connection error— MGCP ALG connection errors. • Connection flood drop— MGCP ALG connection flood drop errors. • Message flood drop— MGCP ALG message flood drop error. • IP resolve error— MGCP ALG IP address resolution errors. • NAT error— MGCP ALG NAT errors. • Resource manager error— MGCP ALG resource manager errors. • DSCP Marked error— MGCP ALG DSCP marked errors. 	—
Count	Provides the count of response codes for each summary error counter category.	—
Counter Summary Chart	Displays the Counter Summary Chart.	—
MGCP Packet Counters		
Category	Displays the following categories: <ul style="list-style-type: none"> • CRCX— Create Connection • MDCX— Modify Connection • DLCX— Delete Connection • AUEP— Audit Endpoint • AUCX— Audit Connection • NTFY— Notify MGCP • RSIP— Restart in Progress • EPCF— Endpoint Configuration • RQNT— Request for Notification • 000-199—Respond code is 0-199 • 200-299—Respond code is 200-299 • 300-399—Respond code is 300-399 	—
Count	Provides count of response codes for each MGCP packet counter category.	—
Calls		

Table 110: Voice ALG MGCP Monitoring Page (continued)

Field	Value	Additional Information
Endpoint@GW	Displays the endpoint name.	—
Zone	Displays the following options: <ul style="list-style-type: none"> • trust—Trust zone. • untrust—Untrust zone. 	—
Endpoint IP	Displays the endpoint IP address.	—
Call ID	Displays the call identifier for ALG MGCP.	—
RM Group	Displays the resource manager group ID.	—
Call Duration	Displays the duration for which connection is active.	—

- Related Documentation**
- [Monitoring Voice ALG Summary on page 673](#)
 - [Monitoring Voice ALG H.323 on page 660](#)
 - [Monitoring Voice ALG SCCP on page 665](#)
 - [Monitoring Voice ALG SIP on page 668](#)

Monitoring Voice ALG SCCP

Purpose Use the monitoring functionality to view the voice ALG SCCP page.

Action To monitor voice ALG SCCP, select **Monitor>Security>Voice ALGs>SCCP** in the J-Web user interface.

Meaning [Table 111 on page 665](#) summarizes key output fields in the voice ALG SCCP page.

Table 111: Voice ALG SCCP Monitoring Page

Field	Value	Additional Information
Virtual Chassis Member	Displays the list of virtual chassis member.	Select one of the virtual chassis members listed.
Refresh Interval (30 sec)	Displays the time interval set for page refresh.	Select the time interval from the drop-down list.
Refresh	Displays the option to refresh the page.	—

Table 111: Voice ALG SCCP Monitoring Page (continued)

Field	Value	Additional Information
Clear	Provides an option to clear the monitor summary.	Click Clear to clear the monitor summary.
SCCP Call Statistics		
Category	Displays the following categories: <ul style="list-style-type: none"> • Active client sessions— Number of active SCCP ALG client sessions. • Active calls— Number of active SCCP ALG calls. • Total calls— Total number of SCCP ALG calls. • Packets received— Number of SCCP ALG packets received. • PDUs processed— Number of SCCP ALG protocol data units (PDUs) processed. • Current call rate— Number of calls per second. • DSCPs Marked— Number of DSCP marked. 	—
Count	Provides count of response codes for each SCCP call statistics category.	—
Call Statistics Chart	Displays the Call Statistics chart.	—
SCCP Error Counters		

Table 111: Voice ALG SCCP Monitoring Page (continued)

Field	Value	Additional Information
Category	Displays the following categories: <ul style="list-style-type: none"> • Packets dropped— Number of packets dropped by the SCCP ALG. • Decode errors— Number of SCCP ALG decoding errors. • Protocol errors— Number of protocol errors. • Address translation errors— Number of NAT errors encountered by SCCP ALG. • Policy lookup errors— Number of packets dropped because of a failed policy lookup. • Unknown PDUs— Number of unknown PDUs. • Maximum calls exceed— Number of times the maximum SCCP calls limit was exceeded. • Maximum call rate exceed— Number of times the maximum SCCP call rate was exceeded. • Initialization errors— Number of initialization errors. • Internal errors— Number of internal errors. • Nonspecific errors— Number of nonspecific errors. • No active calls to be deleted— Number of no active calls to be deleted. • No active client sessions to be deleted— Number of no active client sessions to be deleted. • Session cookie created error— Number of session cookie created errors. • Invalid NAT cookies deleted— Number of invalid NAT cookies deleted. • NAT cookies not found— Number of NAT cookies not found. • DSCP Marked Error— Number of DSCP marked errors. 	—
Count	Provides count of response codes for each SCCP error counter category.	—
Calls		
Client IP	Displays the IP address of the client.	—
Zone	Displays the client zone identifier.	—
Call Manager	Displays the IP address of the call manager.	—
Conference ID	Displays the conference call identifier.	—
RM Group	Displays the resource manager group identifier.	—

- Related Documentation**
- [Monitoring Voice ALG Summary on page 673](#)
 - [Monitoring Voice ALG H.323 on page 660](#)
 - [Monitoring Voice ALG MGCP on page 662](#)
 - [Monitoring Voice ALG SIP on page 668](#)

Monitoring Voice ALG SIP

Purpose Use the monitoring functionality to view the voice ALG SIP page.

Action To monitor voice ALG SIP select **Monitor>Security>Voice ALGs>SIP** in the J-Web user interface.

Meaning [Table 112 on page 668](#) summarizes key output fields in the voice ALG SIP page.

Table 112: Voice ALG SIP Monitoring Page

Field	Value	Additional Information
Virtual Chassis Member	Displays the list of virtual chassis members.	Select one of the virtual chassis members listed.
Refresh Interval (30 sec)	Displays the time interval set for page refresh.	Select the time interval from the drop-down list.
Refresh	Displays the option to refresh the page.	—
Clear	Provides an option to clear the monitor summary.	Click Clear to clear the monitor summary.

Counters

SIP Counters Information

Table 112: Voice ALG SIP Monitoring Page (continued)

Field	Value	Additional Information
Method	<p>Displays the SIP counter information. The available options are:</p> <ul style="list-style-type: none">• BYE— Number of BYE requests sent. A user sends a BYE request to abandon a session. A BYE request from either user automatically terminates the session.• REGISTER— Number of REGISTER requests sent. A user sends a REGISTER request to a SIP registrar server to inform it of the current location of the user. The SIP registrar server records all the information it receives in REGISTER requests and makes this information available to any SIP server attempting to locate a user.• OPTIONS— Number of OPTIONS requests sent. An OPTION message is used by the User Agent (UA) to obtain information about the capabilities of the SIP proxy. A server responds with information about what methods, session description protocols, and message encoding it supports.• INFO— Number of INFO requests sent. An INFO message is used to communicate mid-session signaling information along the signaling path for the call.• MESSAGE— Number of MESSAGE requests sent. SIP messages consist of requests from a client to the server and responses to the requests from the server to a client for the purpose of establishing a session (or a call).	—

SIP Counters Information (continued)

Table 112: Voice ALG SIP Monitoring Page (continued)

Field	Value	Additional Information
Method	<ul style="list-style-type: none"> • NOTIFY— Number of NOTIFY requests sent. A NOTIFY message is sent to inform subscribers about the change in state of the subscription. • PRACK— Number of PRACK requests sent. The PRACK request plays the same role as the ACK request, but for provisional responses. • PUBLISH— Number of PUBLISH requests sent. The PUBLISH request is used for publishing the event state. PUBLISH is similar to REGISTER that allows a user to create, modify, and remove state in another entity which manages this state on behalf of the user. • REFER— Number of REFER requests sent. A REFER request is used to refer the recipient (identified by the Request-URI) to a third party identified by the contact information provided in the request. • SUBSCRIBE— Number of SUBSCRIBE requests sent. A SUBSCRIBE request is used to request current state and state information updates from a remote node. • UPDATE— Number of UPDATE requests sent. An UPDATE request is used to create a temporary opening in the firewall (pinhole) for new or updated Session Description Protocol (SDP) information. The following header fields are modified: Via, From, To, Call-ID, Contact, Route, and Record-Route. • BENOTIFY— Number of BENOTIFY requests sent. A BENOTIFY request is used to reduce the unnecessary SIP signaling traffic on application servers. Applications that do not need a response for a NOTIFY request can enhance performance by enabling BENOTIFY. • SERVICE— Number of SERVICE requests sent. The SERVICE method is used by a SIP client to request a service from a SIP server. It is a standard SIP message and will be forwarded until it reaches the server or end user that is performing the service. • OTHER— Number of OTHER requests sent. 	—
T, RT	Displays the transmit and retransmit method.	—
1xx, RT	Displays one transmit and retransmit method.	—
2xx, RT	Displays two transmit and retransmit methods.	—
3xx, RT	Displays three transmit and retransmit methods.	—
4xx, RT	Displays four transmit and retransmit methods.	—
5xx, RT	Displays five transmit and retransmit methods.	—
6xx, RT	Displays six transmit and retransmit methods.	—
Calls		
Call ID	Displays the call ID.	—

Table 112: Voice ALG SIP Monitoring Page (continued)

Field	Value	Additional Information
Method	Displays the call method used.	—
State	Displays the state of the ALG SIP.	—
Group ID	Displays the group identifier.	—
Invite Method Chart	Displays the invite method chart. The available options are: <ul style="list-style-type: none"> • T/RT • 1xx/ RT • 2xx/ RT • 3xx/ RT • 4xx/ RT • 5xx/ RT • 6xx/ RT 	—

SIP Error Counters

Table 112: Voice ALG SIP Monitoring Page (continued)

Field	Value	Additional Information
Category	<p>Displays the SIP error counters. The available options are:</p> <ul style="list-style-type: none"> • Total Pkt-in— Number of SIP ALG total packets received. • Total Pkt dropped on error— Number of packets dropped by the SIP ALG. • Call error— SIP Number of ALG call errors. • IP resolve error— Number of SIP ALG IP address resolution errors. • NAT error— SIP Number of ALG NAT errors. • Resource manager error— Number of SIP ALG resource manager errors. • RR header exceeded max— Number of times the SIP ALG RR (Record-Route) headers exceeded the maximum limit. • Contact header exceeded max— Number of times the SIP ALG contact header exceeded the maximum limit. • Call dropped due to limit— Number of SIP ALG calls dropped because of call limits. • SIP stack error— Number of SIP ALG stack errors. • SIP Decode error— Number of SIP ALG decode errors. • SIP unknown method error— Number of SIP ALG unknow method errors. • SIP DSCP marked—SIP ALG DSCP marked. • SIP DSCP marked error— Number of SIP ALG DSCPs marked. • RTO message sent— Number of SIP ALG marked RTO messages sent. • RTO message received— Number of SIP ALG RTO messages received. • RTO buffer allocation failure— Number of SIP ALG RTO buffer allocation failures. • RTO buffer transmit failure— Number of SIP ALG RTO buffer transmit failures. • RTO send processing error— Number of SIP ALG RTO send processing errors. • RTO receiving processing error— Number of SIP ALG RTO receiving processing errors. • RTO receive invalid length— Number of SIP ALG RTOs receiving invalid length. • RTO receive call process error— Number of SIP ALG RTO receiving call process errors. • RTO receive call allocation error— Number of SIP ALG RTO receiving call allocation error. • RTO receive call register error— Number of SIP ALG RTO receiving call register errors. • RTO receive invalid status error— Number of SIP ALG RTO receiving register errors. 	—
Count	Provides count of response codes for each SIP ALG counter category.	—

- Related Documentation**
- [Monitoring Voice ALG Summary on page 673](#)
 - [Monitoring Voice ALG H.323 on page 660](#)
 - [Monitoring Voice ALG MGCP on page 662](#)
 - [Monitoring Voice ALG SCCP on page 665](#)

Monitoring Voice ALG Summary

Purpose Use the monitoring functionality to view the voice ALG summary page.

Action To monitor voice ALG summary, select **Monitor>Security>Voice ALGs>Summary** in the J-Web user interface.

Meaning [Table 113 on page 673](#) summarizes key output fields in the voice ALG summary page.

Table 113: Voice ALG Summary Monitoring Page

Field	Value	Additional Information
Virtual Chassis Member	Display the list of virtual chassis member.	Select one of the virtual chassis members listed.
Refresh Interval (30 sec)	Displays the time interval set for page refresh.	Select the time interval from the drop-down list.
Refresh	Displays the option to refresh the page.	–
Clear	Provides an option to clear the monitor summary.	Click Clear to clear the monitor summary.
Protocol Name	Displays the protocols configured.	–
Total Calls	Displays the total number of calls.	–
Number of Active Calls	Displays the number of active calls.	–
Number of Received Packets	Displays the number of packets received.	–
Number of Errors	Displays the number of errors.	–
H.323 Calls Chart	Displays the H.323 calls chart.	–
MGCP Calls Chart	Displays the MGCP calls chart.	–
SCCP Calls Chart	Displays the SCCP calls chart.	–
SIP Calls Chart	Displays the SIP calls chart.	–

- Related Documentation**
- [Monitoring Voice ALG H.323 on page 660](#)
 - [Monitoring Voice ALG MGCP on page 662](#)
 - [Monitoring Voice ALG SCCP on page 665](#)
 - [Monitoring Voice ALG SIP on page 668](#)

Monitoring Interfaces and Switching Functions

- [Displaying Real-Time Interface Information on page 675](#)
- [Monitoring Address Pools on page 677](#)
- [Monitoring Ethernet Switching on page 678](#)
- [Monitoring GVRP on page 679](#)
- [Monitoring Interfaces on page 680](#)
- [Monitoring MPLS Traffic Engineering Information on page 682](#)
- [Monitoring PPP on page 688](#)
- [Monitoring PPPoE on page 688](#)
- [Monitoring Spanning Tree on page 692](#)
- [Monitoring the WAN Acceleration Interface on page 693](#)

Displaying Real-Time Interface Information

Enter the **monitor interface** command to display real-time traffic, error, alarm, and filter statistics about a physical or logical interface:

```
user@host> monitor interface (interface-name | traffic)
```

Replace ***interface-name*** with the name of a physical or logical interface. If you specify the **traffic** option, statistics for all active interfaces display.

The real-time statistics update every second. The **Current delta** and **Delta** columns display the amount the statistics counters have changed since the **monitor interface** command was entered or since you cleared the delta counters. [Table 114 on page 675](#) and [Table 115 on page 676](#) list the keys you use to control the display using the ***interface-name*** and **traffic** options. (The keys are not case sensitive.)

Table 114: CLI monitor interface Output Control Keys

Key	Action
c	Clears (returns to 0) the delta counters in the Current delta column. The statistics counters are not cleared.

Table 114: CLI monitor interface Output Control Keys (continued)

Key	Action
f	Freezes the display, halting the update of the statistics and delta counters.
i	Displays information about a different interface. You are prompted for the name of a specific interface.
n	Displays information about the next interface. The device scrolls through the physical and logical interfaces in the same order in which they are displayed by the show interfaces terse command.
q or ESC	Quits the command and returns to the command prompt.
t	Thaws the display, resuming the update of the statistics and delta counters.

Table 115: CLI monitor interface traffic Output Control Keys

Key	Action
b	Displays the statistics in units of bytes and bytes per second (bps).
c	Clears (returns to 0) the delta counters in the Delta column. The statistics counters are not cleared.
d	Displays the Delta column instead of the rate column—in bps or packets per second (pps).
p	Displays the statistics in units of packets and packets per second (pps).
q or ESC	Quits the command and returns to the command prompt.
r	Displays the rate column—in bps and pps—instead of the Delta column.

The following are sample displays from the **monitor interface** command:

```
user@host> monitor interface fe-0/0/0
```

```

host1                               Seconds: 5                               Time: 04:38:40
                                      Delay: 3/0/10
Interface: fe-0/0/0, Enabled, Link is Up
Encapsulation: Ethernet, Speed: 1000mbps
Traffic statistics:
  Input bytes:      885405423 (3248 bps)      [2631]
  Output bytes:    137411893 (3344 bps)      [10243]
  Input packets:   7155064 (2 pps)          [28]
  Output packets:  636071 (1 pps)           [23]
Error statistics:
  Input errors:    0                        [0]
  Input drops:    0                        [0]

```

```

Input framing errors:          0          [0]
Policed discards:             0          [0]
L3 incompletes:               0          [0]
L2 channel errors:            0          [0]
L2 mismatch timeouts:         0          [0]
Carrier transitions:           1          [0]
Output errors:                0          [0]
Output drops:                 0          [0]
Aged packets:                 0          [0]
Active alarms : None
Active defects: None
Input MAC/Filter statistics:
  Unicast packets              73083      [16]
  Broadcast packets            3629058    [5]
  Multicast packets            3511364    [3]
  Oversized frames             0          [0]
  Packet reject count          0          [0]
  DA rejects                   0          [0]
  SA rejects                   0          [0]
Output MAC/Filter Statistics:
  Unicast packets              629555     [28]
  Broadcast packets            6494      Multicast packet [0]

```



NOTE: The output fields that display when you enter the monitor interface *interface-name* command are determined by the interface you specify.

```
user@host> monitor interface traffic
```

Interface	Link	Input packets	(pps)	Output packets	(pps)
fe-0/0/0	Up	42334	(5)	23306	(3)
fe-0/0/1	Up	587525876	(12252)	589621478	(12891)

Related Documentation

- [Monitoring Interfaces on page 680](#)

Monitoring Address Pools

Purpose Use the monitoring functionality to view the Address Pools page.

Action To monitor Address Pools, select **Monitor>Access>Address Pools** in the J-Web user interface.

Meaning [Table 116 on page 677](#) summarizes key output fields in the Address Pools page.

Table 116: Address Pools Monitoring Page

Field	Values	Additional Information
-------	--------	------------------------

Address Pool Properties

Table 116: Address Pools Monitoring Page (continued)

Field	Values	Additional Information
Address Pool Name	Displays the name of the address pool.	-
Network Address	Displays the IP network address of the address pool.	-
Address Ranges	Displays the name, the lower limit, and the upper limit of the address range.	-
Primary DNS	Displays the primary-dns IP address.	-
Secondary DNS	Displays the secondary-dns IP address.	-
Primary WINS	Displays the primary-wins IP address.	-
Secondary WINS	Displays the secondary-wins IP address.	-
Address Pool Address Assignment		
IP Address	Displays the IP address of the address pool.	-
Hardware Address	Displays the hardware MAC address of the address pool.	-
Host/User	Displays the user name using the address pool.	-
Type	Displays the authentication type used by the address pool	The authentication types can be extended authentication (XAuth) or IKE Authentication.

- Related Documentation**
- [Monitoring Interfaces on page 680](#)
 - [Threats Monitoring Report on page 722](#)

Monitoring Ethernet Switching

Purpose View information about the Ethernet Switching interface details.

Action Select **Monitor>Switching>Ethernet Switching** in the J-Web user interface, or enter the following CLI commands:

- **show ethernet-switching table**
- **show ethernet-switching mac-learning-log**

[Table 117 on page 679](#) summarizes the Ethernet Switching output fields.

Table 117: Summary of Ethernet Switching Output Fields

Field	Values	Additional Information
VLAN	The VLAN for which Ethernet Switching is enabled.	-
MAC Address	The MAC address associated with the VLAN. If a VLAN range has been configured for a VLAN, the output displays the MAC addresses for the entire series of VLANs that were created with that name.	-
Type	The type of MAC address. Values are: <ul style="list-style-type: none"> static—The MAC address is manually created. learn—The MAC address is learned dynamically from a packet's source MAC address. flood—The MAC address is unknown and flooded to all members. 	-
Age	The time remaining before the entry ages out and is removed from the Ethernet switching table.	-
Interfaces	Interface associated with learned MAC addresses or All-members (flood entry).	-
VLAN-ID	The VLAN ID.	-
MAC Address	The learned MAC address.	-
Time	Timestamp when the MAC address was added or deleted from the log.	-
State	Indicates the MAC address learned on the interface.	-

- Related Documentation**
- [Monitoring Overview on page 15](#)
 - [Monitoring Interfaces on page 680](#)

Monitoring GVRP

Purpose Use the monitoring functionality to view the GVRP page.

Action To monitor GVRP select **Monitor>Switching>GVRP** in the J-Web user interface.

Meaning [Table 118 on page 680](#) summarizes key output fields in the GVRP page.

Table 118: GVRP Monitoring Page

Field	Value	Additional Information
Global GVRP Configuration		
GVRP Status	Displays whether GVRP is enabled or disabled.	—
GVRP Timer	Displays the GVRP timer in millisecond.	—
Join	The number of milliseconds the interfaces must wait before sending VLAN advertisements.	—
Leave	The number of milliseconds an interface must wait after receiving a Leave message to remove the interface from the VLAN specified in the message.	—
Leave All	The interval in milliseconds at which Leave All messages are sent on interfaces. Leave All messages maintain current GVRP VLAN membership information in the network.	—
GVRP Interface Details		
Interface Name	The interface on which GVRP is configured.	—
Protocol Status	Displays whether GVRP is enabled or disabled.	—

- Related Documentation**
- [Monitoring Ethernet Switching on page 678](#)
 - [Monitoring Spanning Tree on page 692](#)

Monitoring Interfaces

Purpose View general information about all physical and logical interfaces for a device.

Action Enter the following **show** commands in the CLI to view interface status and traffic statistics.

- **show interfaces terse**



NOTE: On SRX Series devices, when configuring identical IPs on a single interface, you will not see a warning message; instead, you will see a syslog message.

- **show interfaces extensive**
- **show interfaces***interface-name*



NOTE: If you are using the J-Web user interfaces, select **Monitor>Interfaces** in the J-Web user interface. The J-Web Interfaces page displays the following details about each device interface:

- **Port**—Indicates the interface name.
- **Admin Status**—Indicates whether the interface is enabled (Up) or disabled (Down).
- **Link Status**—Indicates whether the interface is linked (Up) or not linked (Down).
- **Address**—Indicates the IP address of the interface.
- **Zone**—Indicates whether the zone is an untrust zone or a trust zone.
- **Services**—Indicates services that are enabled on the device, such as HTTP and SSH.
- **Protocols**—Indicates protocols that are enabled on the device, such as BGP and IGMP.
- **Input Rate graph**—Displays interface bandwidth utilization. Input rates are shown in bytes per second.
- **Output Rate graph**—Displays interface bandwidth utilization. Output rates are shown in bytes per second.
- **Error Counters chart**—Displays input and output error counters in the form of a bar chart.
- **Packet Counters chart**—Displays the number of broadcast, unicast, and multicast packet counters in the form of a pie chart. (Packet counter charts are supported only for interfaces that support MAC statistics.)

To change the interface display, use the following options:

- **Port for FPC**—Controls the member for which information is displayed.
- **Start/Stop button**—Starts or stops monitoring the selected interfaces.
- **Show Graph**—Displays input and output packet counters and error counters in the form of charts.
- **Pop-up button**—Displays the interface graphs in a separate pop-up window.
- **Details**—Displays extensive statistics about the selected interface, including its general status, traffic information, IP address, I/O errors, class-of-service data, and statistics.
- **Refresh Interval**—Indicates the duration of time after which you want the data on the page to be refreshed.
- **Clear Statistics**—Clears the statistics for the selected interface.

Related Documentation

- [Interfaces Feature Guide for Security Devices](#)

Monitoring MPLS Traffic Engineering Information

This section contains the following topics:

- [Monitoring MPLS Interfaces on page 682](#)
- [Monitoring MPLS LSP Information on page 682](#)
- [Monitoring MPLS LSP Statistics on page 684](#)
- [Monitoring RSVP Session Information on page 685](#)
- [Monitoring MPLS RSVP Interfaces Information on page 686](#)

Monitoring MPLS Interfaces

Purpose View the interfaces on which MPLS is configured, including operational state and any administrative groups applied to an interface.

Action Select **Monitor>MPLS>Interfaces** in the J-Web user interface, or enter the **show mpls interface** command.

[Table 119 on page 682](#) summarizes key output fields in the MPLS interface information display.

Table 119: Summary of Key MPLS Interface Information Output Fields

Field	Values	Additional Information
Interface	Name of the interface on which MPLS is configured.	—
State	State of the specified interface: Up or Dn (down).	—
Administrative groups	Administratively assigned colors of the MPLS link configured on the interface.	—

See Also

- [Monitoring MPLS LSP Information on page 682](#)
- [Monitoring MPLS LSP Statistics on page 684](#)
- [Monitoring RSVP Session Information on page 685](#)
- [Monitoring MPLS RSVP Interfaces Information on page 686](#)

Monitoring MPLS LSP Information

Purpose View all label-switched paths (LSPs) configured on the services router, including all inbound (ingress), outbound (egress), and transit LSP information.

Action Select **Monitor>MPLS>LSP Information** in the J-Web user interface, or enter the **show mpls lsp** command.

Table 120 on page 683 summarizes key output fields in the MPLS LSP information display.

Table 120: Summary of Key MPLS LSP Information Output Fields

Field	Values	Additional Information
Ingress LSP	Information about LSPs on the inbound device. Each session has one line of output.	—
Egress LSP	Information about the LSPs on the outbound device. Each session has one line of output.	MPLS learns this information by querying RSVP, which holds all the transit and outbound session information.
Transit LSP	Number of LSPs on the transit routers and the state of these paths.	MPLS learns this information by querying RSVP, which holds all the transit and outbound session information.
To	Destination (outbound device) of the session.	—
From	Source (inbound device) of the session.	—
State	State of the path. It can be Up , Down , or AdminDn .	AdminDn indicates that the LSP is being taken down gracefully.
Rt	Number of active routes (prefixes) installed in the routing table.	For inbound RSVP sessions, the routing table is the primary IPv4 table (inet.0). For transit and outbound RSVP sessions, the routing table is the primary MPLS table (mpls.0).
Active Path	Name of the active path: Primary or Secondary .	This field is used for inbound LSPs only.
P	An asterisk (*) in this column indicates that the LSP is a primary path.	This field is used for inbound LSPs only.
LSPname	Configured name of the LSP.	—
Style	RSVP reservation style. This field consists of two parts. The first is the number of active reservations. The second is the reservation style, which can be FF (fixed filter), SE (shared explicit), or WF (wildcard filter).	This field is used for outbound and transit LSPs only.
Labelin	Incoming label for this LSP.	—
Labelout	Outgoing label for this LSP.	—
Total	Total number of LSPs displayed for the particular type— ingress (inbound), egress (outbound), or transit .	—

- See Also**
- [Monitoring MPLS Interfaces on page 682](#)
 - [Monitoring MPLS LSP Statistics on page 684](#)
 - [Monitoring RSVP Session Information on page 685](#)
 - [Monitoring MPLS RSVP Interfaces Information on page 686](#)

Monitoring MPLS LSP Statistics

Purpose Display statistics for LSP sessions currently active on the device, including the total number of packets and bytes forwarded through an LSP.

Action Select **Monitor>MPLS>LSP Statistics** in the J-Web user interface, or enter the **show mpls lsp statistics** command.



NOTE: Statistics are not available for LSPs on the outbound device, because the penultimate device in the LSP sets the label to 0. Also, as the packet arrives at the outbound device, the hardware removes its MPLS header and the packet reverts to being an IPv4 packet. Therefore, it is counted as an IPv4 packet, not an MPLS packet.

[Table 121 on page 684](#) summarizes key output fields in the MPLS LSP statistics display.

Table 121: Summary of Key MPLS LSP Statistics Output Fields

Field	Values	Additional Information
Ingress LSP	Information about LSPs on the inbound device. Each session has one line of output.	—
Egress LSP	Information about the LSPs on the outbound device. Each session has one line of output.	MPLS learns this information by querying RSVP, which holds all the transit and outbound session information.
Transit LSP	Number of LSPs on the transit routers and the state of these paths.	MPLS learns this information by querying RSVP, which holds all the transit and outbound session information.
To	Destination (outbound device) of the session.	—
From	Source (inbound device) of the session.	—
State	State of the path: Up , Down , or AdminDn .	AdminDn indicates that the LSP is being taken down gracefully.
Packets	Total number of packets received on the LSP from the upstream neighbor.	—

Table 121: Summary of Key MPLS LSP Statistics Output Fields (continued)

Field	Values	Additional Information
Bytes	Total number of bytes received on the LSP from the upstream neighbor.	—
LSPname	Configured name of the LSP.	—
Total	Total number of LSPs displayed for the particular type— ingress (inbound), egress (outbound), or transit .	—

- See Also**
- [Monitoring MPLS Interfaces on page 682](#)
 - [Monitoring MPLS LSP Information on page 682](#)
 - [Monitoring RSVP Session Information on page 685](#)
 - [Monitoring MPLS RSVP Interfaces Information on page 686](#)

Monitoring RSVP Session Information

Purpose View information about RSVP-signaled LSP sessions currently active on the device, including inbound (ingress) and outbound (egress) addresses, LSP state, and LSP name.

Action Select **Monitor>MPLS>RSVP Sessions** in the J-Web user interface, or enter the **show rsvp session** command.

[Table 122 on page 685](#) summarizes key output fields in the RSVP session information display.

Table 122: Summary of Key RSVP Session Information Output Fields

Field	Values	Additional Information
Ingress LSP	Information about inbound RSVP sessions. Each session has one line of output.	—
Egress LSP	Information about outbound RSVP sessions. Each session has one line of output.	MPLS learns this information by querying RSVP, which holds all the transit and outbound session information.
Transit LSP	Information about transit RSVP sessions.	MPLS learns this information by querying RSVP, which holds all the transit and outbound session information.
To	Destination (outbound device) of the session.	—
From	Source (inbound device) of the session.	—

Table 122: Summary of Key RSVP Session Information Output Fields (continued)

Field	Values	Additional Information
State	State of the path: Up , Down , or AdminDn .	AdminDn indicates that the LSP is being taken down gracefully.
Rt	Number of active routes (prefixes) installed in the routing table.	For inbound RSVP sessions, the routing table is the primary IPv4 table (inet.0). For transit and outbound RSVP sessions, the routing table is the primary MPLS table (mpls.0).
Style	RSVP reservation style. This field consists of two parts. The first is the number of active reservations. The second is the reservation style, which can be FF (fixed filter), SE (shared explicit), or WF (wildcard filter).	This field is used for outbound and transit LSPs only.
Labelin	Incoming label for this RSVP session.	—
Labelout	Outgoing label for this RSVP session.	—
LSPname	Configured name of the LSP.	—
Total	Total number of RSVP sessions displayed for the particular type— ingress (inbound), egress (outbound), or transit .	—

- See Also**
- [Monitoring MPLS Interfaces on page 682](#)
 - [Monitoring MPLS LSP Information on page 682](#)
 - [Monitoring MPLS LSP Statistics on page 684](#)
 - [Monitoring MPLS RSVP Interfaces Information on page 686](#)

Monitoring MPLS RSVP Interfaces Information

Purpose View information about the interfaces on which RSVP is enabled, including the interface name, total bandwidth through the interface, and total current reserved and reservable (available) bandwidth on the interface.

Action Select **Monitor>MPLS>RSVP Interfaces** in the J-Web user interface, or enter the **show rsvp interface** command.

[Table 123 on page 687](#) summarizes key output fields in the RSVP interfaces information display.

Table 123: Summary of Key RSVP Interfaces Information Output Fields

Field	Values	Additional Information
RSVP Interface	Number of interfaces on which RSVP is active. Each interface has one line of output.	—
Interface	Name of the interface.	—
State	State of the interface: <ul style="list-style-type: none"> • Disabled—No traffic engineering information is displayed. • Down—The interface is not operational. • Enabled—Displays traffic engineering information. • Up—The interface is operational. 	—
Active resv	Number of reservations that are actively reserving bandwidth on the interface.	—
Subscription	User-configured subscription factor.	—
Static BW	Total interface bandwidth, in bits per second (bps).	—
Available BW	Amount of bandwidth that RSVP is allowed to reserve, in bits per second (bps). It is equal to (static bandwidth X subscription factor).	—
Reserved BW	Currently reserved bandwidth, in bits per second (bps).	—
Highwater mark	Highest bandwidth that has ever been reserved on this interface, in bits per second (bps).	—

- See Also**
- [Monitoring MPLS Interfaces on page 682](#)
 - [Monitoring MPLS LSP Information on page 682](#)
 - [Monitoring MPLS LSP Statistics on page 684](#)
 - [Monitoring RSVP Session Information on page 685](#)

- Related Documentation**
- [Understanding Ping MPLS on page 1207](#)
 - [MPLS Connection Checking Overview on page 1205](#)
 - [Monitoring Overview on page 15](#)
 - [Monitoring Interfaces on page 680](#)

Monitoring PPP

Purpose Display PPP monitoring information, including PPP address pool information, session status for PPP interfaces, cumulative statistics for all PPP interfaces, and a summary of PPP sessions.



NOTE: PPP monitoring information is available only in the CLI. The J-Web user interface does not include pages for displaying PPP monitoring information.

Action Enter the following CLI commands:

- `show ppp address-pool pool-name`
- `show ppp interface interface-name`
- `show ppp statistics`
- `show ppp summary`

Related Documentation

- [Monitoring Overview on page 15](#)
- [Monitoring Interfaces on page 680](#)

Monitoring PPPoE

Purpose Display the session status for PPPoE interfaces, cumulative statistics for all PPPoE interfaces on the device, and the PPPoE version configured on the device.

Action Select **Monitor>PPPoE** in the J-Web user interface. To view interface-specific properties in the J-Web interface, select the interface name on the PPPoE page.

[Table 124 on page 688](#) summarizes key output fields in PPPoE displays.

Table 124: Summary of Key PPPoE Output Fields

Field	Values	Additional Information
PPPoE Interfaces		
Interface	Name of the PPPoE interface.	Click the interface name to display PPPoE information for the interface.
State	State of the PPPoE session on the interface.	—

Table 124: Summary of Key PPPoE Output Fields (continued)

Field	Values	Additional Information
Session ID	Unique session identifier for the PPPoE session.	To establish a PPPoE session, first the device acting as a PPPoE client obtains the Ethernet address of the PPPoE server or access concentrator, and then the client and the server negotiate a unique session ID. This process is referred to as PPPoE active discovery and is made up of four steps: initiation, offer, request, and session confirmation. The access concentrator generates the session ID for session confirmation and sends it to the PPPoE client in a PPPoE Active Discovery Session-Confirmation (PADS) packet.
Service Name	Type of service required from the access concentrator.	Service Name identifies the type of service provided by the access concentrator, such as the name of the Internet service provider (ISP), class, or quality of service.
Configured AC Name	Configured access concentrator name.	—
Session AC Names	Name of the access concentrator.	—
AC MAC Address	Media access control (MAC) address of the access concentrator.	—
Session Uptime	Number of seconds the current PPPoE session has been running.	—
Auto-Reconnect Timeout	Number of seconds to wait before reconnecting after a PPPoE session is terminated.	—
Idle Timeout	Number of seconds a PPPoE session can be idle without disconnecting.	—
Underlying Interface	Name of the underlying logical Ethernet or ATM interface on which PPPoE is running—for example, ge-0/0/0.1 .	—
PPPoE Statistics		
Active PPPoE Sessions	Total number of active PPPoE sessions.	—

Table 124: Summary of Key PPPoE Output Fields (continued)

Field	Values	Additional Information
Packet Type	Packets sent and received during the PPPoE session, categorized by packet type and packet error: <ul style="list-style-type: none"> • PADI—PPPoE Active Discovery Initiation packets. • PADO—PPPoE Active Discovery Offer packets. • PADR—PPPoE Active Discovery Request packets. • PADS—PPPoE Active Discovery Session-Confirmation packets. • PADT—PPPoE Active Discovery Terminate packets. • Service Name Error—Packets for which the Service-Name request could not be honored. • AC System Error—Packets for which the access concentrator experienced an error in processing the host request. For example, the host had insufficient resources to create a virtual circuit. • Generic Error—Packets that indicate an unrecoverable error occurred. • Malformed Packet—Malformed or short packets that caused the packet handler to disregard the frame as unreadable. • Unknown Packet—Unrecognized packets. 	—
Sent	Number of the specific type of packet sent from the PPPoE client.	—
Received	Number of the specific type of packet received by the PPPoE client.	—
Timeout	Information about the timeouts that occurred during the PPPoE session. <ul style="list-style-type: none"> • PADI—Number of timeouts that occurred for the PADI packet. • PADO—Number of timeouts that occurred for the PADO packet. (This value is always 0 and is not supported.) • PADR—Number of timeouts that occurred for the PADR packet. 	—
Sent	Number of the timeouts that occurred for PADI, PADO, and PADR packets.	—
PPPoE Version		
Maximum Sessions	Maximum number of active PPPoE sessions the device can support. The default is 256 sessions.	—

Table 124: Summary of Key PPPoE Output Fields (continued)

Field	Values	Additional Information
PADI Resend Timeout	Initial time, (in seconds) the device waits to receive a PADO packet for the PADI packet sent—for example, 2 seconds. This timeout doubles for each successive PADI packet sent.	The PPPoE Active Discovery Initiation (PADI) packet is sent to the access concentrator to initiate a PPPoE session. Typically, the access concentrator responds to a PADI packet with a PPPoE Active Discovery Offer (PADO) packet. If the access concentrator does not send a PADO packet, the device sends the PADI packet again after timeout period is elapsed. The PADI Resend Timeout doubles for each successive PADI packet sent. For example, if the PADI Resend Timeout is 2 seconds, the second PADI packet is sent after 2 seconds, the third after 4 seconds, the fourth after 8 seconds, and so on.
PADR Resend Timeout	Initial time (in seconds) the device waits to receive a PADS packet for the PADR packet sent. This timeout doubles for each successive PADR packet sent.	The PPPoE Active Discovery Request (PADR) packet is sent to the access concentrator in response to a PADO packet, and to obtain the PPPoE session ID. Typically, the access concentrator responds to a PADR packet with a PPPoE Active Discovery Session-Confirmation (PADS) packet, which contains the session ID. If the access concentrator does not send a PADS packet, the device sends the PADR packet again after the PADR Resend Timeout period is elapsed. The PADR Resend Timeout doubles for each successive PADR packet sent.
Maximum Resend Timeout	Maximum value (in seconds) that the PADI or PADR resend timer can accept—for example, 64 seconds. The maximum value is 64.	—
Maximum Configured AC Timeout	Time (in seconds), within which the configured access concentrator must respond.	—

Alternatively, enter the following CLI commands:

- **show pppoe interfaces**
- **show pppoe statistics**
- **show pppoe version**

You can also view status information about the PPPoE interface by entering the **show interfaces pp0** command in the CLI editor.

Related Documentation

- [Monitoring Overview on page 15](#)
- [Monitoring Interfaces on page 680](#)
- [Monitoring DHCP Client Bindings on page 707](#)

Monitoring Spanning Tree

Purpose Use the monitoring functionality to view the Spanning Tree page.

Action To monitor spanning tree, select **Monitor>Switching>Spanning Tree** in the J-Web user interface.

Meaning [Table 125 on page 692](#) summarizes key output fields in the spanning tree page.

Table 125: Spanning Tree Monitoring Page

Field	Value	Additional Information
Bridge parameters		
Context ID	An internally generated identifier.	—
Enabled Protocol	Spanning tree protocol type enabled.	—
Root ID	Bridge ID of the elected spanning tree root bridge.	The bridge ID consists of a configurable bridge priority and the MAC address of the bridge.
Bridge ID	Locally configured bridge ID.	—
Inter instance ID	An internally generated instance identifier.	—
Extended system ID	Extended system generated instance identifier.	—
Maximum age	Maximum age of received bridge protocol data units (BPDUs).	—
Number of topology changes	Total number of STP topology changes detected since the switch last booted.	—
Forward delay	Spanning tree forward delay.	—
Interface List		
Interface Name	Interface configured to participate in the STP instance.	—
Port ID	Logical interface identifier configured to participate in the STP instance.	—
Designated Port ID	Port ID of the designated port for the LAN segment to which the interface is attached.	—
Port Cost	Configured cost for the interface.	—

Table 125: Spanning Tree Monitoring Page (continued)

Field	Value	Additional Information
State	STP port state. Forwarding (FWD), blocking (BLK), listening, learning, or disabled.	–
Role	MSTP or RSTP port role. Designated (DESG), backup (BKUP), alternate (ALT), or root.	–

- Related Documentation**
- [Monitoring Ethernet Switching on page 678](#)
 - [Monitoring GVRP on page 679](#)

Monitoring the WAN Acceleration Interface

Purpose View status information and traffic statistics for the WAN acceleration interface.

Action Select **Monitor>WAN Acceleration** in the J-Web user interface, or select **Monitor>Interfaces** and select the interface name (**wx-slot/0/0**). Alternatively, enter the following CLI command:

```
[edit]
user@host# show interfaces wx-slot/0/0 detail
```

- Related Documentation**
- [Monitoring Overview on page 15](#)
 - [Monitoring Interfaces on page 680](#)

CHAPTER 28

Monitoring NAT

- [Monitoring NAT on page 695](#)

Monitoring NAT

This section contains the following topics:

- [Monitoring Source NAT Information on page 695](#)
- [Monitoring Destination NAT Information on page 701](#)
- [Monitoring Static NAT Information on page 703](#)
- [Monitoring NAT Incoming Table Information on page 704](#)
- [Monitoring Interface NAT Port Information on page 705](#)

Monitoring Source NAT Information

Purpose Display configured information about source Network Address Translation (NAT) rules, pools, persistent NAT, and paired addresses.

Action Select **Monitor>NAT>Source NAT** in the J-Web user interface, or enter the following CLI commands:

- **show security nat source summary**
- **show security nat source pool *pool-name***
- **show security nat source persistent-nat-table**
- **show security nat source paired-address**

[Table 126 on page 695](#) describes the available options for monitoring source NAT.

Table 126: Source NAT Monitoring Page

Field	Description	Action
Rules		
Rule-set Name	Name of the rule set.	Select all rule sets or a specific rule set to display from the list.

Table 126: Source NAT Monitoring Page (continued)

Field	Description	Action
Total rules	Number of rules configured.	—
ID	Rule ID number.	—
Name	Name of the rule .	—
From	Name of the routing instance/zone/interface from which the packet flows.	—
To	Name of the routing instance/zone/interface to which the packet flows.	—
Source address range	Source IP address range in the source pool.	—
Destination address range	Destination IP address range in the source pool.	—
Source ports	Source port numbers.	—
Ip protocol	IP protocol.	—
Action	Action taken for a packet that matches a rule.	—
Persistent NAT type	Persistent NAT type.	—
Inactivity timeout	Inactivity timeout interval for the persistent NAT binding.	—
Alarm threshold	Utilization alarm threshold.	—
Max session number	The maximum number of sessions.	—
Sessions (Succ/ Failed/ Current)	Successful, failed, and current sessions. <ul style="list-style-type: none"> • Succ—Number of successful session installations after the NAT rule is matched. • Failed—Number of unsuccessful session installations after the NAT rule is matched. • Current—Number of sessions that reference the specified rule. 	—

Table 126: Source NAT Monitoring Page (continued)

Field	Description	Action
Translation Hits	Number of times a translation in the translation table is used for a source NAT rule.	—
Pools		
Pool Name	The names of the pools.	Select all pools or a specific pool to display from the list.
Total Pools	Total pools added.	—
ID	ID of the pool.	—
Name	Name of the source pool.	—
Address range	IP address range in the source pool.	—
Single/Twin ports	Number of allocated single and twin ports.	—
Port	Source port number in the pool.	—
Address assignment	Displays the type of address assignment.	—
Alarm threshold	Utilization alarm threshold.	—
Port overloading factor	Port overloading capacity.	—
Routing instance	Name of the routing instance.	—
Total addresses	Total IP address, IP address set, or address book entry.	—
Host address base	Host base address of the original source IP address range.	—
Translation hits	Number of times a translation in the translation table is used for source NAT.	—
Top 10 Translation Hits		
Graph	Displays the graph of top 10 translation hits.	—
Persistent NAT		

Table 126: Source NAT Monitoring Page (continued)

Field	Description	Action
Persistent NAT table statistics		
binding total	Displays the total number of persistent NAT bindings for the FPC.	—
binding in use	Number of persistent NAT bindings that are in use for the FPC.	—
enode total	Total number of persistent NAT enodes for the FPC.	—
enode in use	Number of persistent NAT enodes that are in use for the FPC.	—
Persistent NAT table		
Source NAT pool	Name of the pool.	Select all pools or a specific pool to display from the list.
Internal IP	Internal IP address.	Select all IP addresses or a specific IP address to display from the list.
Internal port	Displays the internal ports configured in the system.	Select the port to display from the list.
Internal protocol	Internal protocols .	Select all protocols or a specific protocol to display from the list.
Internal IP	Internal transport IP address of the outgoing session from internal to external.	—
Internal port	Internal transport port number of the outgoing session from internal to external.	—
Internal protocol	Internal protocol of the outgoing session from internal to external.	—
Reflective IP	Translated IP address of the source IP address.	—
Reflective port	Displays the translated number of the port.	—
Reflective protocol	Translated protocol.	—
Source NAT pool	Name of the source NAT pool where persistent NAT is used.	—
Type	Persistent NAT type.	—

Table 126: Source NAT Monitoring Page (continued)

Field	Description	Action
Left time/Conf time	Inactivity timeout period that remains and the configured timeout value.	—
Current session num/Max session num	Number of current sessions associated with the persistent NAT binding and the maximum number of sessions.	—
Source NAT rule	Name of the source NAT rule to which this persistent NAT binding applies.	—
External node table		
Internal IP	Internal transport IP address of the outgoing session from internal to external.	—
Internal port	Internal port number of the outgoing session from internal to external.	—
External IP	External IP address of the outgoing session from internal to external.	—
External port	External port of the outgoing session from internal to external.	—
Zone	External zone of the outgoing session from internal to external.	—
Paired Address		
Pool name	Name of the pool.	Select all pools or a specific pool to display from the list.
Specified Address	IP address.	Select all addresses, or select the internal or external IP address to display, and enter the IP address.
Pool name	Displays the selected pool or pools.	—
Internal address	Displays the internal IP address.	—
External address	Displays the external IP address.	—
Resource Usage		
Utilization for all source pools		

Table 126: Source NAT Monitoring Page (continued)

Field	Description	Action
Pool name	Name of the pool.	To view additional usage information for Port Address Translation (PAT) pools, select a pool name. The information displays under Detail Port Utilization for Specified Pool.
Pool type	Pool type: PAT or Non-PAT.	—
Port overloading factor	Port overloading capacity for PAT pools.	—
Address	Addresses in the pool.	—
Used	<p>Number of used resources in the pool.</p> <p>For Non-PAT pools, the number of used IP addresses is displayed.</p> <p>For PAT pools, the number of used ports is displayed.</p>	—
Available	<p>Number of available resources in the pool.</p> <p>For Non-PAT pools, the number of available IP addresses is displayed.</p> <p>For PAT pools, the number of available ports is displayed.</p>	—
Total	<p>Number of used and available resources in the pool.</p> <p>For Non-PAT pools, the total number of used and available IP addresses is displayed.</p> <p>For PAT pools, the total number of used and available ports is displayed.</p>	—
Usage	<p>Percent of resources used.</p> <p>For Non-PAT pools, the percent of IP addresses used is displayed.</p> <p>For PAT pools, the percent of ports, including single and twin ports, is displayed.</p>	—
Peak usage	Percent of resources used during the peak date and time.	—
Detail Port Utilization for Specified Pool		
Address Name	IP addresses in the PAT pool.	Select the IP address for which you want to display detailed usage information.
Factor-Index	Index number.	—

Table 126: Source NAT Monitoring Page (continued)

Field	Description	Action
Port-range	Displays the number of ports allocated at a time.	—
Used	Displays the number of used ports.	—
Available	Displays the number of available ports.	—
Total	Displays the number of used and available ports.	—
Usage	Displays the percentage of ports used during the peak date and time.	—

Monitoring Destination NAT Information

Purpose View the destination Network Address Translation (NAT) summary table and the details of the specified NAT destination address pool information.

Action Select **Monitor>NAT> Destination NAT** in the J-Web user interface, or enter the following CLI commands:

- **show security nat destination summary**
- **show security nat destination pool *pool-name***

Table 127 on page 701 summarizes key output fields in the destination NAT display.

Table 127: Summary of Key Destination NAT Output Fields

Field	Values	Action
Rules		
Rule-set Name	Name of the rule set.	Select all rule sets or a specific rule set to display from the list.
Total rules	Number of rules configured.	—
ID	Rule ID number.	—
Name	Name of the rule .	—
Ruleset Name	Name of the rule set.	—
From	Name of the routing instance/zone/interface from which the packet flows.	—

Table 127: Summary of Key Destination NAT Output Fields (continued)

Field	Values	Action
Source address range	Source IP address range in the source pool.	—
Destination address range	Destination IP address range in the source pool.	—
Destination port	Destination port in the destination pool.	—
IP protocol	IP protocol.	—
Action	Action taken for a packet that matches a rule.	—
Alarm threshold	Utilization alarm threshold.	—
Sessions (Succ/ Failed/ Current)	Successful, failed, and current sessions. <ul style="list-style-type: none"> Succ—Number of successful session installations after the NAT rule is matched. Failed—Number of unsuccessful session installations after the NAT rule is matched. Current—Number of sessions that reference the specified rule. 	—
Translation hits	Number of times a translation in the translation table is used for a destination NAT rule.	—
Pools		
Pool Name	The names of the pools.	Select all pools or a specific pool to display from the list.
Total Pools	Total pools added.	—
ID	ID of the pool.	—
Name	Name of the destination pool.	—
Address range	IP address range in the destination pool.	—
Port	Destination port number in the pool.	—
Routing instance	Name of the routing instance.	—

Table 127: Summary of Key Destination NAT Output Fields (continued)

Field	Values	Action
Total addresses	Total IP address, IP address set, or address book entry.	–
Translation hits	Number of times a translation in the translation table is used for destination NAT.	–
Top 10 Translation Hits		
Graph	Displays the graph of top 10 translation hits.	–

Monitoring Static NAT Information

Purpose View static NAT rule information.

Action Select **Monitor>NAT>Static NAT** in the J-Web user interface, or enter the following CLI command:

show security nat static rule

Table 128 on page 703 summarizes key output fields in the static NAT display.

Table 128: Summary of Key Static NAT Output Fields

Field	Values	Action
Rule-set Name	Name of the rule set.	Select all rule sets or a specific rule set to display from the list.
Total rules	Number of rules configured.	–
ID	Rule ID number.	–
Position	Position of the rule that indicates the order in which it applies to traffic.	–
Name	Name of the rule.	–
Ruleset Name	Name of the rule set.	–
From	Name of the routing instance/interface/zone from which the packet comes	–
Source addresses	Source IP addresses.	–
Source ports	Source port numbers.	–

Table 128: Summary of Key Static NAT Output Fields (continued)

Field	Values	Action
Destination addresses	Destination IP address and subnet mask.	—
Destination ports	Destination port numbers .	—
Host addresses	Name of the host addresses.	—
Host ports	Host port numbers.	
Netmask	Subnet IP address.	—
Host routing instance	Name of the routing instance from which the packet comes.	—
Alarm threshold	Utilization alarm threshold.	—
Sessions (Succ/ Failed/ Current)	Successful, failed, and current sessions. <ul style="list-style-type: none"> • Succ—Number of successful session installations after the NAT rule is matched. • Failed—Number of unsuccessful session installations after the NAT rule is matched. • Current—Number of sessions that reference the specified rule. 	—
Translation hits	Number of times a translation in the translation table is used for a static NAT rule.	—
Top 10 Translation Hits Graph	Displays the graph of top 10 translation hits.	—

Monitoring NAT Incoming Table Information

Purpose View NAT table information.

Action Select **Monitor>NAT>Incoming Table** in the J-Web user interface, or enter the following CLI command:

```
show security nat incoming-table
```

[Table 129 on page 705](#) summarizes key output fields in the incoming table display.

Table 129: Summary of Key Incoming Table Output Fields

Field	Values
Statistics	
In use	Number of entries in the NAT table.
Maximum	Maximum number of entries possible in the NAT table.
Entry allocation failed	Number of entries failed for allocation.
Incoming Table	
Clear	
Destination	Destination IP address and port number.
Host	Host IP address and port number that the destination IP address is mapped to.
References	Number of sessions referencing the entry.
Timeout	Timeout, in seconds, of the entry in the NAT table.
Source-pool	Name of source pool where translation is allocated.

Monitoring Interface NAT Port Information

Purpose View port usage for an interface source pool information.

- Action** To monitoring interface NAT port information, do one of the following:
- If you are using SRX5400, SRX5600, or SRX5800 platforms, select **Monitor>Firewall/NAT>Interface NAT** in the J-Web user interface or enter the CLI command **show security nat interface-nat-ports**.
 - Select **Monitor>NAT>Interface NAT Ports** in the J-Web user interface.

[Table 130 on page 705](#) summarizes key output fields in the interface NAT display.

Table 130: Summary of Key Interface NAT Output Fields

Field	Values	Additional Information
Interface NAT Summary Table		
Pool Index	Port pool index.	—
Total Ports	Total number of ports in a port pool.	—
Single Ports Allocated	Number of ports allocated one at a time that are in use.	—

Table 130: Summary of Key Interface NAT Output Fields (continued)

Field	Values	Additional Information
Single Ports Available	Number of ports allocated one at a time that are free for use.	—
Twin Ports Allocated	Number of ports allocated two at a time that are in use.	—
Twin Ports Available	Number of ports allocated two at a time that are free for use.	—

- Related Documentation**
- [Monitoring Overview on page 15](#)
 - [Monitoring Interfaces on page 680](#)

Monitoring Events, Services and System

- [Monitoring DHCP Client Bindings on page 707](#)
- [Monitoring Events on page 707](#)
- [Monitoring the System on page 710](#)

Monitoring DHCP Client Bindings

Purpose

View information about DHCP client bindings.

Action

Select **Monitor>Services>DHCP>Binding** in the J-Web user interface, or enter the **show system services dhcp binding** command.

[Table 131 on page 707](#) summarizes the key output fields in the DHCP client binding displays.

Table 131: Summary of Key DHCP Client Binding Output Fields

Field	Values	Additional Information
IP Address	List of IP addresses the DHCP server has assigned to clients.	–
Hardware Address	Corresponding media access control (MAC) address of the client.	–
Type	Type of binding assigned to the client: dynamic or static.	–
Lease Expires at	Date and time the lease expires, or never for leases that do not expire.	–

- Related Documentation**
- [Monitoring PPPoE on page 688](#)
 - [Understanding DHCP Client Operation](#)

Monitoring Events

Purpose

Use the monitoring functionality to view the events page.

Action To monitor events select **Monitor>Events and Alarms>View Events** in the J-Web user interface.



NOTE: When you use an HTTPS connection in the Microsoft Internet Explorer browser to save a report from this page in the J-Web interface, the error message "Internet Explorer was not able to open the Internet site" is displayed. This problem occurs because the Cache-Control: no cache HTTP header is added on the server side and Internet Explorer does not allow you to download the encrypted file with the Cache-Control: no cache HTTP header set in the response from the server.

As a workaround, refer to Microsoft Knowledge Base article 323308, which is available at this URL: <http://support.microsoft.com/kb/323308>. Also, you can alternatively use HTTP in the Internet Explorer browser or use HTTPS in the Mozilla Firefox browser to save a file from this page.

Meaning Table 132 on page 708 summarizes key output fields in the events page.

Table 132: Events Monitoring Page

Field	Value	Additional Information
Events Filter		
System Log File	Specifies the name of the system log file that records errors and events.	-
Process	Specifies the system processes that generate the events to display.	-
Include archived files	Specifies to enable the option to include archived files.	Select to enable.
Date From	Specifies the beginning date range to monitor. Set the date using the calendar pick tool.	-
To	Specifies the end of the date range to monitor. Set the date using the calendar pick tool.	-
Event ID	Specifies the specific ID of the error or event to monitor.	-
Description	Enter a description for the errors or events.	-
Search	Fetches the errors and events specified in the search criteria.	-

Table 132: Events Monitoring Page (continued)

Field	Value	Additional Information
Reset	Clears the cache of errors and events that were previously selected.	-
Generate Report	Creates an HTML report based on the specified parameters.	-
Events Detail		
Process	Displays the system process that generated the error or event.	-
Severity	<p>Displays the severity level that indicates how seriously the triggering event affects routing platform functions. Only messages from the facility that are rated at that level or higher are logged. Possible severities and their corresponding color code are:</p> <ul style="list-style-type: none"> • Debug/Info/Notice(Green)—Indicates conditions that are not errors but are of interest or might warrant special handling. • Warning (Yellow) – Indicates conditions that warrant monitoring. • Error (Blue) – Indicates standard error conditions that generally have less serious consequences than errors in the emergency, alert, and critical levels. • Critical (Pink) – Indicates critical conditions, such as hard drive errors. • Alert (Orange) – Indicates conditions that require immediate correction, such as a corrupted system database. • Emergency (Red) – Indicates system panic or other conditions that cause the routing platform to stop functioning. 	-
Event ID	Displays the unique ID of the error or event. The prefix on each code identifies the generating software process. The rest of the code indicates the specific event or error.	-
Event Description	Displays a more detailed explanation of the message.	-
Time	Time that the error or event occurred.	-

- Related Documentation**
- [Monitoring Alarms on page 478](#)
 - [Monitoring Security Events by Policy on page 631](#)

Monitoring the System

The J-Web user interface lets you monitor a device's physical characteristics, current processing status and alarms, and ongoing resource utilization to quickly assess the condition of a device at any time.

On SRX Series devices, the **Dashboard** lets you customize your view by selecting which informational panes to include on the Dashboard.

This section contains the following topics:

- [Monitoring System Properties for SRX Series Devices on page 710](#)
- [Monitoring Chassis Information on page 712](#)
- [System Health Management for SRX Series Devices on page 714](#)

Monitoring System Properties for SRX Series Devices

Purpose View system properties and customize the Dashboard.

When you start the J-Web user interface on an SRX Series device, the interface opens to the Dashboard. At the top and bottom of the page, the Dashboard displays an interactive representation of your device and a current log messages pane. By default, the center panes of the Dashboard display System Information, Resource Utilization, Security Resources, and System Alarms. However, you can customize the Dashboard panes to provide the best overview of your system.

Action To control the content and appearance of the Dashboard:

1. Click the **Preferences** icon at the top-right corner of the page. The Dashboard Preference dialog box appears.
2. Select the types of information you want to display.
3. (Optional) Specify the Automatically Refresh Data option to specify how often you want the data on the Dashboard to be refreshed.
4. Click **OK** to save the configuration or **Cancel** to clear it.
5. On the Dashboard, minimize, maximize, or drag the individual information panes to customize the display as needed.

Chassis View—Displays an image of the device chassis, including line cards, link states, errors, individual PICs, FPCs, fans, and power supplies.

You can use the Chassis View to link to corresponding configuration and monitoring pages for the device. To link to interface configuration pages for a selected port from

the Chassis View, right-click the port in the device image and choose one of the following options:

- Chassis Information—Links to the Chassis page.
- Configure Port: *Port-name*—Links to the interfaces configuration page for the selected port.
- Monitor Port: *Port-name*—Links to the monitor interfaces page for the selected port.

System Identification—Displays the device's serial number, hostname, current software version, the BIOS version, the amount of time since the device was last booted, and the system's time.



NOTE:

- To view the BIOS version under system identification, delete your browser cookies.
- The hostname that appears in this pane is defined using the `set system hostname` command.

On SRX Series devices, security logs were always timestamped using the UTC time zone by running `set system time-zone utc` and `set security log utc-timestamp` CLI commands. Now, time zone can be defined using the local time zone by running the `set system time-zone time-zone` command to specify the local time zone that the system should use when timestamping the security logs.

Resource Utilization—Provides a graphic representation of resource use. Each bar represents the percentage of CPU, memory, or storage utilization for the data plane or the control plane.

Security Resources—Provides the maximum, configured, and active sessions; firewall and VPN policies; and IPsec VPNs. Click **Sessions**, **FW/VPN Policies**, or **IPsec VPNs** for detailed statistics about each category.

System Alarms—Indicates a missing rescue configuration or software license, where valid. System alarms are preset and cannot be modified.

File Usage—Displays the usage statistics for log files, temporary files, crash (core) files, and database files.

Login Sessions—Provides a list of all currently logged in sessions. The display includes user credentials, login time, and idle time for each session.

Chassis Status—Provides a snapshot of the current physical condition of the device, including temperature and fan status.

Storage Usage—Displays the storage usage report in detail.

Threat Activity—Provides information about the most current threats received on the device.

Message Logs—Displays log messages and errors. You can clear old logs from the Message Logs pane by clicking the Clear button.

To control the information that is displayed in the Chassis View, use the following options:

- To view an image of the front of the device, right-click the image and choose **View Front**.
- To view an image of the back of the device, right-click the image and choose **View Rear**.
- To enlarge or shrink the device view, use the **Zoom** bar.
- To return the device image to its original position and size, click **Reset**.



NOTE: To use the Chassis View, a recent version of Adobe Flash that supports ActionScript and AJAX (Version 9) must be installed. Also note that the Chassis View appears by default on the Dashboard page. You can enable or disable it using options in the Dashboard Preference dialog box. Clearing cookies in Internet Explorer also causes the Chassis View appear on the Dashboard page.

To return to the Dashboard at any time, select **Dashboard** in the J-Web user interface.

Alternatively, you can view system properties by entering the following **show** commands in the CLI:

- **show system uptime**
- **show system users**
- **show system storage**
- **show version**
- **show chassis hardware**

Monitoring Chassis Information

Purpose View chassis properties, which include the status of hardware components on the device.

Action To view these chassis properties, select **Monitor>System View>Chassis Information** in the J-Web user interface.



CAUTION: Do not install a combination of Physical Interface Modules (PIMs) in a single chassis that exceeds the maximum power and heat capacity of the chassis. If power management is enabled, PIMs that exceed the maximum power and heat limits remain offline when the chassis is powered on. To check PIM power and heat status, use the `show chassis fpc` and `show chassis power-ratings` commands.

The Chassis Information page displays the following types of information:

- Routing Engine Details—This section of the page includes the following tabs:
 - Master—Master tab displays information about the routing engine, including the routing engine module, model number, version, part number, serial number, memory utilization, temperature, and start time. Additionally, this tab displays the CPU load averages for the last 1, 5, and 15 minutes.
 - Backup—If a backup routing engine is available, the Backup tab displays the routing engine module, model number, version, part number, serial number, memory utilization, temperature, and start time. Additionally, this tab displays the CPU load averages for the last 1, 5, and 15 minutes.



NOTE: If you need to contact customer support about the device chassis, supply them with the version and serial number displayed in the Routing Engine Details section of the page.

- Power and Fan Tray Details—This Details section of the page includes the following tabs:
 - Power—Power tab displays the names of the device's power supply units and their statuses.
 - Fan—Fan tab displays the names of the device's fans and their speeds (normal or high). (The fan speeds are adjusted automatically according to the current temperature.)
- Chassis Component Details—This section of the page includes the following tabs:
 - General—General tab displays the version number, part number, serial number, and description of the selected device component.
 - Temperature—Temperature tab displays the temperature of the selected device component (if applicable).
 - Resource—Resource tab displays the state, total CPU DRAM, and start time of the selected device component (if applicable).



NOTE: On some devices, you can have an FPC state as “offline.” You might want to put an FPC offline because of an error or if the FPC is not responding. You can put the FPC offline by using the CLI command `request chassis fpc slot number offline`.

- Sub-Component—Sub-Component tab displays information about the device’s sub-components (if applicable). Details include the sub-component’s version, part number, serial number, and description.

To control which component details appear, select a hardware component from the **Select component** list.

Alternatively, you can view chassis details by entering the following **show** commands in the CLI configuration editor:

- `show chassis hardware`
- `show chassis routing-engine`
- `show chassis environment`
- `show chassis redundant-power-supply`
- `show redundant-power-supply status`

- See Also**
- *Monitoring Cluster Status*
 - *Monitoring Cluster Statistics*

System Health Management for SRX Series Devices

Purpose Tracking the utilization of critical resources in the system ensures that all parameters are within normal limits and the system remains functional.

In the event of a malfunction caused by abnormal resource usage, the system health management feature provides the right diagnostic information to identify the source of the problem.

When the system health management action is configured by the user, the system takes appropriate monitoring, preventive, and recovery actions to ensure that the system is accessible. The system configuration might be updated based on the information collected by system health management feature to ensure that the system stays in the normal operating environment. For example, when a system runs out of memory, then the configuration associated with applications identified to be consuming memory resources can be updated to bring down the memory resource consumption.

Action The system health management feature periodically monitors critical system resources against configurable thresholds. The resources that can be monitored include CPU usage,

memory, storage, open-file-descriptor, process-count, and temperature. The system health management feature collects usage information for each resource at the configured interval and compares it against the three levels of thresholds: moderate, high, and critical. Based on the configurations, appropriate action is taken.

The intervals, thresholds, and action are associated with system health management and can be configured at both the resource level and the global level. Configurable and default levels are as follows:

- Default configuration level— Default configuration is applied when system health monitoring is enabled, and neither a global nor a resource-specific configuration is present.
- Global configuration level—Configuration that is applied to resources when no resource-specific configuration is available.
- Resource-specific configuration level—Configuration that, if available, overrides both the global and the default configurations.

Per-resource configurations take precedence over the global configuration, and a global configuration takes precedence over the defaults.

When resource usage exceeds the configured thresholds, the system collects information that can be used to find the source of the increased usage and saves it in history for analysis and action.

When resource utilization exceeds the high threshold, a minor system alarm is generated, and the alarm LED lights yellow. When resource utilization exceeds the critical threshold, a major alarm is generated, and the alarm LED lights red.

An SNMP trap is also sent to the remote monitoring server (NMS) for all events that exceed the threshold.

To enable the system health monitor, use the **set snmp health-monitor routing engine** command. You can view system properties by using CLI show commands.

- Related Documentation**
- [Monitoring Overview on page 15](#)
 - [Monitoring Interfaces on page 680](#)

Monitoring Unified Threat Management Features

- [Monitoring Antivirus Scan Engine Status on page 717](#)
- [Monitoring Antivirus Scan Results on page 718](#)
- [Monitoring Antivirus Session Status on page 720](#)
- [Monitoring Content Filtering Configurations on page 721](#)
- [Monitoring Reports on page 722](#)
- [Monitoring Web Filtering Configurations on page 728](#)

Monitoring Antivirus Scan Engine Status

Purpose The Monitoring Antivirus Scan Engine Status is not supported from Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1 onwards. For previous releases, using the CLI, you can view the following scan engine status items:

Antivirus license key status

- View license expiration dates.

Scan engine status and settings

- View last action result.
- View default file extension list.

Antivirus pattern update server settings

- View update URL (HTTP or HTTPS-based).
- View update interval.

Antivirus pattern database status

- View auto update status.
- View last result of database loading.
- If the download completes, view database version timestamp virus record number.
- If the download fails, view failure reason.

Action In the CLI, enter the `user@host> show security utm anti-virus status` command.

Example status result:

```
AV Key Expire Date: 03/01/2010 00:00:00
Update Server: http://update.juniper-updates.net/AV/device-name
interval: 60 minutes
auto update status: next update in 12 minutes
last result: new database loaded
AV signature version: 12/21/2008 00:35 GMT, virus records: 154018
Scan Engine Info: last action result: No error(0x00000000)
```

Release History Table

Release	Description
15.1X49-D10	The Monitoring Antivirus Scan Engine Status is not supported from Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1 onwards.

Related Documentation

- *Understanding the Full Antivirus Scan Engine*

Monitoring Antivirus Scan Results

Purpose The Monitoring Antivirus Scan Results are not supported from Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1 onwards. For previous releases, view statistics for antivirus requests, scan results, and fallback counters.

Scan requests provide

- The total number of scan request forwarded to the engine.
- The number of scan request being pre-windowed.
- The number of scan requests using scan-all mode.
- The number of scan requests using scan-by-extension mode.

Scan code counters provide

- Number of clean files.
- Number of infected files.
- Number of password protected files.
- Number of decompress layers.
- Number of corrupt files.
- When the engine is out of resources.
- When there is an internal error.

Fallback applied status provides either a log-and-permit or block result when the following has occurred

- Scan engine not ready.
- Maximum content size reached.
- Too many requests.
- Password protected file found.
- Decompress layer too large.
- Corrupt file found.
- Timeout occurred.
- Out of resources.
- Other.

Action To view antivirus scan results using the CLI editor, enter the **user@host> show security utm anti-virus statistics status** command.

To view antivirus scan results using J-Web:

1. Select **Monitor>Security>UTM>Anti-Virus**.

The following information becomes viewable in the right pane.

Antivirus license key status

- View license expiration dates.

Antivirus pattern update server settings

- View update URL (HTTP or HTTPS-based).
- View update interval.

Antivirus pattern database status

- View auto update status.
- View last result of database loading.
- If the download completes, view database version timestamp virus record number.
- If the download fails, view failure reason.

Antivirus statistics provide

- The number of scan request being pre-windowed.
- The total number of scan request forwarded to the engine.
- The number of scan requests using scan-all mode.
- The number of scan requests using scan-by-extension mode.

Scan code counters provide

- Number of clean files.
- Number of infected files.
- Number of password protected files.
- Number of decompress layers.
- Number of corrupt files.
- When the engine is out of resources.
- When there is an internal error.

Fallback applied status provides either a log-and-permit or block result when the following has occurred

- Scan engine not ready.
- Password protected file found.
- Decompress layer too large.
- Corrupt file found.
- Out of resources.
- Timeout occurred.
- Maximum content size reached.
- Too many requests.
- Other.

2. You can click the **Clear Anti-Virus Statistics** button to clear all current viewable statistics and begin collecting new statistics.

Release History Table

Release	Description
15.1X49-D10	The Monitoring Antivirus Scan Results are not supported from Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1 onwards.

Monitoring Antivirus Session Status

Purpose The Monitoring Antivirus Session Status is not supported from Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1 onwards. For previous releases, using the CLI, you can view the following session status items:

Antivirus session status displays a snapshot of current antivirus sessions. It includes

- Maximum supported antivirus session numbers.
- Total allocated antivirus session numbers.

- Total freed antivirus session numbers.
- Current active antivirus session numbers.

Action In the CLI, enter the `user@host> show security utm session status` command.

Release History Table

Release	Description
15.1X49-D10	The Monitoring Antivirus Session Status is not supported from Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1 onwards.

Monitoring Content Filtering Configurations

Purpose View content filtering statistics.

Action To view content filtering statistics in the CLI, enter the `user@host > show security utm content-filtering statistics` command.

The content filtering **show statistics** command displays the following information:

```
Base on command list: # Blocked
Base on mime list: # Blocked
Base on extension list: # Blocked
ActiveX plugin: # Blocked
Java applet: # Blocked
EXE files: # Blocked
ZIP files: # Blocked
HTTP cookie: # Blocked
```

To view content filtering statistics using J-Web:

1. Select **Clear Content filtering statistics**Monitor>Security>UTM>Content FilteringMonitor>Security>UTM>Content Filtering.

The following statistics become viewable in the right pane.

```
Base on command list: # Passed # Blocked
Base on mime list: # Passed # Blocked
Base on extension list: # Passed # Blocked
ActiveX plugin: # Passed # Blocked
Java applet: # Passed # Blocked
EXE files: # Passed # Blocked
ZIP files: # Passed # Blocked
HTTP cookie: # Passed # Blocked
```

2. You can click **Clear Content filtering statistics** to clear all current viewable statistics and begin collecting new statistics.

Monitoring Reports

On-box reporting offers a comprehensive reporting facility where your security management team can spot a security event when it occurs, immediately access and review pertinent details about the event, and quickly decide appropriate remedial action. The J-Web reporting feature provides one- or two-page reports that are equivalent to a compilation of numerous log entries.

This section contains the following topics:

- [Threats Monitoring Report on page 722](#)
- [Traffic Monitoring Report on page 726](#)

Threats Monitoring Report

Purpose Use the Threats Report to monitor general statistics and activity reports of current threats to the network. You can analyze logging data for threat type, source and destination details, and threat frequency information. The report calculates, displays, and refreshes the statistics, providing graphic presentations of the current state of the network.

Action To view the Threats Report:

1. Click **Threats Report** in the bottom right of the Dashboard, or select **Monitor>Reports>Threats** in the J-Web user interface. The Threats Report appears.
2. Select one of the following tabs:
 - **Statistics** tab. See [Table 133 on page 722](#) for a description of the page content.
 - **Activities** tab. See [Table 134 on page 724](#) for a description of the page content.

Table 133: Statistics Tab Output in the Threats Report

Field	Description
General Statistics Pane	
Threat Category	<p>One of the following categories of threats:</p> <ul style="list-style-type: none"> • Traffic • IDP • Content Security <ul style="list-style-type: none"> • Antivirus • Antispam • Web Filter—Click the Web filter category to display counters for 39 subcategories. • Content Filter • Firewall Event

Table 133: Statistics Tab Output in the Threats Report (continued)

Field	Description
Severity	Severity level of the threat: <ul style="list-style-type: none"> • emerg • alert • crit • err • warning • notice • info • debug
Hits in past 24 hours	Number of threats encountered per category in the past 24 hours.
Hits in current hour	Number of threats encountered per category in the last hour.
Threat Counts in the Past 24 Hours	
By Severity	Graph representing the number of threats received each hour for the past 24 hours sorted by severity level.
By Category	Graph representing the number of threats received each hour for the past 24 hours sorted by category.
X Axis	Twenty-four hour span with the current hour occupying the right-most column of the display. The graph shifts to the left every hour.
Y Axis	Number of threats encountered. The axis automatically scales based on the number of threats encountered.
Most Recent Threats	
Threat Name	Names of the most recent threats. Depending on the threat category, you can click the threat name to go to a scan engine site for a threat description.
Category	Category of each threat: <ul style="list-style-type: none"> • Traffic • IDP • Content Security <ul style="list-style-type: none"> • Antivirus • Antispam • Web Filter • Content Filter • Firewall Event
Source IP/Port	Source IP address (and port number, if applicable) of the threat.
Destination IP/Port	Destination IP address (and port number, if applicable) of the threat.

Table 133: Statistics Tab Output in the Threats Report (continued)

Field	Description
Protocol	Protocol name of the threat.
Description	Threat identification based on the category type: <ul style="list-style-type: none"> • Antivirus—URL • Web filter—category • Content filter—reason • Antispam—sender e-mail
Action	Action taken in response to the threat.
Hit Time	Time the threat occurred.
Threat Trend in past 24 hours	
Category	Pie chart graphic representing comparative threat counts by category: <ul style="list-style-type: none"> • Traffic • IDP • Content Security <ul style="list-style-type: none"> • Antivirus • Antispam • Web Filter • Content Filter • Firewall Event
Web Filter Counters Summary	
Category	Web filter count broken down by up to 39 subcategories. Clicking on the Web filter listing in the General Statistics pane opens the Web Filter Counters Summary pane.
Hits in past 24 hours	Number of threats per subcategory in the last 24 hours.
Hits in current hour	Number of threats per subcategory in the last hour.

Table 134: Activities Tab Output in the Threats Report

Field	Function
Most Recent Virus Hits	
Threat Name	Name of the virus threat. Viruses can be based on services, like Web, FTP, or e-mail, or based on severity level.

Table 134: Activities Tab Output in the Threats Report (continued)

Field	Function
Severity	Severity level of each threat: <ul style="list-style-type: none"> • emerg • alert • crit • err • warning • notice • info • debug
Source IP/Port	IP address (and port number, if applicable) of the source of the threat.
Destination IP/Port	IP address (and port number, if applicable) of the destination of the threat.
Protocol	Protocol name of the threat.
Description	Threat identification based on the category type: <ul style="list-style-type: none"> • Antivirus—URL • Web filter—category • Content filter—reason • Antispam—sender e-mail
Action	Action taken in response to the threat.
Last Hit Time	Last time the threat occurred.
Most Recent Spam E-Mail Senders	
From e-mail	E-mail address that was the source of the spam.
Severity	Severity level of the threat: <ul style="list-style-type: none"> • emerg • alert • crit • err • warning • notice • info • debug
Source IP	IP address of the source of the threat.
Action	Action taken in response to the threat.
Last Send Time	Last time that the spam e-mail was sent.

Table 134: Activities Tab Output in the Threats Report (continued)

Field	Function
Recently Blocked URL Requests	
URL	URL request that was blocked.
Source IP/Port	IP address (and port number, if applicable) of the source.
Destination IP/Port	IP address (and port number, if applicable) of the destination.
Hits in current hour	Number of threats encountered in the last hour.
Most Recent IDP Attacks	
Attack	
Severity	Severity of each threat: <ul style="list-style-type: none"> • emerg • alert • crit • err • warning • notice • info • debug
Source IP/Port	IP address (and port number, if applicable) of the source.
Destination IP/Port	IP address (and port number, if applicable) of the destination.
Protocol	Protocol name of the threat.
Action	Action taken in response to the threat.
Last Send Time	Last time the IDP threat was sent.

- See Also**
- [Traffic Monitoring Report on page 726](#)
 - [Monitoring Address Pools on page 677](#)

Traffic Monitoring Report

- Purpose** Monitor network traffic by reviewing reports of flow sessions over the past 24 hours. You can analyze logging data for connection statistics and session usage by a transport protocol.

Action To view network traffic in the past 24 hours, select **Monitor>Reports>Traffic** in the J-Web user interface. See [Table 135 on page 727](#) for a description of the report.

Table 135: Traffic Report Output

Field	Description
Sessions in Past 24 Hours per Protocol	
Protocol Name	Name of the protocol. To see hourly activity by protocol, click the protocol name and review the "Protocol activities chart" in the lower pane. <ul style="list-style-type: none"> • TCP • UDP • ICMP
Total Session	Total number of sessions for the protocol in the past 24 hours.
Bytes In (KB)	Total number of incoming bytes in KB.
Bytes Out (KB)	Total number of outgoing bytes in KB.
Packets In	Total number of incoming packets.
Packets Out	Total number of outgoing packets.
Most Recently Closed Sessions	
Source IP/Port	Source IP address (and port number, if applicable) of the closed session.
Destination IP/Port	Destination IP address (and port number, if applicable) of the closed session.
Protocol	Protocol of the closed session. <ul style="list-style-type: none"> • TCP • UDP • ICMP
Bytes In (KB)	Total number of incoming bytes in KB.
Bytes Out (KB)	Total number of outgoing bytes in KB.
Packets In	Total number of incoming packets.
Packets Out	Total number of outgoing packets.
Timestamp	The time the session was closed.
Protocol Activities Chart	
Bytes In/Out	Graphic representation of traffic as incoming and outgoing bytes per hour. The byte count is for the protocol selected in the Sessions in Past 24 Hours per Protocol pane. Changing the selection causes this chart to refresh immediately.

Table 135: Traffic Report Output (continued)

Field	Description
Packets In/Out	Graphic representation of traffic as incoming and outgoing packets per hour. The packet count is for the protocol selected in the Sessions in Past 24 Hours per Protocol pane. Changing the selection causes this chart to refresh immediately.
Sessions	Graphic representation of traffic as the number of sessions per hour. The session count is for the protocol selected in the Sessions in Past 24 Hours per Protocol pane. Changing the selection causes this chart to refresh immediately.
X Axis	One hour per column for 24 hours.
Y Axis	Byte, packet, or session count.
Protocol Session Chart	
Sessions by Protocol	Graphic representation of the traffic as the current session count per protocol. The protocols displayed are TCP, UDP, and ICMP.

See Also • [Threats Monitoring Report on page 722](#)

Related Documentation • [Monitoring Overview on page 15](#)
• [Monitoring Interfaces on page 680](#)

Monitoring Web Filtering Configurations

Purpose View Web-filtering statistics.

Action To view Web-filtering statistics using the CLI, enter the following commands:

```
user@host> show security utm web-filtering status
user@host> show security utm web-filtering statistics
```

To view Web-filtering statistics using J-Web:

1. Select **Clear Web Filtering Statistics**.

The following information is displayed in the right pane.

```
Total Requests: #
White List Hit: #
Black List Hit: #
Queries to Server: #
Server Reply Permit: #
Server Reply Block: #
Custom Category Permit: #
Custom Category Block: #
```

```
Cache Hit Permit: #  
Cache Hit Block: #  
Web Filtering Session Total: #  
Web Filtering Session Inuse: #  
Fall Back: Log-and-Permit Block  
Default # #  
Timeout # #  
Server-Connectivity # #  
Too-Many-Requests # #
```

2. You can click the **Clear Web Filtering Statistics** button to clear all current viewable statistics and begin collecting new statistics.

- Related Documentation**
- *Web Filtering Overview*
 - *Example: Configuring Enhanced Web Filtering*

Monitoring VPNs

- [Monitoring VPNs on page 731](#)

Monitoring VPNs

This section contains the following topics:

- [Monitoring IKE Gateway Information on page 731](#)
- [Monitoring IPsec VPN—Phase I on page 735](#)
- [Monitoring IPsec VPN—Phase II on page 736](#)
- [Monitoring IPsec VPN Information on page 737](#)

Monitoring IKE Gateway Information

Purpose View information about IKE security associations (SAs).

Action Select **Monitor>IPSec VPN>IKE Gateway** in the J-Web user interface. To view detailed information for a particular SA, select the IKE SA index on the IKE gateway page.

Alternatively, enter the following CLI commands:

- **show security ike security-associations**
- **show security ike security-associations index *index-id* detail**

[Table 136 on page 731](#) summarizes key output fields in the IKE gateway display.

Table 136: Summary of Key IKE SA Information Output Fields

Field	Values	Additional Information
IKE Security Associations		
IKE SA Index	Index number of an SA.	This number is an internally generated number you can use to display information about a single SA.
Remote Address	IP address of the destination peer with which the local peer communicates.	—

Table 136: Summary of Key IKE SA Information Output Fields (continued)

Field	Values	Additional Information
State	State of the IKE security associations: <ul style="list-style-type: none"> • DOWN—SA has not been negotiated with the peer. • UP—SA has been negotiated with the peer. 	—
Initiator cookie	Random number, called a cookie, which is sent to the remote node when the IKE negotiation is triggered.	—
Responder cookie	Random number generated by the remote node and sent back to the initiator as a verification that the packets were received.	A cookie is aimed at protecting the computing resources from attack without spending excessive CPU resources to determine the cookie's authenticity.
Mode	Negotiation method agreed on by the two IPsec endpoints, or peers, used to exchange information between themselves. Each exchange type determines the number of messages and the payload types that are contained in each message. The modes, or exchange types, are: <ul style="list-style-type: none"> • Main—The exchange is done with six messages. This mode, or exchange type, encrypts the payload, protecting the identity of the neighbor. The authentication method used is displayed: preshared keys or certificate. • Aggressive—The exchange is done with three messages. This mode, or exchange type, does not encrypt the payload, leaving the identity of the neighbor unprotected. 	—
IKE Security Association (SA) Index		
IKE Peer	IP address of the destination peer with which the local peer communicates.	—
IKE SA Index	Index number of an SA.	This number is an internally generated number you can use to display information about a single SA.
Role	Part played in the IKE session. The device triggering the IKE negotiation is the initiator, and the device accepting the first IKE exchange packets is the responder.	—
State	State of the IKE security associations: <ul style="list-style-type: none"> • DOWN—SA has not been negotiated with the peer. • UP—SA has been negotiated with the peer. 	—

Table 136: Summary of Key IKE SA Information Output Fields (continued)

Field	Values	Additional Information
Initiator cookie	Random number, called a cookie, which is sent to the remote node when the IKE negotiation is triggered.	–
Responder cookie	Random number generated by the remote node and sent back to the initiator as a verification that the packets were received.	A cookie is aimed at protecting the computing resources from attack without spending excessive CPU resources to determine the cookie's authenticity.
Exchange Type	<p>Negotiation method agreed on by the two IPsec endpoints, or peers, used to exchange information between themselves. Each exchange type determines the number of messages and the payload types that are contained in each message. The modes, or exchange types, are:</p> <ul style="list-style-type: none"> • Main—The exchange is done with six messages. This mode, or exchange type, encrypts the payload, protecting the identity of the neighbor. The authentication method used is displayed: preshared keys or certificate. • Aggressive—The exchange is done with three messages. This mode, or exchange type, does not encrypt the payload, leaving the identity of the neighbor unprotected. 	–
Authentication Method	Path chosen for authentication.	–
Local	Address of the local peer.	–
Remote	Address of the remote peer.	–
Lifetime	Number of seconds remaining until the IKE SA expires.	–

Table 136: Summary of Key IKE SA Information Output Fields (continued)

Field	Values	Additional Information
Algorithm	<p>IKE algorithms used to encrypt and secure exchanges between the peers during the IPsec Phase 2 process:</p> <ul style="list-style-type: none"> • Authentication—Type of authentication algorithm used. <ul style="list-style-type: none"> • sha1—Secure Hash Algorithm 1 (SHA-1) authentication. • md5—MD5 authentication. • Encryption—Type of encryption algorithm used. <ul style="list-style-type: none"> • aes-256-cbc—Advanced Encryption Standard (AES) 256-bit encryption. • aes-192-cbc—Advanced Encryption Standard (AES) 192-bit encryption. • aes-128-cbc—Advanced Encryption Standard (AES) 128-bit encryption. • 3des-cbc—3 Data Encryption Standard (DES) encryption. • des-cbc—Data Encryption Standard (DES) encryption. • Pseudorandom function—Cryptographically secure pseudorandom function family. 	—
Traffic Statistics	<p>Traffic statistics include the following:</p> <ul style="list-style-type: none"> • Input bytes—The number of bytes presented for processing by the device. • Output bytes—The number of bytes actually processed by the device. • Input packets—The number of packets presented for processing by the device. • Output packets—The number of packets actually processed by the device. 	—
IPsec security associations	<ul style="list-style-type: none"> • number created—The number of SAs created. • number deleted—The number of SAs deleted. 	—
Role	Part played in the IKE session. The device triggering the IKE negotiation is the initiator, and the device accepting the first IKE exchange packets is the responder.	—
Message ID	Message identifier.	—
Local identity	Specifies the identity of the local peer so that its partner destination gateway can communicate with it. The value is specified as any of the following: IPv4 address, fully qualified domain name, e-mail address, or distinguished name.	—

Table 136: Summary of Key IKE SA Information Output Fields (continued)

Field	Values	Additional Information
Remote identity	IPv4 address of the destination peer gateway.	—

Monitoring IPsec VPN—Phase I

Purpose View IPsec VPN Phase I information.

Action Select **Monitor>IPSec VPN>Phase I** in the J-Web user interface.

Table 137 on page 735 describes the available options for monitoring IPsec VPN-Phase I.

Table 137: IPsec VPN—Phase I Monitoring Page

Field	Values	Additional Information
IKE SA Tab Options		
IKE Security Associations		
SA Index	Index number of an SA.	—
Remote Address	IP address of the destination peer with which the local peer communicates.	—
State	State of the IKE security associations: <ul style="list-style-type: none"> DOWN—SA has not been negotiated with the peer. UP—SA has been negotiated with the peer. 	—
Initiator Cookie	Random number, called a cookie, which is sent to the remote node when the IKE negotiation is triggered.	—
Responder Cookie	Random number generated by the remote node and sent back to the initiator as a verification that the packets were received.	A cookie is aimed at protecting the computing resources from attack without spending excessive CPU resources to determine the cookie's authenticity.

Table 137: IPsec VPN—Phase I Monitoring Page (continued)

Field	Values	Additional Information
Mode	<p>Negotiation method agreed upon by the two IPsec endpoints, or peers, used to exchange information. Each exchange type determines the number of messages and the payload types that are contained in each message. The modes, or exchange types, are:</p> <ul style="list-style-type: none"> • Main—The exchange is done with six messages. This mode, or exchange type, encrypts the payload, protecting the identity of the neighbor. The authentication method used is displayed: preshared keys or certificate. • Aggressive—The exchange is done with three messages. This mode, or exchange type, does not encrypt the payload, leaving the identity of the neighbor unprotected. 	—

See Also • [Monitoring IPsec VPN—Phase II on page 736](#)

Monitoring IPsec VPN—Phase II

Purpose View IPsec VPN Phase II information.

Action Select **Monitor>IPSec VPN>Phase II** in the J-Web user interface.

[Table 138 on page 736](#) describes the available options for monitoring IPsec VPN-Phase II.

Table 138: IPsec VPN—Phase II Monitoring Page

Field	Values	Additional Information
Statistics Tab Details		
By bytes	Provides total number of bytes encrypted and decrypted by the local system across the IPsec tunnel.	—
By packets	Provides total number of packets encrypted and decrypted by the local system across the IPsec tunnel.	—
IPsec Statistics	Provides details of the IPsec statistics.	—
IPsec SA Tab Details		
IPsec Security Associations		

Table 138: IPsec VPN—Phase II Monitoring Page (continued)

Field	Values	Additional Information
ID	Index number of the SA.	—
Gateway/Port	IP address of the remote gateway/port.	—
Algorithm	<p>Cryptography scheme used to secure exchanges between peers during the IKE Phase II negotiations:</p> <ul style="list-style-type: none"> An authentication algorithm used to authenticate exchanges between the peers. Options are hmac-md5-95 or hmac-sha1-96. 	—
SPI	<p>Security parameter index (SPI) identifier. An SA is uniquely identified by an SPI. Each entry includes the name of the VPN, the remote gateway address, the SPIs for each direction, the encryption and authentication algorithms, and keys. The peer gateways each have two SAs, one resulting from each of the two phases of negotiation: Phase I and Phase II.</p>	—
Life	The lifetime of the SA, after which it expires, expressed either in seconds or kilobytes.	—
Monitoring	Specifies if VPN-Liveliness Monitoring has been enabled/disabled. Enabled - 'U ', Disabled- '—'	—
Vsys	Specifies the root system.	—

See Also • [Monitoring IPsec VPN—Phase I on page 735](#)

Monitoring IPsec VPN Information

Purpose View information about IPsec security (SAs).

Action Select **Monitor>IPSec VPN>IPsec VPN** in the J-Web user interface. To view the IPsec statistics information for a particular SA, select the IPsec SA ID value on the IPsec VPN page.

Alternatively, enter the following CLI commands:

- `show security ipsec security-associations`
- `show security ipsec statistics`

Table 139 on page 738 summarizes key output fields in the IPsec VPN display.

Table 139: Summary of Key IPsec VPN Information Output Fields

Field	Values	Additional Information
IPsec Security Associations		
Total configured SA	Total number of IPsec security associations (SAs) configured on the device.	—
ID	Index number of the SA.	—
Gateway	IP address of the remote gateway.	—
Port	If Network Address Translation (NAT-T) is used, this value is 4500. Otherwise, it is the standard IKE port, 500.	—
Algorithm	<p>Cryptography used to secure exchanges between peers during the IKE Phase 2 negotiations:</p> <ul style="list-style-type: none"> An authentication algorithm used to authenticate exchanges between the peers. Options are hmac-md5-95 or hmac-sha1-96. An encryption algorithm used to encrypt data traffic. Options are 3des-cbc, aes-128-cbc, aes-192-cbc, aes-256-cbc, or des-cbc. 	—
SPI	Security parameter index (SPI) identifier. An SA is uniquely identified by an SPI. Each entry includes the name of the VPN, the remote gateway address, the SPIs for each direction, the encryption and authentication algorithms, and keys. The peer gateways each have two SAs, one resulting from each of the two phases of negotiation: Phase 1 and Phase 2.	—
Life: sec/kb	The lifetime of the SA, after which it expires, expressed either in seconds or kilobytes.	—
State	<p>State has two options, Installed and Not Installed.</p> <ul style="list-style-type: none"> Installed—The security association is installed in the security association database. Not Installed—The security association is not installed in the security association database. 	For transport mode, the value of State is always Installed .
Vsys	The root system.	—
IPsec Statistics Information		

Table 139: Summary of Key IPsec VPN Information Output Fields (continued)

Field	Values	Additional Information
ESP Statistics	<p>Encapsulation Security Protocol (ESP) statistics include the following:</p> <ul style="list-style-type: none"> • Encrypted bytes—Total number of bytes encrypted by the local system across the IPsec tunnel. • Decrypted bytes—Total number of bytes decrypted by the local system across the IPsec tunnel. • Encrypted packets—Total number of packets encrypted by the local system across the IPsec tunnel. • Decrypted packets—Total number of packets decrypted by the local system across the IPsec tunnel. 	—
AH Statistics	<p>Authentication Header (AH) statistics include the following:</p> <ul style="list-style-type: none"> • Input bytes—The number of bytes presented for processing by the device. • Output bytes—The number of bytes actually processed by the device. • Input packets—The number of packets presented for processing by the device. • Output packets—The number of packets actually processed by the device. 	—
Errors	<p>Errors include the following</p> <ul style="list-style-type: none"> • AH authentication failures—Total number of authentication header (AH) failures. An AH failure occurs when there is a mismatch of the authentication header in a packet transmitted across an IPsec tunnel. • Replay errors—Total number of replay errors. A replay error is generated when a duplicate packet is received within the replay window. • ESP authentication failures—Total number of Encapsulation Security Payload (ESP) failures. An ESP failure occurs when there is an authentication mismatch in ESP packets. • ESP decryption failures—Total number of ESP decryption errors. • Bad headers—Total number of invalid headers detected. • Bad trailers—Total number of invalid trailers detected. 	—
Details for IPsec SA Index: <i>ID</i>		
Virtual System	The root system.	—

Table 139: Summary of Key IPsec VPN Information Output Fields (continued)

Field	Values	Additional Information
Local Gateway	Gateway address of the local system.	—
Remote Gateway	Gateway address of the remote system.	—
Local identity	Specifies the identity of the local peer so that its partner destination gateway can communicate with it. The value is specified as any of the following: IPv4 address, fully qualified domain name, e-mail address, or distinguished name.	—
Remote identity	IPv4 address of the destination peer gateway.	—
Df bit	State of the don't fragment bit— set or cleared .	—
Policy name	Name of the applicable policy.	—
Direction	Direction of the security association— inbound , or outbound .	—
SPI	Security parameter index (SPI) identifier. An SA is uniquely identified by an SPI. Each entry includes the name of the VPN, the remote gateway address, the SPIs for each direction, the encryption and authentication algorithms, and keys. The peer gateways each have two SAs, one resulting from each of the two phases of negotiation: Phase 1 and Phase 2.	—
Mode	Mode of the security association. Mode can be transport or tunnel. <ul style="list-style-type: none"> • transport—Protects host-to-host connections. • tunnel—Protects connections between security gateways. 	—
Type	Type of the security association, either manual or dynamic . <ul style="list-style-type: none"> • manual—Security parameters require no negotiation. They are static and are configured by the user. • dynamic—Security parameters are negotiated by the IKE protocol. Dynamic security associations are not supported in transport mode. 	—

Table 139: Summary of Key IPsec VPN Information Output Fields (continued)

Field	Values	Additional Information
State	<p>State has two options, Installed, and Not Installed.</p> <ul style="list-style-type: none"> • Installed—The security association is installed in the security association database. • Not Installed—The security association is not installed in the security association database. 	For transport mode, the value of State is always Installed .
Protocol	<p>Protocol supported:</p> <ul style="list-style-type: none"> • Transport mode supports Encapsulation Security Protocol (ESP) and Authentication Header (AH). • Tunnel mode supports ESP and AH. <ul style="list-style-type: none"> • Authentication—Type of authentication used. • Encryption—Type of encryption used. 	—
Authentication/Encryption	<ul style="list-style-type: none"> • Authentication—Type of authentication algorithm used. <ul style="list-style-type: none"> • sha1—Secure Hash Algorithm 1 (SHA-1) authentication. • md5—MD5 authentication. • Encryption—Type of encryption algorithm used. <ul style="list-style-type: none"> • aes-256-cbc—Advanced Encryption Standard (AES) 256-bit encryption. • aes-192-cbc—Advanced Encryption Standard (AES) 192-bit encryption. • aes-128-cbc—Advanced Encryption Standard (AES) 128-bit encryption. • 3des-cbc—3 Data Encryption Standard (DES) encryption. • des-cbc—Data Encryption Standard (DES) encryption. 	—
Soft Lifetime	<p>The soft lifetime informs the IPsec key management system that the SA is about to expire.</p> <ul style="list-style-type: none"> • Expires in seconds—Number of seconds left until the SA expires. • Expires in kilobytes—Number of kilobytes left until the SA expires. 	Each lifetime of a security association has two display options, hard and soft , one of which must be present for a dynamic security association. This allows the key management system to negotiate a new SA before the hard lifetime expires.
Hard Lifetime	<p>The hard lifetime specifies the lifetime of the SA.</p> <ul style="list-style-type: none"> • Expires in seconds—Number of seconds left until the SA expires. • Expires in kilobytes—Number of kilobytes left until the SA expires. 	—

Table 139: Summary of Key IPsec VPN Information Output Fields (continued)

Field	Values	Additional Information
Anti Replay Service	State of the service that prevents packets from being replayed. It can be Enabled or Disabled .	–
Replay Window Size	Configured size of the antireplay service window. It can be 32 or 64 packets. If the replay window size is 0, the antireplay service is disabled.	The antireplay window size protects the receiver against replay attacks by rejecting old or duplicate packets.

- Related Documentation**
- [Monitoring Overview on page 15](#)
 - [Monitoring Interfaces on page 680](#)

PART 9

Performance Management

- [Ethernet Frame Delay on page 745](#)
- [Configuring Network Analytics on page 753](#)

CHAPTER 32

Ethernet Frame Delay

- [Understanding Ethernet Frame Delay Measurements on Switches on page 745](#)
- [Configuring MEP Interfaces on Switches to Support Ethernet Frame Delay Measurements \(CLI Procedure\) on page 747](#)
- [Configuring One-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\) on page 748](#)
- [Configuring an Iterator Profile on a Switch \(CLI Procedure\) on page 749](#)
- [Triggering an Ethernet Frame Delay Measurement Session on a Switch on page 751](#)
- [Configuring Two-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\) on page 752](#)

Understanding Ethernet Frame Delay Measurements on Switches

Performance management depends on the accurate measurement of service-level agreement (SLA) objective parameters, which can include bandwidth and reliability. In many cases, a service provider could be subject to penalties imposed by regulation, statute, or contract if network performance is not within the bounds established for the service. One key performance objective is delay, along with its close relative, delay variation (often called jitter). Some applications (such as bulk file transfer) will function just as well with high delays across the network and high delay variations, while other applications (such as voice) can function only with low and stable delays. Many networks invoke protocols or features available at Layer 3 (the packet layer) or higher to measure network delays and jitter link by link. However, when the network consists of many Ethernet links, there are few protocols and features available at Layer 2 (the frame layer) that allow routers and switches to measure frame delay and jitter. This is where the ability to configure and monitor Ethernet frame delay is helpful.

This topic includes:

- [Ethernet Frame Delay Measurements on page 745](#)
- [Types of Ethernet Frame Delay Measurements on page 746](#)
- [Limitations on page 747](#)

Ethernet Frame Delay Measurements

You can perform Ethernet frame delay measurements (referred to as ETH-DM in Ethernet specifications) on Juniper Networks EX Series Ethernet Switches. This feature allows

you to configure on-demand Operation, Administration, and Maintenance (OAM) statements for the measurement of frame delay and frame delay variation (jitter). You can configure Ethernet frame delay measurement in either one-way or two-way (round-trip) mode to gather frame delay statistics simultaneously from multiple sessions. Ethernet frame delay measurement provides fine control to operators for triggering delay measurement on a given service and can be used to monitor SLAs.

Ethernet frame delay measurement also collects other useful information, such as worst and best case delays, average delay, and average delay variation. It supports software-assisted timestamping in the receive direction for delay measurements. It also provides runtime display of delay statistics when two-way delay measurement is triggered. Ethernet frame delay measurement records the last 100 samples collected per remote maintenance association end point (MEP) or per connectivity fault management (CFM) session. You can retrieve the history at any time using simple commands. You can clear all Ethernet frame delay measurement statistics and PDU counters. Ethernet frame delay measurement is fully compliant with the ITU-T Y.1731 (*OAM Functions and Mechanisms for Ethernet-based Networks*) specification.

Ethernet frame delay measurement uses the IEEE 802.1ag CFM infrastructure.

Generally, Ethernet frame delay measurements are made in a peer fashion from one MEP or CFM session to another. However, these measurements are not made to maintenance association intermediate points (MIPs).

For a complete description of Ethernet frame delay measurement, see the *ITU-T Y.1731 Ethernet Service OAM* topics in the *Junos OS Network Interfaces Library for Routing Devices*.

Types of Ethernet Frame Delay Measurements

There are two types of Ethernet frame delay measurements:

- One-way
- Two-way (round-trip)

For one-way Ethernet frame delay measurement, either MEP can send a request to begin a one-way delay measurement to its peer MEP. However, the statistics are collected only at the receiver MEP. This feature requires the clocks at the transmitting and receiving MEPs to be synchronized. If these clocks fall out of synchronization, only one-way delay variation and average delay variation values are computed correctly (and will, therefore, be valid). Use the **show** commands at the receiver MEP to display one-way delay statistics.

For two-way (round-trip) Ethernet frame delay measurement, either MEP can send a request to begin a two-way delay measurement to its peer MEP, which responds with timestamp information. Run-time statistics are collected and displayed at the initiator MEP. The clocks do not need to be synchronized at the transmitting and receiving MEPs. Junos OS supports timestamps in delay measurement reply (DMR) frames to increase the accuracy of delay calculations.

Use the **show** commands at the initiator MEP to display two-way delay statistics, and at the receiver MEP to display one-way delay statistics.

You can create an iterator profile to periodically transmit SLA measurement packets in the form of ITU-Y.1731-compliant frames for delay measurement or loss measurement.

Limitations

The following are some limitations with regard to using Ethernet frame delay measurement:

- Ethernet frame delay measurements are available only when distributed periodic packet management (PPM) is enabled.
- The statistics collected are lost after a graceful Routing Engine switchover (GRES).
- You can monitor only one session to the same remote MEP or MAC address.
- Accuracy is compromised when the system configuration changes (such as from reconfiguration). We recommend performing Ethernet frame delay measurements on a stable system.

Related Documentation

- [Configuring MEP Interfaces on Switches to Support Ethernet Frame Delay Measurements \(CLI Procedure\) on page 747](#)
- [Configuring One-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\) on page 748](#)
- [Configuring Two-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\) on page 752](#)
- [Triggering an Ethernet Frame Delay Measurement Session on a Switch on page 751](#)

Configuring MEP Interfaces on Switches to Support Ethernet Frame Delay Measurements (CLI Procedure)

Ethernet frame delay measurement is a useful tool for providing performance statistics or supporting or challenging service-level agreements (SLAs). By default, Ethernet frame delay measurement uses software for timestamping and delay calculations. You can configure an EX Series switch to perform and display Ethernet frame delay measurements on Ethernet interfaces. The switches support software-assisted timestamping.

Before you can begin configuring MEP interfaces to support Ethernet frame delay measurements on switches, ensure that you have:

- Configured Operation, Administration, and Maintenance (OAM) connectivity fault management (CFM) correctly
- Enabled distributed periodic packet management (PPM) (distributed PPM is enabled by default)

To configure MEP interfaces on switches to support Ethernet frame delay measurements:

1. Enable the Ethernet frame delay measurement by issuing the [monitor ethernet delay-measurement](#) operational mode command. In this command, you must specify one measurement type (either one-way or two-way measurement), and you must specify either the unicast MAC address of the peer MEP or its numeric identifier.

Optionally, you can also specify the following parameters:

- Number of frames to send to the peer MEP (**count count**)
- Number of seconds to wait between sending frames (**wait time**)
- Priority value of the delay measurement request frame (**priority value**)
- Size of the data in the data TLV of the request packet (**size value**)
- Suppression of the insertion of the session ID TLV in the request packet (**no-session-id-tlv**)

```
user@switch> monitor ethernet delay-measurement maintenance-domain md-name
maintenance-association ma-name one-way mep remote-mep-id count count wait
time priority value size value no-session-id-tlv
```

**Related
Documentation**

- [Configuring One-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\) on page 748](#)
- [Configuring Two-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\) on page 752](#)
- [Triggering an Ethernet Frame Delay Measurement Session on a Switch on page 751](#)
- [Understanding Ethernet Frame Delay Measurements on Switches on page 745](#)

[Configuring One-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\)](#)

Ethernet frame delay measurement is a useful tool for providing performance statistics or supporting or challenging service-level agreements (SLAs). You can configure the frame delay measurements in either a one-way mode or a two-way (round-trip) mode to gather frame delay statistics. For one-way Ethernet frame delay measurement, clocks at the local and remote MEPs need to be synchronized. However, clock synchronization is not required for two-way Ethernet frame delay measurement.

Before you begin configuring one-way Ethernet frame delay measurements on two EX Series switches, ensure that you have:

- Configured Operation, Administration, and Maintenance (OAM) connectivity fault management (CFM) correctly on both the switches
- Synchronized the system clocks of both the switches

To configure one-way Ethernet frame delay measurements:

1. Configure the maintenance domain, maintenance association, and MEP ID on both the switches.
2. From either switch, start a one-way Ethernet frame delay measurement:

```
user@switch> monitor ethernet delay-measurement maintenance-domain md-name
maintenance-association ma-name one-way mep remote-mep-id count count wait
time
```

You can view the result on the other switch:

```
user@switch> show oam ethernet connectivity-fault-management delay-statistics
maintenance-domain md-name maintenance-association ma-name local-mep mep-id
remote-mep mep-id
```

Related Documentation

- [Configuring MEP Interfaces on Switches to Support Ethernet Frame Delay Measurements \(CLI Procedure\) on page 747](#)
- [Configuring Two-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\) on page 752](#)
- [Triggering an Ethernet Frame Delay Measurement Session on a Switch on page 751](#)
- [Understanding Ethernet Frame Delay Measurements on Switches on page 745](#)

Configuring an Iterator Profile on a Switch (CLI Procedure)

Ethernet frame delay measurement provides fine control to operators for triggering delay measurement on a given service and can be used to monitor service-level agreements (SLAs). You can create an iterator profile with its parameters to periodically transmit SLA measurement packets in the form of ITU-Y.1731-compliant frames for two-way delay measurement.

To create an iterator profile:

1. Specify a name for an SLA iterator profile—for example, i1:

```
[edit protocols oam ethernet connectivity-fault-management performance-monitoring]
user@switch# edit sla-iterator-profiles i1
```

2. (Optional) Configure the cycle time, which is the time (in milliseconds) between back-to-back transmissions of SLA frames.

```
[edit protocols oam ethernet connectivity-fault-management performance-monitoring
sla-iterator-profiles i1]
user@switch# set cycle-time cycle-time-value
```

3. (Optional) Configure the iteration period, which indicates the maximum number of cycles per iteration (the number of connections registered to an iterator cannot exceed this value).

```
[edit protocols oam ethernet connectivity-fault-management performance-monitoring  
sla-iterator-profiles i1]  
user@switch# set iteration-period iteration-period-value
```

4. Configure the measurement type as two-way delay measurement.

```
[edit protocols oam ethernet connectivity-fault-management performance-monitoring  
sla-iterator-profiles i1]  
user@switch# set measurement-type two-way-delay
```

5. (Optional) Configure the calculation weight for delay.

```
[edit protocols oam ethernet connectivity-fault-management performance-monitoring  
sla-iterator-profiles i1]  
user@switch# set calculation-weight delay delay-value
```

6. (Optional) Configure the calculation weight for delay variation.

```
[edit protocols oam ethernet connectivity-fault-management performance-monitoring  
sla-iterator-profiles i1]  
user@switch# set calculation-weight delay-variation delay-variation-value
```

7. Configure a remote MEP with the iterator profile.

```
[edit protocols oam ethernet connectivity-fault-management maintenance-domain  
md-name maintenance-association ma-name mep mep-id remote-mep  
remote-mep-id]  
user@switch# set sla-iterator-profiles i1
```

Related Documentation

- [Configuring MEP Interfaces on Switches to Support Ethernet Frame Delay Measurements \(CLI Procedure\) on page 747](#)
- [Configuring One-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\) on page 748](#)
- [Configuring Two-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\) on page 752](#)
- [Triggering an Ethernet Frame Delay Measurement Session on a Switch on page 751](#)
- [Understanding Ethernet Frame Delay Measurements on Switches on page 745](#)

Triggering an Ethernet Frame Delay Measurement Session on a Switch

To trigger Ethernet frame delay measurement, use the [monitor ethernet delay-measurement](#) operational command and specify the following values:

- Either one-way (**one-way**) or two-way (**two-way**) measurement
- Either the MAC address (**remote-mac-address**) or the MEP ID (**mep**) of the remote host
- The maintenance domain (**maintenance-domain**)
- The maintenance association (**maintenance-association**)
- (Optional) Any or all of these options: **count**, **size**, **wait**, **no-session-id-tlv**, **priority**

For example:

```
user@switch> monitor ethernet delay-measurement one-way 00:05:85:73:39:4a
maintenance-domain md6 maintenance-association ma6 count 10 size 50 wait 5 no-session-id-tlv
priority 1
```

Related Documentation

- [Configuring MEP Interfaces on Switches to Support Ethernet Frame Delay Measurements \(CLI Procedure\) on page 747](#)
- [Configuring One-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\) on page 748](#)
- [Configuring Two-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\) on page 752](#)
- [Understanding Ethernet Frame Delay Measurements on Switches on page 745](#)

Configuring Two-Way Ethernet Frame Delay Measurements on Switches (CLI Procedure)

Ethernet frame delay measurement is a useful tool for providing performance statistics or supporting or challenging service-level agreements (SLAs). You can configure the frame delay measurements in either a one-way mode or a two-way (round-trip) mode to gather frame delay statistics. For one-way Ethernet frame delay measurement, clocks at the local and remote MEPs need to be synchronized. However, clock synchronization is not required for two-way Ethernet frame delay measurement.

Before you begin configuring two-way Ethernet frame delay measurements on two EX Series switches, ensure that you have:

- Configured Operation, Administration, and Maintenance (OAM) connectivity fault management (CFM) correctly on both the switches

To configure two-way Ethernet frame delay measurements:

1. Configure the maintenance domain, maintenance association, and MEP ID on both the switches.
2. From either switch, start a two-way Ethernet frame delay measurement:

```
user@switch> monitor ethernet delay-measurement maintenance-domain md-name
maintenance-association ma-name two-way mep remote-mep-id count count wait
time
```

You can view the result on the other switch:

```
user@switch> show oam ethernet connectivity-fault-management delay-statistics
maintenance-domain md-name maintenance-association ma-name local-mep mep-id
remote-mep mep-id
```

Related Documentation

- [Configuring MEP Interfaces on Switches to Support Ethernet Frame Delay Measurements \(CLI Procedure\) on page 747](#)
- [Configuring One-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\) on page 748](#)
- [Triggering an Ethernet Frame Delay Measurement Session on a Switch on page 751](#)
- [Understanding Ethernet Frame Delay Measurements on Switches on page 745](#)

Configuring Network Analytics

- [Network Analytics Overview on page 753](#)
- [Understanding Enhanced Network Analytics Streaming Data on page 761](#)
- [Understanding Enhanced Analytics Local File Output on page 767](#)
- [Understanding Network Analytics Streaming Data on page 769](#)
- [Understanding Network Analytics Configuration and Status on page 772](#)
- [Prototype File for the Google Protocol Buffer Stream Format on page 773](#)
- [Configuring Queue Monitoring on page 774](#)
- [Configuring Traffic Monitoring on page 776](#)
- [Configuring a Local File for Network Analytics Data on page 777](#)
- [Configuring a Remote Collector for Streaming Analytics Data on page 778](#)
- [Example: Configuring Network Analytics on page 780](#)
- [Example: Configuring Enhanced Network Analytics Features on page 786](#)

Network Analytics Overview

The network analytics feature provides visibility into the performance and behavior of the data center infrastructure. This feature collects data from the switch, analyzes the data using sophisticated algorithms, and captures the results in reports. Network administrators can use the reports to help troubleshoot problems, make decisions, and adjust resources as needed. The analytics manager (analyticsm) in the Packet Forwarding Engine collects traffic and queue statistics, and the analytics daemon (analyticd) in the Routing Engine analyzes the data and generates reports. You can enable network analytics by configuring microburst monitoring and high-frequency traffic statistics monitoring.



NOTE: In Junos OS Release 13.2X51-D15, the network analytics feature was enhanced, and extensive changes were made to the CLI statements and hierarchies. If you upgrade to Junos OS Release 13.2X51-D15 or later from a release prior to 13.2X51-D15, network analytics configurations committed in previous releases will appear on your device, but the feature is disabled. To enable this feature, you must reconfigure it using the new CLI statements and hierarchies.

For more information, see:

- [Analytics Feature Overview on page 754](#)
- [Network Analytics Enhancements Overview on page 755](#)
- [Summary of CLI Changes on page 756](#)

Analytics Feature Overview

You enable network analytics by configuring queue (microburst) monitoring and high-frequency traffic statistics monitoring. You use microburst monitoring to look at traffic queue conditions in the network. A microburst occurrence indicates to the Packet Forwarding Engine that a user-specified queue depth or latency threshold is reached. The queue depth is the buffer (in bytes) containing the data, and latency is the time (in nanoseconds or microseconds) the data stays in the queue.

You can configure queue monitoring based on either queue depth or latency (but not both), and configure the frequency (polling interval) at which the Packet Forwarding Engine checks for microbursts and sends the data to the Routing Engine for processing. You may configure queue monitoring globally for all physical interfaces on the system, or for a specific interface on the switch. However, the specified queue monitoring interval applies either to all interfaces, or none; you cannot configure the interval for each interface.

You use high-frequency traffic statistics monitoring to collect traffic statistics at specified polling intervals. Similar to the queue monitoring interval, the traffic monitoring interval applies either to all interfaces, or none; you cannot configure the interval for each interface.

Both traffic and queue monitoring are disabled by default. You must configure each type of monitoring using the CLI. In each case, the configuration for an interface always takes precedence over the global configuration.



NOTE: You can configure traffic and queue monitoring for physical interfaces only; logical interfaces and Virtual Chassis port (VCP) interfaces are not supported.

The `analyticsd` daemon in the Routing Engine generates local log files containing queue and traffic statistics records. You can specify the log filename and size, and the number of log files. If you do not configure a filename, the data is not saved.

You can display the local log file or specify a server to receive the streaming data containing the queue and traffic statistics.

For each port, information for the last 10 records of traffic statistics and 100 records of queue statistics is cached. You may view this information by using the **show analytics** commands.

To store traceoptions data, you configure the **traceoptions** statement at the **[edit services analytics]** hierarchy level.

Network Analytics Enhancements Overview

Beginning in Junos OS Release 13.2X51-D15, the network analytics feature provides the following enhancements:

- **Resources**—Consist of interfaces and system. The interfaces resource allows you to configure an interface name and an associated resource profile name for each interface. With the system resource, you can configure the polling intervals for queue monitoring and traffic monitoring, and an associated resource profile for the system.
- **Resource profile**—A template that contains the configurations for queue and traffic monitoring, such as depth threshold and latency threshold values, and whether each type of monitoring is enabled or disabled. Once a resource profile is configured, you apply it to a system or interfaces resource.
- **Collector**—A server for collecting queue and traffic monitoring statistics, and can be a local or remote server. You can configure a local server to store monitoring statistics in a log file, or a remote server to receive streamed statistics data.
- **Export profile**—You must configure an export profile if you wish to send streaming data to a remote collector. In the export profile, you define the category of streamed data (system-wide or interface-specific) to determine stream type the collector will receive. You can specify both system and interface stream categories. System data includes system information and status of queue and traffic monitoring. Interface-specific data includes interface information, queue and traffic statistics, and link, queue, and traffic status.
- **Google Protocol Buffer (GBP) stream format**—A new streaming format for monitoring statistics data that is sent to a remote collector in a single AnRecord message. This stream format provides nine types of information, including:
 - **System information**—General system information, including boot time, model information, serial number, number of ports, and so on.
 - **System queue status**—Queue status for the system in general.
 - **System traffic status**—Traffic status for the system in general.
 - **Interface information**—Includes SNMP index, slot, port, and other information.
 - **Queue statistics for interfaces**—Queue statistics for specific interfaces.
 - **Traffic statistics for interfaces**—Traffic statistics for specific interfaces.
 - **Link status for interfaces**—Includes link speed, state, and so on.
 - **Queue status for interfaces**—Queue status for specific interfaces.
 - **Traffic status for interfaces**—Traffic status for specific interfaces.
- **The `analytics.proto` file**—Provides a template for the GBP stream format. This file can be used for writing your analytics server application. To download the file, go to:

https://www.juniper.net/documentation/en_US/junos13.2/topics/reference/proto-files/analytics-proto.txt
- **Use of threshold values**—The Analytics Manager (analyticsm) will generate a queue statistics record when the lower queue depth or latency threshold value is exceeded.

- User Datagram Protocol (UDP)—Additional transport protocol you can configure, in addition to Transmission Control Protocol (TCP), for the remote streaming server port.
- Single file for local logging—Replaces the separate log files for queue and traffic statistics.
- Change in latency measurement—Configuration and reporting of latency values have changed from microseconds to nanoseconds.
- Change in reporting of the collection time in UTC format—Statistics collection time is reported in microseconds instead of milliseconds.
- New operational mode command **show analytics collector**—Replaces the **show analytics streaming-server** command.
- Changes in command output format—Include the following changes:
 - Addition of unicast, multicast, and broadcast packet counters in queue and traffic statistics.
 - Reversal of the sequence of statistics information in the output. The most recent record is displayed at the beginning, and the oldest record at the end of the output.
 - Removal of traffic or queue monitoring status information from the global portion of the **show analytics configuration** and **show analytics status** command output if there is no global configuration.
 - Addition of **n/a** to the interface-specific portion of the **show analytics configuration** and **show analytics status** command output if a parameter is not configured (for example, depth threshold or latency threshold).

Summary of CLI Changes

Beginning in Junos OS Release 13.2X51-D15, enhancements to the network analytics feature result in changes in the CLI when you configure the feature. See [Table 140 on page 756](#) for a summary of CLI changes.

Table 140: Network Analytics CLI Changes

Task	CLI for Junos OS Release 13.2X50-D15 and 13.2X51-D10	CLI for Junos OS Release 13.2X51-D15 and later
Configuring global queue and traffic monitoring polling interval	<pre>[edit services analytics] traffic-statistics { interval <i>interval</i>; } queue-statistics { interval <i>interval</i>; }</pre>	<pre>[edit services analytics] resource { system { polling-interval { queue-monitoring <i>interval</i>; traffic-monitoring <i>interval</i>; } } }</pre>

Table 140: Network Analytics CLI Changes (continued)

Task	CLI for Junos OS Release 13.2X50-D15 and 13.2X51-D10	CLI for Junos OS Release 13.2X51-D15 and later
Configuring local files for traffic and queue statistics reporting	<pre>[edit services analytics] traffic-statistics { file <i>filename</i>; size <i>size</i>; files <i>number</i>; } queue-statistics { file <i>filename</i>; size <i>size</i>; files <i>number</i>; }</pre>	<pre>[edit services analytics] collector { local { file <i>filename</i> { files <i>number</i>; size <i>size</i>; } } }</pre>
Enabling queue statistics and traffic monitoring, and specifying the depth threshold for all interfaces (globally)	<pre>[edit services analytics] interfaces { all { queue-statistics; traffic-statistics; depth-threshold { high <i>number</i>; low <i>number</i>; } } }</pre>	<p>Requires defining a resource profile and applying it to the system:</p> <ol style="list-style-type: none"> To define a resource profile: <pre>[edit services analytics] resource-profiles { <i>profile-name</i> { queue-monitoring; traffic-monitoring; depth-threshold { high <i>number</i>; low <i>number</i>; } } }</pre> To apply a profile to the system: <pre>[edit services analytics] resource { system { resource-profile <i>profile-name</i>; } }</pre>

Table 140: Network Analytics CLI Changes (continued)

Task	CLI for Junos OS Release 13.2X50-D15 and 13.2X51-D10	CLI for Junos OS Release 13.2X51-D15 and later
Enabling queue statistics and traffic monitoring, and specifying the latency threshold for one interface	<pre>[edit services analytics] interfaces { interface { queue-statistics; traffic-statistics; latency-threshold high <i>number</i>; low <i>number</i>; } }</pre>	<p>Requires defining a resource profile and applying it to the interface:</p> <ol style="list-style-type: none"> To define a resource profile: <pre>[edit services analytics] resource-profiles { profile-name { queue-monitoring; traffic-monitoring; latency-threshold { high <i>number</i>; low <i>number</i>; } } }</pre> To apply a profile to the interface: <pre>[edit services analytics] resource { interfaces { interface-name { resource-profile <i>profile-name</i>; } } }</pre>
<p>Configuring the streaming data format (JSON, CSV, or TSV) to send to a remote server</p> <p>NOTE: Junos OS Release 13.2X51-D15 added support for the GPB stream format and configuration of the transport protocols (TCP or UDP).</p>	<pre>[edit services analytics] streaming-servers { address <i>ip-address</i> { port <i>number</i> { stream-format <i>format</i>; } } }</pre>	<p>Requires defining the stream format in an export profile and applying the profile to the collector.</p> <ol style="list-style-type: none"> To configure the stream format: <pre>[edit services analytics] export-profiles { profile-name { stream-format <i>format</i>; } }</pre> To apply an export profile to the collector: <pre>[edit services analytics] collector { address <i>ip-address</i> { port <i>number</i> { transport <i>protocol</i> { export-profile <i>profile-name</i>; } } } }</pre>

Table 140: Network Analytics CLI Changes (continued)

Task	CLI for Junos OS Release 13.2X50-D15 and 13.2X51-D10	CLI for Junos OS Release 13.2X51-D15 and later
Configuring the streaming message types (queue or traffic statistics) to send to a remote server	<pre> [edit services analytics] streaming-servers { address <i>ip-address</i> { port <i>number</i> { stream-type <i>type</i>; stream-type <i>type</i>; } } } </pre>	<p>Requires defining an export profile and applying it to the collector:</p> <ol style="list-style-type: none"> To define an export profile: <pre> [edit services analytics] export-profiles { <i>profile-name</i> { interface { information; statistics { queue; traffic; } status { link; queue; traffic; } } system { information; status { queue; traffic; } } } } </pre> To apply an export profile to the collector: <pre> [edit services analytics] collector { address <i>ip-address</i> { port <i>number</i> { export-profile <i>profile-name</i>; } } } </pre>

Table 140: Network Analytics CLI Changes (continued)

Task	CLI for Junos OS Release 13.2X50-D15 and 13.2X51-D10	CLI for Junos OS Release 13.2X51-D15 and later
Configuring the transport protocol for sending streaming data to an external server	No configuration is available. Only the TCP protocol is supported.	Configuration is available. Both TCP and UDP protocols are supported, and can be configured for the same port. [edit services analytics] collector { address <i>ip-address</i> { port <i>number1</i> { transport tcp; transport udp; } port <i>number2</i> { transport udp; } } }
Show information about remote streaming server or collector	Issue the show analytics streaming-sever command.	Issue the show analytics collector command.

Release History Table

Release	Description
13.2X51-D15	In Junos OS Release 13.2X51-D15, the network analytics feature was enhanced, and extensive changes were made to the CLI statements and hierarchies.
13.2X51-D15	Beginning in Junos OS Release 13.2X51-D15, the network analytics feature provides the following enhancements:
13.2X51-D15	Beginning in Junos OS Release 13.2X51-D15, enhancements to the network analytics feature result in changes in the CLI when you configure the feature.

Understanding Enhanced Network Analytics Streaming Data

Network analytics monitoring data can be streamed to remote servers called collectors. You can configure one or more collectors to receive streamed data containing queue and traffic statistics. This topic describes the streamed data output.



NOTE: This topic applies to Junos OS Release 13.2X51-D15 or later.

Starting in Junos OS Release 13.2X51-D15, network analytics supports the following streaming data formats and output:

- [Google Protocol Buffer \(GPB\) on page 761](#)
- [JavaScript Object Notation \(JSON\) on page 764](#)
- [Comma-separated Values \(CSV\) on page 764](#)
- [Tab-separated Values \(TSV\) on page 764](#)
- [Queue Statistics Output for JSON, CSV, and TSV on page 765](#)
- [Traffic Statistics Output for JSON, CSV, and TSV on page 765](#)

Google Protocol Buffer (GPB)

Support for the Google Protocol Buffer (GPB) streaming format has been added in Junos OS Release 13.2X51-D15. This streaming format provides:

- Support for nine types of messages, based on resource type (system-wide or interface-specific).
- Sends messages in a hierarchical format.
- You can generate other stream format messages (JSON, CSV, TSV) from GPB formatted messages.
- Includes a 8-byte message header. See [Table 141 on page 762](#) for more information.

[Table 141 on page 762](#) describes the GPB stream format message header.

Table 141: GPB Stream Format Message Header Information

Byte Position	Field
0 to 3	Length of message
4	Message version
5 to 7	Reserved for future use

The following GPB prototype file (**analytics.proto**) provides details about the streamed data:

```
package analytics;

// Traffic statistics related info
message TrafficStatus {
    optional uint32      status      = 1;
    optional uint32      poll_interval = 2;
}

// Queue statistics related info
message QueueStatus {
    optional uint32      status      = 1;
    optional uint32      poll_interval = 2;
    optional uint64      lt_high     = 3;
    optional uint64      lt_low      = 4;
    optional uint64      dt_high     = 5;
    optional uint64      dt_low      = 6;
}

message LinkStatus {
    optional uint64      speed      = 1;
    optional uint32      duplex     = 2;
    optional uint32      mtu        = 3;
    optional bool        state      = 4;
    optional bool        auto_negotiation = 5;
}

message InterfaceInfo {
    optional uint32      snmp_index  = 1;
    optional uint32      index       = 2;
    optional uint32      slot        = 3;
    optional uint32      port        = 4;
    optional uint32      media_type  = 5;
    optional uint32      capability  = 6;
    optional uint32      porttype    = 7;
}

message InterfaceStatus {
    optional LinkStatus  link        = 1;
    optional QueueStatus queue_status = 2;
    optional TrafficStatus traffic_status = 3;
}

message QueueStats {
    optional uint64      timestamp   = 1;
}
```



```

        optional uint64      queue_depth    = 2;
        optional uint64      latency        = 3;
    }

    message TrafficStats {
        optional uint64      timestamp      = 1;
        optional uint64      rxpkt          = 2;
        optional uint64      rxucpkt       = 3;
        optional uint64      rxmcpkt       = 4;
        optional uint64      rxbcpkt       = 5;
        optional uint64      rxpps         = 6;
        optional uint64      rxbyte        = 7;
        optional uint64      rxbps         = 8;
        optional uint64      rxrcerr       = 9;
        optional uint64      rxdropkt      = 10;
        optional uint64      txpkt         = 11;
        optional uint64      txucpkt       = 12;
        optional uint64      txmcpkt       = 13;
        optional uint64      txbcpkt       = 14;
        optional uint64      txpps         = 15;
        optional uint64      txbyte        = 16;
        optional uint64      txbps         = 17;
        optional uint64      txrcerr       = 18;
        optional uint64      txdropkt      = 19;
    }

    message InterfaceStats {
        optional TrafficStats traffic_stats = 1;
        optional QueueStats  queue_stats  = 2;
    }

    //Interface message
    message Interface {
        required string      name          = 1;
        optional bool        deleted       = 2;
        optional InterfaceInfo information   = 3;
        optional InterfaceStats stats       = 4;
        optional InterfaceStatus status     = 5;
    }

    message SystemInfo {
        optional uint64      boot_time      = 1;
        optional string      model_info     = 2;
        optional string      serial_no      = 3;
        optional uint32      max_ports      = 4;
        optional string      collector      = 5;
        repeated string      interface_list = 6;
    }

    message SystemStatus {
        optional QueueStatus queue_status   = 1;
        optional TrafficStatus traffic_status = 2;
    }

    //System message
    message System {
        required string      name          = 1;
        optional bool        deleted       = 2;
        optional SystemInfo  information   = 3;
        optional SystemStatus status      = 4;
    }

```

```

}

message AnRecord {
    optional uint64      timestamp      = 1;
    optional System     system         = 2;
    repeated Interface   interface     = 3;
}

```

JavaScript Object Notation (JSON)

The JavaScript Object Notation (JSON) streaming format supports the following data:

- Queue statistics data. For example:

```

{"record-type":"queue-stats","time":1383453988263,"router-id":"qfx5100-switch",
"port":"xe-0/0/18","latency":0,"queue-depth":208}

```

See [Table 142 on page 765](#) for more information about queue statistics output fields.

- Traffic statistics. For example:

```

{"record-type":"traffic-stats","time":1383453986763,"router-id":"qfx5100-switch",
"port":"xe-0/0/16","rxpkt":26524223621,"rxpps":8399588,"rxbyte":3395100629632,
"rxbps":423997832,"rxdrop":0,"rxerr":0,"txpkt":795746503,"txpps":0,"txbyte":101855533467,
"txbps":0,"txdrop":0,"txerr":0}

```

See [Table 143 on page 765](#) for more information about traffic statistics output fields.

Comma-separated Values (CSV)

The Comma-separated Values (CSV) streaming format supports the following data:

- Queue statistics. For example:

```

q,1383454067604,qfx5100-switch,xe-0/0/18,0,208

```

See [Table 142 on page 765](#) for more information about queue statistics output fields.

- Traffic statistics. For example:

```

t,1383454072924,qfx5100-switch,xe-0/0/19,1274299748,82950,163110341556,85603312,0,0,
27254178291,8300088,3488534810679,600002408,27268587050,3490379142400

```

See [Table 143 on page 765](#) for more information about traffic statistics output fields.

Tab-separated Values (TSV)

The Tab-separated Values (TSV) streaming format supports the following data:

- Queue statistics. For example:

q	585870192561703872	qfx5100-switch	xe-0/0/18	(null)
208	2			

See [Table 142 on page 765](#) for more information about queue statistics output fields.

- Traffic statistics. For example:

t	1383454139025	qfx5100-switch	xe-0/0/19	1279874033	82022
163823850036	84801488	0	0	27811618258	8199630
3559887126455	919998736	27827356915	3561901685120		

See [Table 143 on page 765](#) for more information about traffic statistics output fields.

Queue Statistics Output for JSON, CSV, and TSV

[Table 142 on page 765](#) describes the output fields for streamed queue statistics data in the order they appear.

Table 142: Streamed Queue Statistics Data Output Fields

Field	Description
record-type	Type of statistics. Displayed as: <ul style="list-style-type: none"> • queue-stats (JSON format) • q (CSV or TSV format)
time	Time (in Unix epoch format) at which the statistics were captured.
router-id	ID of the network analytics host device.
port	Name of the physical port configured for network analytics.
latency	Traffic queue latency in milliseconds.
queue depth	Depth of the traffic queue in bytes.

Traffic Statistics Output for JSON, CSV, and TSV

[Table 143 on page 765](#) describes the output fields for streamed traffic statistics data in the order they appear.

Table 143: Streamed Traffic Statistics Data Output Fields

Field	Description
record-type	Type of statistics. Displayed as: <ul style="list-style-type: none"> • traffic-stats (JSON format) • t (CSV or TSV format)
time	Time (in Unix epoch format) at which the statistics were captured.

Table 143: Streamed Traffic Statistics Data Output Fields (continued)

Field	Description
router-id	ID of the network analytics host device.
port	Name of the physical port configured for network analytics.
rxpkt	Total packets received.
rxpps	Total packets received per second.
rxbyte	Total bytes received.
rxbps	Total bytes received per second.
rxdrop	Total incoming packets dropped.
rxerr	Total packets with errors.
txpkt	Total packets transmitted.
txpps	Total packets transmitted per second.
txbyte	Total bytes transmitted.
txbps	Total bytes transmitted per second.
txdrop	Total transmitted bytes dropped.
txerr	Total transmitted packets with errors (dropped).

Release History Table

Release	Description
13.2X51-D15	Starting in Junos OS Release 13.2X51-D15, network analytics supports the following streaming data formats and output:

Related Documentation

- [Network Analytics Overview on page 753](#)
- [Prototype File for the Google Protocol Buffer Stream Format on page 773](#)
- [collector \(Analytics\) on page 1488](#)

Understanding Enhanced Analytics Local File Output

The network analytics feature provides visibility into the performance and behavior of the data center infrastructure. You enable network analytics by configuring queue or traffic statistics monitoring, or both. In addition, you can configure a local file for storing the traffic and queue statistics records.



NOTE: This topic describes the local file output in Junos OS Release 13.2X51-D15 and later.

Beginning in Junos OS Release 13.2X51-D15, the traffic and queue monitoring statistics can be stored locally in a single file. The following example shows the output from the **monitor start** command.

```
root@qfx5100-33> monitor start an
```

```
root@qfx5100-33>
*** an ***
q,1393947567698432,qfx5100-33,xe-0/0/19,1098572,1373216
q,1393947568702418,qfx5100-33,xe-0/0/19,1094912,1368640
q,1393947569703415,qfx5100-33,xe-0/0/19,1103065,1378832
t,1393947569874528,qfx5100-33,xe-0/0/16,12603371884,12603371884,0,0,
8426023,1613231610488,8628248712,0,3,5916761,5916761,0,0,0,757345408,0,0,0
t,1393947569874528,qfx5100-33,xe-0/0/18,12601953614,12601953614,0,0,
8446737,1613050071660,8649421552,0,5,131761619,131761619,0,0,84468,
16865487232,86495888,0,0
t,1393947569874528,qfx5100-33,xe-0/0/19,126009250,126009250,0,0,84469,
16129184128,86496392,0,0,12584980342,12584980342,0,0,8446866,1610877487744,
8649588432,12593703960,0
q,1393947575698402,qfx5100-33,xe-0/0/19,1102233,1377792
q,1393947576701398,qfx5100-33,xe-0/0/19,1107724,1384656
```

See [Table 144 on page 767](#) for queue statistics output, and [Table 145 on page 768](#) for traffic statistics output. The fields in the tables are listed in the order they appear in the output example.

Table 144: Output Fields for Queue Statistics in Local Analytics File

Field	Description	Example in Output
Record type	Type of statistics (queue or traffic monitoring)	q
Time (microseconds)	Unix epoch (or Unix time) in microseconds at which the statistics were captured.	1393947567698432
Router ID	ID of the network analytics host device.	qfx5100-33
Port	Name of the physical port configured for network analytics.	xe-0/0/19
Latency (nanoseconds)	Traffic queue latency in nanoseconds.	1098572

Table 144: Output Fields for Queue Statistics in Local Analytics File (continued)

Field	Description	Example in Output
Queue depth (bytes)	Depth of the traffic queue in bytes.	1373216

Table 145: Output Fields for Traffic Statistics in Local Analytics File

Field	Description	Example in Output
Record type	Type of statistics (queue or traffic monitoring)	t
Time (microseconds)	Unix epoch (or Unix time) in microseconds at which the statistics were captured.	1393947569874528
Router ID	ID of the network analytics host device.	qfx5100-33
Port	Name of the physical port configured for network analytics.	xe-0/0/16
rxpkt	Total packets received.	12603371884
rxucpkt	Total unicast packets received.	12603371884
rxmcpkt	Total multicast packets received.	0
rxbcpkt	Total broadcast packets received.	0
rxpps	Total packets received per second.	8426023
rxbyte	Total octets received.	1613231610488
rxbps	Total bytes received per second.	8628248712
rxdroppkt	Total incoming packets dropped.	0
rxrcerr	CRC/Align errors received.	3
txpkt	Total packets transmitted.	5916761
txucpkt	Total unicast packets transmitted.	5916761
txmcpkt	Total multicast packets transmitted.	0
txbcpkt	Total broadcast packets transmitted.	0
txpps	Total packets transmitted per second.	0
txbyte	Total octets transmitted.	757345408
txbps	Bytes per second transmitted.	0

Table 145: Output Fields for Traffic Statistics in Local Analytics File (continued)

Field	Description	Example in Output
txdroppkt	Total transmitted packets dropped.	0
txcerr	CRC/Align errors transmitted.	0

Release History Table	Release	Description
	13.2X51-D15	Beginning in Junos OS Release 13.2X51-D15, the traffic and queue monitoring statistics can be stored locally in a single file.

Related Documentation

- [Network Analytics Overview on page 753](#)

Understanding Network Analytics Streaming Data

This topic describes the network analytics queue and traffic statistics that are streamed to remote servers.

You can configure one or more remote servers to receive streamed data containing queue and traffic statistics. The format of the streamed data can be Javascript Object Notation (JSON), Comma-separated Values (CSV), or Tab-separated Values (TSV).



NOTE: The output shown in this topic applies to Junos OS Release 13.2X51-D10 only. The time is displayed in the Unix epoch format (also known as Unix time or POSIX time).

The following examples show the streamed queue statistics data output in different formats.

- JSON format:

```
{"record-type":"queue-stats","time":1383453988263,"router-id":"qfx5100-switch",
"port":"xe-0/0/18","latency":0,"queue-depth":208}
```

- CSV format:

```
q,1383454067604,qfx5100-switch,xe-0/0/18,0,208
```

- TSV format:

```
q      585870192561703872    qfx5100-switch    xe-0/0/18    (null)
208    2
```

[Table 142 on page 765](#) describes the output fields for streamed queue statistics data in the order they appear.

Table 146: Streamed Queue Statistics Data Output Fields

Field	Description
record-type	Type of statistics. Displayed as: <ul style="list-style-type: none"> • queue-stats (JSON format) • q (CSV or TSV format)
time	Time (in Unix epoch format) at which the statistics were captured.
router-id	ID of the network analytics host device.
port	Name of the physical port configured for network analytics.
latency	Traffic queue latency in milliseconds.
queue depth	Depth of the traffic queue in bytes.

The following examples show the streamed traffic statistics data output in different formats.

- JSON format:

```
{"record-type":"traffic-stats","time":1383453986763,"router-id":"qfx5100-switch",
"port":"xe-0/0/16","rxpkt":26524223621,"rxpps":8399588,"rxbyte":3395100629632,
"rxbps":423997832,"rxdrop":0,"rxerr":0,"txpkt":795746503,"txpps":0,"txbyte":101855533467,
"txbps":0,"txdrop":0,"txerr":0}
```

- CSV format:

```
t,1383454072924,qfx5100-switch,xe-0/0/19,1274299748,82950,163110341556,85603312,0,0,
27254178291,8300088,3488534810679,600002408,27268587050,3490379142400
```

- TSV format:

```
t      1383454139025  qfx5100-switch  xe-0/0/19      1279874033      82022
163823850036      84801488        0              0              27811618258      8199630
3559887126455      919998736        27827356915    3561901685120
```

[Table 143 on page 765](#) describes the output fields for streamed traffic statistics data in the order they appear.

Table 147: Streamed Traffic Statistics Data Output Fields

Field	Description
record-type	Type of statistics. Displayed as: <ul style="list-style-type: none"> • traffic-stats (JSON format) • t (CSV or TSV format)
time	Time (in Unix epoch format) at which the statistics were captured.
router-id	ID of the network analytics host device.
port	Name of the physical port configured for network analytics.
rxpkt	Total packets received.
rxpps	Total packets received per second.
rxbyte	Total bytes received.
rxbps	Total bits received per second.
rxdrop	Total incoming packets dropped.
rxerr	Total packets with errors.
txpkt	Total packets transmitted.
txpps	Total packets transmitted per second.
txbyte	Total bytes transmitted.
txbps	Total bytes transmitted per second.
txdrop	Total transmitted bytes dropped.
txerr	Total transmitted packets with errors (dropped).

Related Documentation

- [Network Analytics Overview on page 753](#)
- [streaming-servers on page 1513](#)

Understanding Network Analytics Configuration and Status

The network analytics feature provides visibility into the performance and behavior of the data center infrastructure. You can enable network analytics by configuring traffic and queue statistics monitoring.



NOTE: This topic describes the configuration and status output from Junos OS Release 13.2X50-D15 and 13.2X51-D10 only.

If you had enabled traffic or queue monitoring, you can issue the **show analytics configuration** and **show analytics status** commands to view the global interface configuration and status and that of specific interfaces. The output that is displayed depends on your configuration at the global interface and specific interface levels. For example:

- A global interface configuration (for all interfaces) to disable monitoring supersedes the configuration to enable it on an interface.
- The interface configuration to enable or disable monitoring supersedes the global interface configuration, unless monitoring had been disabled globally for all interfaces.
- If there is no configuration, whether for all interfaces or a specific interface, monitoring is disabled by default (see [Table 148 on page 772](#)).

[Table 148 on page 772](#) describes the correlation between the user configuration and the settings that are displayed.

Table 148: Configuration and Status Output in Junos OS Release 13.2X51-D10 and 13.2X50-D15

User Configuration	Global or System Settings		Specific Interface Settings	
	Configuration	Status	Configuration	Status
No global or specific interface configuration. This is the default setting.	Auto	Auto	Auto	Disabled
No global interface configuration but the specific interface monitoring is disabled.	Auto	Auto	Disabled	Disabled
No global interface configuration but the specific interface monitoring is enabled.	Auto	Auto	Enabled	Enabled
Monitoring is disabled globally and there is no interface configuration.	Disabled	Disabled	Auto	Disabled
Monitoring is disabled at both the global and specific interface levels.	Disabled	Disabled	Disabled	Disabled

Table 148: Configuration and Status Output in Junos OS Release 13.2X51-D10 and 13.2X50-D15 (continued)

User Configuration	Global or System Settings		Specific Interface Settings	
	Configuration	Status	Configuration	Status
Monitoring is disabled at the global interface level but is enabled at the specific interface level. The global interface <i>Disabled</i> setting supersedes the <i>Enabled</i> setting for a specific interface.	Disabled	Disabled	Enabled	Disabled
Monitoring is enabled for all interfaces but there is no configuration for the specific interface .	Enabled	Enabled	Auto	Enabled
Monitoring is enabled at both the global and specific interface levels.	Enabled	Enabled	Enabled	Enabled
Monitoring is enabled for all interfaces but is disabled for the specific interface.	Enabled	Enabled	Disabled	Disabled

- Related Documentation**
- [Network Analytics Overview on page 753](#)
 - [queue-statistics on page 1506](#)
 - [traffic-statistics on page 1520](#)

Prototype File for the Google Protocol Buffer Stream Format

The Google Protocol Buffer (GPB) stream format is used for streaming monitoring statistics data to a remote collector in a single AnRecord message.

The **analytics.proto** file provides a template for the GPB stream format. This file can be used for writing your analytics server application.

To download the GPB prototype file, go to:

https://www.juniper.net/documentation/en_US/junos13.2/topics/reference/proto-files/analytics-proto.txt

- Related Documentation**
- [Network Analytics Overview on page 753](#)
 - [export-profiles on page 1491](#)

Configuring Queue Monitoring

Network analytics queue monitoring provides visibility into the performance and behavior of the data center infrastructure. This feature collects data from the switch, analyzes the data using sophisticated algorithms, and captures the results in reports. You can use the reports to help troubleshoot problems, make decisions, and adjust resources as needed.

You enable queue monitoring by first defining a resource profile template, and then applying the profile to the system (for a global configuration) or to individual interfaces.



NOTE: You can configure queue monitoring on physical network interfaces only; logical interfaces and Virtual Chassis physical (VCP) interfaces are not supported.



NOTE: The procedure to configure queue monitoring on a QFX Series standalone switch requires Junos OS Release 13.2X51-D15 or later to be installed on your device.

To configure queue monitoring on a QFX Series standalone switch:

1. Configure the queue monitoring polling interval (in milliseconds) globally (for the system):

[edit]

```
set services analytics resource system polling-interval queue-monitoring interval
```

2. Configure a resource profile for the system, and enable queue monitoring:

[edit]

```
set services analytics resource-profiles profile-name queue-monitoring
```

3. Configure high and low values of the depth-threshold (in bytes) for queue monitoring in the system profile:

[edit]

```
set services analytics resource-profiles profile-name depth-threshold high number low number
```

For both high and low values, the range is from 1 to 1,250,000,000 bytes, and the default value is 0 bytes.



NOTE: You can configure either the depth-threshold or latency threshold for the system, but not both.

4. Apply the resource profile template to the system for a global configuration:

```
[edit]
set services analytics resource system resource-profile profile-name
```

5. Configure an interface-specific resource profile and enable queue monitoring for the interface:

```
[edit]
set services analytics resource-profiles profile-name queue-monitoring
```

6. Configure the latency-threshold (high and low values) for queue monitoring in the interface-specific profile:

```
[edit]
set services analytics resource-profiles profile-name latency-threshold high number
low number
```

For both high and low values, the range is from 1 to 100,000,000 nanoseconds, and the default value is 1,000,000 nanoseconds.



NOTE: You can configure either the depth-threshold or latency threshold for interfaces, but not both.

7. Apply the resource profile template for interfaces to one or more interfaces:

```
[edit]
set services analytics resource interfaces interface-name resource-profile profile-name
```



NOTE: If a conflict arises between the system and interface configurations, the interface-specific configuration supersedes the global (system) configuration.

Release History Table

Release	Description
13.2X51-D15	The procedure to configure queue monitoring on a QFX Series standalone switch requires Junos OS Release 13.2X51-D15 or later to be installed on your device.

Related Documentation

- [Network Analytics Overview on page 753](#)

Configuring Traffic Monitoring

Network analytics queue monitoring provides visibility into the performance and behavior of the data center infrastructure. This feature collects data from the switch, analyzes the data using sophisticated algorithms, and captures the results in reports. You can use the reports to help troubleshoot problems, make decisions, and adjust resources as needed.

You enable traffic monitoring by first defining a resource profile template, and then applying the profile to the system (for a global configuration) or to individual interfaces.



NOTE: You can configure traffic monitoring on physical network interfaces only; logical interfaces and Virtual Chassis physical (VCP) interfaces are not supported.



NOTE: The procedure to configure traffic monitoring on a QFX Series standalone switch requires Junos OS Release 13.2X51-D15 or later to be installed on your device.

To configure traffic monitoring on a QFX Series standalone switch:

1. Configure the traffic monitoring polling interval (in seconds) for the system:

```
[edit]
set services analytics resource system polling-interval traffic-monitoring interval
```

2. Configure a resource profile for the system, and enable traffic monitoring in the profile:

```
[edit]
set services analytics resource-profiles profile-name traffic-monitoring
```

3. Apply the resource profile to the system for a global configuration:

```
[edit]
set services analytics resource system resource-profile profile-name
```

4. Configure a resource profile for interfaces, and enable traffic monitoring in the profile:

```
[edit]
set services analytics resource-profiles profile-name traffic-monitoring
```



NOTE: If a conflict arises between the system and interface configurations, the interface-specific configuration supersedes the global (system) configuration.

5. Apply the resource profile template to one or more interfaces:

[edit]

set services analytics resource interfaces *interface-name* **resource-profile** *profile-name*

Release History Table

Release	Description
13.2X51-D15	The procedure to configure traffic monitoring on a QFX Series standalone switch requires Junos OS Release 13.2X51-D15 or later to be installed on your device.

**Related
Documentation**

- [Network Analytics Overview on page 753](#)

Configuring a Local File for Network Analytics Data

The network analytics feature provides visibility into the performance and behavior of the data center infrastructure. This feature collects data from the switch, analyzes the data using sophisticated algorithms, and captures the results in reports. Network administrators can use the reports to help troubleshoot problems, make decisions, and adjust resources as needed.

To save the queue and traffic statistics data in a local file, you must configure a filename to store it.



NOTE: The procedure to configure a local file for storing queue and traffic monitoring statistics requires Junos OS Release 13.2X51-D15 or later to be installed on your device.

To configure a local file for storing queue and traffic monitoring statistics:

1. Configure a filename:

[edit]

set services analytics collector local file *filename*

There is no default filename. If you do not configure a filename, network analytics statistics are not saved locally.

2. Configure the number of files (from 2 to 1000 files):

[edit]

set services analytics collector local file *filename* files *number*

3. Configure the file size (from 10 to 4095 MB) in the format of xm:

[edit]

set services analytics collector local file an size *size*

Release History Table

Release	Description
13.2X51-D15	The procedure to configure a local file for storing queue and traffic monitoring statistics requires Junos OS Release 13.2X51-D15 or later to be installed on your device.

Related Documentation

- [Network Analytics Overview on page 753](#)

Configuring a Remote Collector for Streaming Analytics Data

The network analytics feature provides visibility into the performance and behavior of the data center infrastructure. This feature collects data from the switch, analyzes the data using sophisticated algorithms, and captures the results in reports. Network administrators can use the reports to help troubleshoot problems, make decisions, and adjust resources as needed.

You can configure an export profile to define the stream format and type of data, and one or more remote servers (collectors) to receive streaming network analytics data.



NOTE: The procedure to configure a collector for receiving streamed analytics data requires Junos OS Release 13.2X51-D15 or later to be installed on your device.

To configure a collector for receiving streamed analytics data:

1. Create an export profile and specify the stream format:

[edit]

set services analytics export-profiles *profile-name* stream-format *format*

2. Configure the export profile to include interface information:

[edit]

set services analytics export-profiles *profile-name* interface information

3. Configure the export profile to include interface queue statistics:


```
[edit]
set services analytics export-profiles profile-name interface statistics queue
```

4. Configure the export profile to include interface traffic statistics:

```
[edit]
set services analytics export-profiles profile-name interface statistics traffic
```

5. Configure the export profile to include interface status link information:

```
[edit]
set services analytics export-profiles profile-name interface status link
```

6. Configure the export profile to include system information:

```
[edit]
set services analytics export-profiles profile-name system information
```

7. Configure the export profile to include system queue status:

```
[edit]
set services analytics export-profiles profile-name system status queue
```

8. Configure the export profile to include system traffic status:

```
[edit]
set services analytics export-profiles profile-name system status traffic
```

9. Configure the transport protocol for the collector addresses and apply the export profile:

```
[edit]
set services analytics collector address ip-address port port transport protocol
export-profile profile-name
set services analytics collector address ip-address port port transport protocol
export-profile profile-name
```



NOTE: If you configure the `tcp` or `udp` option for the JSON, CSV, and TSV formats, you must also set up the TCP or UDP client software on the remote collector to process records that are separated by the newline character (`\n`) on the remote server.

If you configure the `tcp` or `udp` option for the GPB format, you must also set up the TCP or UDP build streaming server using the `analytics.proto` file.

Release History Table

Release	Description
13.2X51-D15	The procedure to configure a collector for receiving streamed analytics data requires Junos OS Release 13.2X51-D15 or later to be installed on your device.

Related Documentation

- [Network Analytics Overview on page 753](#)

Example: Configuring Network Analytics

This example shows how to configure network analytics which includes queue and traffic monitoring on a QFX3500 standalone switch.



NOTE: The configuration shown in this example is supported only on Junos OS Release 13.2X50-D15 and 13.2X51-D10.

- [Requirements on page 780](#)
- [Overview on page 780](#)
- [Configuration on page 781](#)
- [Verification on page 784](#)

Requirements

This example uses the following hardware and software components:

- A QFX3500 standalone switch
- A external streaming server to collect data
- Junos OS Release 13.2X50-D15 software
- TCP server software (for remote streaming servers)

Before you configure network analytics, be sure you have:

- Junos OS Release 13.2X50-D15 or later software installed and running on the QFX3500 switch
- (Optional for streaming servers) TCP server software set up for processing records separated by a newline character (\n) on the remote streaming server
- All other devices running

Overview

The network analytics feature provides visibility into the performance and behavior of the data center infrastructure. This feature collects data from the switch, analyzes the data using sophisticated algorithms, and captures the results in reports. Network

administrators can use the reports to help troubleshoot problems, make decisions, and adjust resources as needed. You can enable network analytics by configuring queue and traffic statistics monitoring.

Topology

In this example, the QFX3500 switch is connected to an external server used for streaming statistics data.

Configuration

To configure network analytics, perform these tasks:

- [Configuring Queue and Traffic Statistics Monitoring on page 782](#)
- [Configuring Local Statistics Files on page 782](#)
- [Configuring Streaming Servers on page 783](#)
- [Results on page 783](#)

CLI Quick Configuration

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

```
[edit]
set services analytics interfaces all queue-statistics
set services analytics interfaces all latency-threshold high 900 low 300
set services analytics interfaces xe-0/0/1 traffic-statistics
set services analytics queue-statistics file qstats1.qs files 3 size 10
set services analytics queue-statistics interval 10
set services analytics traffic-statistics file tstats1.ts files 3 size 10
set services analytics traffic-statistics interval 2
set services analytics streaming-servers address 10.94.198.11 port 50001 stream-format
  json stream-type queue-statistics
set services analytics streaming-servers address 10.94.198.11 port 50005 stream-format
  csv stream-type traffic-statistics
```

Configuring Queue and Traffic Statistics Monitoring

Step-by-Step Procedure

To configure queue and traffic monitoring on physical interfaces:



NOTE: You can configure queue and traffic monitoring on physical network interfaces only; logical interfaces and Virtual Chassis physical (VCP) interfaces are not supported.



NOTE: Disabling of the queue or traffic monitoring supersedes the configuration (enabling) of this feature. You disable monitoring by issuing the `no-queue-statistics` or `no-traffic-statistics` at the `[edit services analytics interfaces]` hierarchy level.

1. Configure all interfaces for queue monitoring and set the latency thresholds (in microseconds):

```
[edit]
set services analytics interfaces all queue-statistics
set services analytics interfaces all latency-threshold high 900 low 300
```

2. Configure one interface for traffic monitoring:

```
[edit]
set services analytics interfaces xe-0/0/1 traffic-statistics
```

Configuring Local Statistics Files

Step-by-Step Procedure

To configure local statistics files:

1. Configure the number of queue statistics files, and each file size in MB:

```
[edit]
set services analytics queue-statistics file qstats1.qs files 3 size 10m
```

2. Configure the queue statistics collection interval in milliseconds

```
[edit]
set services analytics queue-statistics interval 10
```

3. Configure the number of traffic statistics files, and each file size in MB:

```
[edit]
```

```
set services analytics traffic-statistics file tstats1.ts files 3 size 10m
```

4. Configure the traffic statistics collection interval in seconds:

```
[edit]
set services analytics traffic-statistics interval 2
```

Configuring Streaming Servers

Step-by-Step Procedure

To configure streaming servers for receiving monitoring data:



NOTE: In addition to configuring streaming servers, you must also set up the TCP client software to process records that are separated by the newline character (\n) on the remote server.

1. Configure a server IP address and port for queue statistics monitoring:

```
[edit]
set services analytics streaming-servers address 10.94.198.11 port 50001
stream-format json stream-type queue-statistics
```

2. Configure a server IP address and port for traffic statistics monitoring:

```
[edit]
set services analytics streaming-servers address 10.94.198.11 port 50005
stream-format csv stream-type traffic-statistics
```

Results

Display the results of the configuration:

```
[edit services analytics]
user@switch> show configuration
queue-statistics {
  file qstats1.qs size 10m files 3;
  interval 10;
}
traffic-statistics {
  file tstats1.ts size 10m files 3;
  interval 2;
}
interfaces {
  xe-0/0/1 {
    traffic-statistics;
  }
}
```

```

all {
    queue-statistics;
    latency-threshold high 900 low 300;
}

```

Verification

Confirm that the configuration is correct and works as expected by performing these tasks:

- [Verifying the Network Analytics Configuration on page 784](#)
- [Verifying the Network Analytics Status on page 784](#)
- [Verifying Streaming Servers Configuration on page 785](#)
- [Verifying Queue Statistics on page 785](#)
- [Verifying Traffic Statistics on page 786](#)

Verifying the Network Analytics Configuration

Purpose Verify the configuration for network analytics.

Action From operational mode, enter the **show analytics configuration** command to display the traffic and queue monitoring configuration.

```
user@host> show analytics configuration
```

Global configurations:

Traffic statistics: Auto, Poll interval: 2 seconds

Queue statistics: Enabled, Poll interval: 10 milliseconds

Depth threshold high: 0 bytes, low: 0 bytes

Latency threshold high: 900 microseconds, low: 300 microseconds

Interface	Traffic Statistics	Queue Statistics	Depth-threshold		Latency-threshold	
			High	Low	High	Low
			(bytes)		(microseconds)	
xe-0/0/1	Enabled	Auto	0	0	900	300

Meaning The output displays information about traffic and queue monitoring on the switch.

Verifying the Network Analytics Status

Purpose Verify the network analytics operational status of the switch.

Action From operational mode, enter the **show analytics status** command to display the traffic and queue monitoring status.

```
user@host> show analytics status
```

Global configurations:

Traffic statistics: Auto, Poll interval: 2 seconds

Queue statistics: Auto, Poll interval: 10 milliseconds

Depth threshold high: 1228800 bytes, low: 1024 bytes

Latency threshold high: 900 microseconds, low: 300 microseconds

Interface	Traffic Statistics	Queue Statistics	Depth-threshold		Latency-threshold	
			High	Low	High	Low
			(bytes)		(microseconds)	
xe-0/0/1	Enabled	Auto	1228800	1024	900	300
xe-0/0/7	Auto	Auto	1228800	1024	900	300
xe-0/0/8	Auto	Auto	1228800	1024	900	300

Verifying Streaming Servers Configuration

Purpose Verify the configuration for streaming data to remote servers is working.

Action From operational mode, enter the **show analytics streaming-servers** command to display the streaming servers configuration.

```
user@host> show analytics streaming-servers
```

Address	Port	Stream-Format	Stream-Type	State	Sent
10.94.198.11	50001	json	QS	Established	1100
10.94.198.11	50005	csv	TS/QS	In Progress	0

Meaning The output displays information about the remote streaming server.

Verifying Queue Statistics

Purpose Verify that queue statistics collection is working.

Action From operational mode, enter the **show analytics queue-statistics** command to display the queue statistics.

```
user@host> show analytics queue-statistics
```

Time	Interface	Queue-length (bytes)	Latency (us)
Apr 6 0:17:18.224	xe-0/0/1	1043952	835
Apr 6 0:17:18.234	xe-0/0/1	1053520	842
Apr 6 0:17:18.244	xe-0/0/1	1055184	844

Meaning The output displays queue-statistics information as expected.

Verifying Traffic Statistics

Purpose Verify that traffic statistics collection is working.

Action From operational mode, enter the **show analytics traffic-statistics** command to display the traffic statistics.

```
user@host> show analytics traffic-statistics
```

```
Time: Apr 5 19:52:48.549, Physical interface: xe-0/0/1
Traffic Statistics:
Total octets:          4797548752936      408886273632
Total packet:          5658257464        3190613435
Octets per second:      0                0
Packet per second:      0                0
Octets dropped:          0                252901000
Packet dropped:          0                252901
Utilization:            0.0%              0.0%

Time: Apr 5 19:52:48.549, Physical interface: xe-0/0/7
Traffic Statistics:
Total octets:          4790866253100      477139024
Total packet:          5624473639        477944
Octets per second:      0                0
Packet per second:      0                0
Octets dropped:          0                166582000
Packet dropped:          0                166582
Utilization:            0.0%              0.0%

Time: Apr 5 19:52:48.549, Physical interface: xe-0/0/8
Traffic Statistics:
Total octets:          4789797668456      764910024
Total packet:          5623280870        765715
Octets per second:      0                0
Packet per second:      0                0
Octets dropped:          0                156099000
Packet dropped:          0                156099
Utilization:            0.0%              0.0%
```

Meaning The output displays traffic-statistics information as expected.

Related Documentation

- [Network Analytics Overview on page 753](#)

Example: Configuring Enhanced Network Analytics Features

This example shows how to configure the enhanced network analytics feature, including queue and traffic monitoring.

- [Requirements on page 787](#)
- [Overview on page 787](#)

- [Configuration on page 788](#)
- [Verification on page 794](#)

Requirements

This example uses the following hardware and software components:

- A QFX5100 standalone switch
- A external streaming server to collect data
- Junos OS Release 13.2X51-D15 software
- TCP server software (for remote streaming servers)

Before you configure network analytics, be sure you have:

- Junos OS Release 13.2X51-D15 or later software installed and running on the QFX5100 switch.
- (Optional for streaming servers for the JSON, CSV, and TSV formats) TCP or UDP server software set up for processing records separated by a newline character (\n) on the remote streaming server.
- (Optional for streaming servers for the GPB format) TCP or UDP build streaming server using the **analytics.proto** file.
- All other network devices running.

Overview

The network analytics feature provides visibility into the performance and behavior of the data center infrastructure. This feature collects data from the switch, analyzes the data using sophisticated algorithms, and captures the results in reports. Network administrators can use the reports to help troubleshoot problems, make decisions, and adjust resources as needed.

You enable network analytics by first defining a resource profile template, and then applying the profile to the system (for a global configuration) or to individual interfaces.



NOTE: You can configure queue and traffic monitoring on physical network interfaces only; logical interfaces and Virtual Chassis physical (VCP) interfaces are not supported.

Disabling of the queue or traffic monitoring supersedes the configuration (enabling) of this feature. You disable monitoring by applying a resource profile that includes the **no-queue-monitoring** or **no-traffic-monitoring** configuration statement at the [edit services analytics resource-profiles] hierarchy level.

Topology

In this example, the QFX5100 switch is connected to an external server used for streaming statistics data.

Configuration

To configure the network analytics features, perform these tasks:

- [Configuring the Polling Interval for Queue and Traffic Monitoring on page 789](#)
- [Configuring a Local Statistics File on page 789](#)
- [Configuring and Applying a Resource Profile for the System on page 789](#)
- [Configuring and Applying a Resource Profile for an Interface on page 790](#)
- [Configuring an Export Profile and Collector for Streaming Data on page 791](#)

CLI Quick Configuration

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

```
[edit]
set services analytics resource system polling-interval queue-monitoring 1000
set services analytics resource system polling-interval traffic-monitoring 5
set services analytics collector local file an.stats
set services analytics collector local file an files 3
set services analytics collector local file an size 10m
set services analytics resource-profiles sys-rp queue-monitoring
set services analytics resource-profiles sys-rp traffic-monitoring
set services analytics resource-profiles sys-rp depth-threshold high 999999 low 99
set services analytics resource system resource-profile sys-rp
set services analytics resource-profiles if-rp queue-monitoring
set services analytics resource-profiles if-rp traffic-monitoring
set services analytics resource-profiles if-rp latency-threshold high 2300 low 20
set services analytics resource interfaces xe-0/0/16 resource-profile if-rp
set services analytics resource interfaces xe-0/0/18 resource-profile if-rp
set services analytics resource interfaces xe-0/0/19 resource-profile if-rp
set services analytics export-profiles ep stream-format gpb
set services analytics export-profiles ep interface information
set services analytics export-profiles ep interface statistics queue
set services analytics export-profiles ep interface statistics traffic
set services analytics export-profiles ep interface status link
set services analytics export-profiles ep system information
set services analytics export-profiles ep system status queue
set services analytics export-profiles ep system status traffic
set services analytics collector address 10.94.198.11 port 50001 transport tcp export-profile
ep
set services analytics collector address 10.94.184.25 port 50013 transport udp
export-profile ep
```

Configuring the Polling Interval for Queue and Traffic Monitoring

Step-by-Step Procedure

To configure the polling interval queue and traffic monitoring globally:

1. Configure the queue monitoring polling interval (in milliseconds) for the system:

```
[edit]
set services analytics resource system polling-interval queue-monitoring 1000
```

2. Configure the traffic monitoring polling interval (in seconds) for the system:

```
[edit]
set services analytics resource system polling-interval traffic-monitoring 5
```

Configuring a Local Statistics File

Step-by-Step Procedure

To configure a file for local statistics collection:

1. Configure the filename:

```
[edit]
set services analytics collector local file an.stats
```

2. Configure the number of files:

```
[edit]
set services analytics collector local file an files 3
```

3. Configure the file size:

```
[edit]
set services analytics collector local file an size 10m
```

Configuring and Applying a Resource Profile for the System

Step-by-Step Procedure

To define a resource profile template for queue and traffic monitoring resources:

1. Configure a resource profile and enable queue monitoring:

```
[edit]
set services analytics resource-profiles sys-rp queue-monitoring
```

2. Enable traffic monitoring in the profile:

```
[edit]
```

```
set services analytics resource-profiles sys-rp traffic-monitoring
```

3. Configure the depth-threshold (high and low values) for queue monitoring in the profile:

```
[edit]
set services analytics resource-profiles sys-rp depth-threshold high 999999 low
99
```

4. Apply the resource profile template to the system resource type for a global configuration:

```
[edit]
set services analytics resource system resource-profile sys-rp
```

Configuring and Applying a Resource Profile for an Interface

Step-by-Step Procedure

You can configure queue and traffic monitoring for one or more specific interfaces. The interface-specific configuration supersedes the global (system) configuration. To define a resource profile template for queue and traffic monitoring resources for an interface:

1. Configure a resource profile and enable queue monitoring:

```
[edit]
set services analytics resource-profiles if-rp queue-monitoring
```

2. Enable traffic monitoring in the profile:

```
[edit]
set services analytics resource-profiles if-rp traffic-monitoring
```

3. Configure the latency-threshold (high and low values) for queue monitoring in the profile:

```
[edit]
set services analytics resource-profiles if-rp latency-threshold high 2300 low 20
```

4. Apply the resource profile template to the interfaces resource type for specific interfaces:

```
[edit]
set services analytics resource interfaces xe-0/0/16 resource-profile if-rp
set services analytics resource interfaces xe-0/0/18 resource-profile if-rp
set services analytics resource interfaces xe-0/0/19 resource-profile if-rp
```

Configuring an Export Profile and Collector for Streaming Data

Step-by-Step Procedure

To configure a collector (streaming server) for receiving monitoring data:

1. Create an export profile and specify the stream format:

```
[edit]  
set services analytics export-profiles ep stream-format gpb
```

2. Configure the export profile to include interface information:

```
[edit]  
set services analytics export-profiles ep interface information
```

3. Configure the export profile to include interface queue statistics:

```
[edit]  
set services analytics export-profiles ep interface statistics queue
```

4. Configure the export profile to include interface traffic statistics:

```
[edit]  
set services analytics export-profiles ep interface statistics traffic
```

5. Configure the export profile to include interface status link information:

```
[edit]  
set services analytics export-profiles ep interface status link
```

6. Configure the export profile to include system information:

```
[edit]  
set services analytics export-profiles ep system information
```

7. Configure the export profile to include system queue status:

```
[edit]  
set services analytics export-profiles ep system status queue
```

8. Configure the export profile to include system traffic status:

```
[edit]  
set services analytics export-profiles ep system status traffic
```

9. Configure the transport protocol for the collector addresses and apply an export profile:

```
[edit]
set services analytics collector address 10.94.198.11 port 50001 transport tcp
export-profile ep
set services analytics collector address 10.94.184.25 port 50013 transport udp
export-profile ep
```



NOTE: If you configure the `tcp` or `udp` option for the JSON, CSV, and TSV formats, you must also set up the TCP or UDP client software on the remote collector to process records that are separated by the newline character (`\n`) on the remote server.

If you configure the `tcp` or `udp` option for the GPB format, you must also set up the TCP or UDP build streaming server using the `analytics.proto` file.

Results Display the results of the configuration:

```
[edit services analytics]
user@switch# run show configuration
services {
  analytics {
    export-profiles {
      ep {
        stream-format gpb;
        interface {
          information;
          statistics {
            traffic;
            queue;
          }
          status {
            link;
          }
        }
      }
      system {
        information;
        status {
          traffic;
          queue;
        }
      }
    }
  }
}
resource-profiles {
  sys-rp {
    queue-monitoring;
```

```

        traffic-monitoring;
        depth-threshold high 99999 low 99;
    }
    if-rp {
        queue-monitoring;
        traffic-monitoring;
        latency-threshold high 2300 low 20;
    }
}
resource {
    system {
        resource-profile sys-rp;
        polling-interval {
            traffic-monitoring 5;
            queue-monitoring 1000;
        }
    }
    interfaces {
        xe-0/0/16 {
            resource-profile if-rp;
        }
        xe-0/0/18 {
            resource-profile if-rp;
        }
        xe-0/0/19 {
            resource-profile if-rp;
        }
    }
}
collector {
    local {
        file an size 10m files 3;
    }
    address 10.94.184.25 {
        port 50013 {
            transport udp {
                export-profile ep;
            }
        }
    }
    address 10.94.198.11 {
        port 50001 {
            transport tcp {
                export-profile ep;
            }
        }
    }
}
}
}
}
}

```

Verification

Confirm that the configuration is correct and works as expected by performing these tasks:

- [Verifying the Network Analytics Configuration on page 794](#)
- [Verifying the Network Analytics Status on page 794](#)
- [Verifying the Collector Configuration on page 795](#)
- [Verifying Queue Statistics on page 796](#)
- [Verifying Traffic Statistics on page 796](#)

Verifying the Network Analytics Configuration

Purpose Verify the configuration for network analytics.

Action From operational mode, enter the **show analytics configuration** command to display the traffic and queue monitoring configuration.

```
user@host> show analytics configuration
```

```
Traffic monitoring status is enabled
Traffic monitoring polling interval : 5 seconds
Queue monitoring status is enabled
Queue monitoring polling interval : 1000 milliseconds
Queue depth high threshold : 99999 bytes
Queue depth low threshold : 99 bytes
```

Interface	Traffic Statistics	Queue Statistics	Queue depth threshold		Latency threshold	
			High	Low	High	Low
			(bytes)		(nanoseconds)	
xe-0/0/16	enabled	enabled	n/a	n/a	2300	20
xe-0/0/18	enabled	enabled	n/a	n/a	2300	20
xe-0/0/19	enabled	enabled	n/a	n/a	2300	20

Meaning The output displays the traffic and queue monitoring configuration information on the switch.

Verifying the Network Analytics Status

Purpose Verify the network analytics operational status of the switch.

Action From operational mode, enter the **show analytics status global** command to display global traffic and queue monitoring status.

```
user@host> show analytics status global

Traffic monitoring status is enabled
Traffic monitoring polling interval : 5 seconds
Queue monitoring status is enabled
Queue monitoring polling interval : 1000 milliseconds
Queue depth high threshold : 99999 bytes
Queue depth low threshold : 99 bytes
```

From operational mode, enter the **show analytics status** command to display both the interface and global queue monitoring status.

```
user@host> show analytics status

Traffic monitoring status is enabled
Traffic monitoring polling interval : 5 seconds
Queue monitoring status is enabled
Queue monitoring polling interval : 1000 milliseconds
Queue depth high threshold : 99999 bytes
Queue depth low threshold : 99 bytes
```

Interface	Traffic Statistics	Queue Statistics	Queue depth threshold		Latency threshold	
			High (bytes)	Low	High (nanoseconds)	Low
xe-0/0/16	enabled	enabled	n/a	n/a	2300	20
xe-0/0/18	enabled	enabled	n/a	n/a	2300	20
xe-0/0/19	enabled	enabled	n/a	n/a	2300	20

Meaning The output displays the global and interface status of traffic and queue monitoring on the switch.

Verifying the Collector Configuration

Action Verify the configuration for the collector for streamed data is working.

From operational mode, enter the **show analytics collector** command to display the streaming servers configuration.

```
user@host> show analytics collector
```

Address	Port	Transport	Stream format	State	Sent
10.94.184.25	50013	udp	gpb	n/a	484
10.94.198.11	50001	tcp	gpb	In progress	0

Meaning The output displays the collector configuration.



NOTE: The connection state of a port configured with the `udp` transport protocol is always displayed as `n/a`.

Verifying Queue Statistics

Purpose Verify that queue statistics collection is working.

Action From operational mode, enter the `show analytics queue-statistics` command to display the queue statistics.

```
user@host> show analytics queue-statistics
```

```
CLI issued at 2014-03-04 15:37:03.116018
```

Time	Interface	Queue-depth (bytes)	Latency (nanoseconds)
00:00:00.412371 ago	xe-0/0/19	1384656	1107724
00:00:01.412395 ago	xe-0/0/19	1375712	1100569
00:00:02.415366 ago	xe-0/0/19	1385280	1108224
00:00:03.417395 ago	xe-0/0/19	1381744	1105395
00:00:04.411392 ago	xe-0/0/19	1368432	1094745
00:00:05.414387 ago	xe-0/0/19	1374880	1099904
00:00:06.414365 ago	xe-0/0/19	1373632	1098905
00:00:07.416386 ago	xe-0/0/19	1370096	1096076
00:00:08.413384 ago	xe-0/0/19	1377168	1101734
00:00:09.415379 ago	xe-0/0/19	1370720	1096576
00:00:10.418374 ago	xe-0/0/19	1381120	1104896
00:00:11.410376 ago	xe-0/0/19	1383408	1106726
00:00:12.412372 ago	xe-0/0/19	1382576	1106060
00:00:13.417371 ago	xe-0/0/19	1387152	1109721
00:00:14.411368 ago	xe-0/0/19	1375296	1100236
---(more)---			

Meaning The output displays queue-statistics information, with the latest record at the top of the report.

Verifying Traffic Statistics

Purpose Verify that traffic statistics collection is working.

Action From operational mode, enter the **show analytics traffic-statistics** command to display the traffic statistics.

```
user@host> show analytics traffic-statistics
```

CLI issued at 2014-03-04 15:37:52.047136

Time: 00:00:02.252377 ago, Physical interface: xe-0/0/19

Traffic Statistics:	Receive	Transmit
Total octets:	15044882432	1502607382656
Total packets:	117538143	11739120146
Unicast packet:	117538143	11739120146
Multicast packets:	0	0
Broadcast packets:	0	0
Octets per second:	86488360	8649309384
Packets per second:	84461	8446590
CRC/Align errors:	0	0
Packets dropped:	0	11760298455

Time: 00:00:02.252377 ago, Physical interface: xe-0/0/18

Traffic Statistics:	Receive	Transmit
Total octets:	1504619929836	15782818944
Total packets:	11754843131	123303273
Unicast packet:	11754843131	123303273
Multicast packets:	0	0
Broadcast packets:	0	0
Octets per second:	8649134008	86487816
Packets per second:	8446458	84461
CRC/Align errors:	5	0
Packets dropped:	0	0

Time: 00:00:02.252377 ago, Physical interface: xe-0/0/16

Traffic Statistics:	Receive	Transmit
Total octets:	1504801437048	757345408
Total packets:	11756261156	5916761
Unicast packet:	11756261156	5916761
Multicast packets:	0	0
Broadcast packets:	0	0
Octets per second:	7910619496	0
Packets per second:	7725214	0
CRC/Align errors:	3	0
Packets dropped:	0	0

Meaning The output displays traffic-statistics information.

Related Documentation

- [Network Analytics Overview on page 753](#)

PART 10

Port Mirroring and Analyzers

- [Overview of Port Mirroring on page 801](#)
- [Configuring Port Mirroring Analyzers on page 833](#)
- [Configuring Port Mirroring Instances on page 913](#)
- [Configuring Port Mirroring for Physical Interfaces on page 927](#)
- [Configuring Port Mirroring for Logical Interfaces on page 941](#)
- [Configuring Port Mirroring for Multiple Destinations on page 993](#)

CHAPTER 34

Overview of Port Mirroring

- [Understanding Port Mirroring and Analyzers on EX2300, EX3400, and EX4300 Switches on page 802](#)
- [Understanding Port Mirroring on EX Series Switches on page 808](#)
- [Understanding Port Mirroring on Routers with an Internet Processor II ASIC or T Series Internet Processor on page 814](#)
- [Understanding Port Mirroring on page 814](#)
- [Understanding Port Mirroring on page 821](#)
- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Understanding Layer 2 Port Mirroring Properties on page 823](#)
- [Application of Layer 2 Port Mirroring Types on page 825](#)
- [Restrictions on Layer 2 Port Mirroring on page 827](#)
- [Port Mirroring Constraints and Limitations on page 828](#)

Understanding Port Mirroring and Analyzers on EX2300, EX3400, and EX4300 Switches



NOTE: This concept uses Junos OS for EX Series switches with support for the Enhanced Layer 2 Software (ELS) configuration style.

Mirroring might be needed for traffic analysis on a switch because a switch, unlike a hub, does not broadcast packets to every port on the destination device. The switch sends packets only to the port to which the destination device is connected.

Juniper Networks EX2300, EX3400, and EX4300 Ethernet Switches support the following mirroring methods: port mirroring and analyzers. You can use port mirroring or analyzers to facilitate analyzing traffic on these switches at the packet level. You might use analyzers as part of monitoring switch traffic for such purposes as enforcing policies concerning network usage and file sharing and for identifying sources of problems on your network by locating abnormal or heavy bandwidth usage by particular stations or applications.

Mirrored packets can be copied either to a local interface for local monitoring or to a VLAN for remote monitoring. The following packets can be copied:

- **Packets entering or exiting a port**—You can mirror the packets in any combination of packets entering or exiting ports on up to 256 ports. For example, you can send copies of the packets entering some ports and the packets exiting other ports to the same local analyzer port or analyzer VLAN.
- **Packets entering a VLAN**—You can mirror the packets entering a VLAN to either a local analyzer port or to an analyzer VLAN. You can configure multiple VLANs (up to 256 VLANs), including a VLAN range and PVLANS, as ingress input to an analyzer.
- **Policy-based sample packets**—You can mirror a policy-based sample of packets that are entering a port or a VLAN. You configure a firewall filter to establish a policy to select the packets to be mirrored. You can send the sample to a port-mirroring instance or to an analyzer VLAN.

This topic describes:

- [Port Mirroring Overview on page 802](#)
- [Analyzer Overview on page 803](#)
- [Port Mirroring and Analyzer Terminologies on page 803](#)
- [Configuration Guidelines for Port Mirroring and Analyzers on EX2300, EX3400, and EX4300 Switches on page 805](#)

Port Mirroring Overview

You configure port mirroring on an EX2300, EX3400, or EX4300 switch to send copies of unicast traffic to an output destination such as an interface, a routing-instance, or a VLAN. Then, you can analyze the mirrored traffic by using a protocol analyzer application. The protocol analyzer application can run either on a computer connected to the analyzer output interface or on a remote monitoring station. For the input traffic, you can configure

a firewall filter term to specify whether port mirroring must be applied to all packets at the interface to which the firewall filter is applied. You can apply a firewall filter configured with the action **port-mirror** or **port-mirror-instance *name*** to the input or output logical interfaces (including aggregated Ethernet logical interfaces), to traffic forwarded or flooded to a VLAN, or traffic forwarded or flooded to a VPLS routing instance. EX2300, EX3400, and EX4300 switches support port mirroring of VPLS (**family ethernet-switching** or **family vpls**) traffic and VPN traffic with **family ccc** in a Layer 2 environment. Within a firewall filter term, you can specify the port-mirroring properties under the **then** statement in either of the following ways:

- Implicitly reference the port-mirroring properties in effect on the port.
- Explicitly reference a particular named instance of port mirroring.

You can configure port mirroring at the **[edit forwarding-options port-mirroring]** hierarchy level.



NOTE: You can use port mirroring to mirror traffic on Layer 3 interfaces. Analyzers can be used to mirror bridged (Layer 2) packets. To mirror routed packets (Layer 3 packets), you can use the port mirroring configuration in which the **family** statement is set to **inet** or **inet6**.

Analyzer Overview

You can configure an analyzer to define both the input traffic and output traffic in the same analyzer configuration. The input traffic to be analyzed can be traffic that enters or exits an interface, or traffic that enters a VLAN. The analyzer configuration enables you to send this traffic to an output interface, instance, or VLAN. You can configure an analyzer at the **[edit forwarding-options analyzer]** hierarchy.

Port Mirroring and Analyzer Terminologies

Table 149 on page 803 lists some port mirroring terms and their descriptions.

Table 149: Mirroring Terminologies

Term	Description
Analyzer	<p>In a mirroring configuration (analyzer) on an EX2300, EX3400, or EX4300 switch, the analyzer includes:</p> <ul style="list-style-type: none"> • The name of the analyzer • Source (input) ports or VLAN • A destination for mirrored packets (either a monitor port or a monitor VLAN)

Table 149: Mirroring Terminologies (continued)

Term	Description
Analyzer output interface (Also known as monitor port)	<p>Interface to which mirrored traffic is sent and to which a protocol analyzer application is connected.</p> <p>NOTE: Interfaces used as output for an analyzer must be configured under the ethernet-switching family.</p> <p>Analyzer output interfaces have the following limitations:</p> <ul style="list-style-type: none"> • Cannot also be a source port. • Do not participate in Layer 2 protocols, such as Spanning Tree Protocol (STP), when part of a port-mirroring configuration. • If the bandwidth of the analyzer output interface is not sufficient to handle the traffic from the source ports, overflow packets are dropped.
Analyzer VLAN (Also known as monitor VLAN)	VLAN to which mirrored traffic is sent. The mirrored traffic can be used by a protocol analyzer application. The member interfaces in the monitor VLAN are spread across the switches in your network.
Port mirroring	A port-mirroring configuration that does not specify an input source; it specifies only an output destination. A firewall filter configuration must be defined for the input source. A firewall filter configuration must be defined to mirror packets that match the match conditions defined in the firewall filter term. The action item port-mirror-instance instance-name in the firewall filter configuration is used to send packets to the analyzer and these packets form the input source.
Global port mirror	A port mirroring configuration that does not have an instance name. The firewall filter action port-mirror will be the action for the firewall filter configuration.
Input interface (Also known as mirrored ports or monitored interfaces)	An interface on the switch that is being mirrored. Traffic that is either entering or exiting this interface is mirrored.
LAG-based analyzer	An analyzer that has a link aggregation group (LAG) specified as the input (ingress) interface in the analyzer configuration.
Local mirroring	An analyzer configuration in which packets are mirrored to a local analyzer port.
Monitoring station	A computer running a protocol analyzer application.
Native analyzer session	An analyzer session that has both input and output definitions in its analyzer configuration.
Policy-based mirroring (Also known as port mirroring)	Mirroring of packets that match the match items in the defined firewall filter term. The action item port-mirror-instance instance-name is used in the firewall filter to send the packets to the monitor port.
Port-based analyzer	An analyzer session whose configuration defines interfaces for both input and output.
Protocol analyzer application	An application used to examine packets transmitted across a network segment. Also commonly called network analyzer, packet sniffer, or probe.

Table 149: Mirroring Terminologies (continued)

Term	Description
Remote port mirroring	Functions the same way as local port mirroring, except that the mirrored traffic is not copied to a local analyzer port but is flooded to an analyzer VLAN that you create specifically for the purpose of receiving mirrored traffic.
VLAN-based analyzer	An analyzer session whose configuration uses VLANs for both input and output or for either input or output.

Configuration Guidelines for Port Mirroring and Analyzers on EX2300, EX3400, and EX4300 Switches

When you configure port mirroring or analyzers on EX2300, EX3400, and EX4300 switches, we recommend that you follow certain guidelines to ensure that you obtain optimum benefit from mirroring. Additionally, we recommend that you disable mirroring when you are not using it and that you select specific interfaces for which packets must be mirrored (that is, select specific interfaces as input to the analyzer) in preference to using the **all** keyword option, which will enable mirroring on all interfaces. Mirroring only the necessary packets reduces any potential performance impact.

With local mirroring, traffic from multiple ports is replicated to the analyzer output interface. If the output interface for an analyzer reaches capacity, packets are dropped. Thus, while configuring an analyzer, you must consider whether the traffic being mirrored exceeds the capacity of the analyzer output interface.

[Table 150 on page 805](#) summarizes further configuration guidelines for mirroring on EX2300, EX3400, and EX4300 switches.

Table 150: Configuration Guidelines for Port Mirroring and Analyzers on EX2300, EX3400, and EX4300 Switches

Guideline	Value or Support Information	Comment
Number of VLANs that you can use as ingress input to an analyzer.	256	

Table 150: Configuration Guidelines for Port Mirroring and Analyzers on EX2300, EX3400, and EX4300 Switches (continued)

Guideline	Value or Support Information	Comment
Number of port-mirroring sessions and analyzers that you can enable concurrently.	4	<ul style="list-style-type: none"> You can configure a total of four sessions and you can enable only one of the following at any point in time: <ul style="list-style-type: none"> A maximum of four port-mirroring sessions (including the global port-mirroring session). See Table 149 on page 803 for a description of global port mirror. A maximum of four analyzer sessions. A combination of port-mirroring and analyzer sessions, and the total of this combination must be four. You can configure more than the specified number of port-mirroring instances or analyzers on the switch, but you can enable only the specified number for a session.
Types of ports on which you cannot mirror traffic.	<ul style="list-style-type: none"> Virtual Chassis ports (VCPs) Management Ethernet ports (me0 or vme0) Integrated routing and bridging (IRB) interfaces; also known as routed VLAN interfaces (RVIs). VLAN-tagged Layer 3 interfaces 	
Protocol families that you can include in a port-mirroring configuration for remote traffic.	any	
Traffic directions that you can configure for mirroring on ports in firewall-filter-based configurations.	Ingress and egress	
Mirrored packets exiting an interface reflect rewritten class-of-service (CoS) DSCP or 802.1p bits.	Applicable	
Packets with physical layer errors are not sent to the local or remote analyzer.	Applicable	Packets with these errors are filtered out and thus are not sent to the analyzer.
Port mirroring does not support line-rate traffic.	Applicable	Port mirroring for line-rate traffic is done on a best-effort basis.
Mirroring of packets egressing a VLAN.	Not supported	

Table 150: Configuration Guidelines for Port Mirroring and Analyzers on EX2300, EX3400, and EX4300 Switches (continued)

Guideline	Value or Support Information	Comment
Port-mirroring or analyzer output on a LAG interface.	Supported	
Maximum number of child members on a port-mirroring or analyzer output LAG interface.	8	
Maximum number of interfaces in a remote port-mirroring or analyzer VLAN.	1	
Egress mirroring of host-generated control packets.	Not Supported	
Configuring Layer 3 logical interfaces in the input stanza of an analyzer.	Not supported	This functionality can be achieved by configuring port mirroring.
The analyzer input and output stanzas containing members of the same VLAN or the VLAN itself must be avoided.	Applicable	

- Related Documentation**
- [Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use on EX4300 Switches on page 893](#)
 - [Configuring Mirroring on EX4300 Switches to Analyze Traffic \(CLI Procedure\) on page 847](#)

Understanding Port Mirroring on EX Series Switches



NOTE: This concept uses Junos OS for EX Series switches that do not support the Enhanced Layer 2 Software (ELS) configuration style.

You can use port mirroring to facilitate analyzing traffic on your Juniper Networks EX Series Ethernet Switch on a packet level. You might use port mirroring as part of monitoring switch traffic for such purposes as enforcing policies concerning network usage and file sharing and for identifying sources of problems on your network by locating abnormal or heavy bandwidth usage by particular stations or applications.

Port mirroring copies packets to either a local interface for local monitoring or to a VLAN for remote monitoring. You can use port mirroring to copy these packets:

- Packets entering or exiting a port
- Packets entering a VLAN on Juniper Networks EX2200, EX3200, EX3300, EX4200, EX4500, EX4550, or EX6200 Ethernet Switches
- Packets exiting a VLAN on Juniper Networks EX8200 Ethernet Switches

This topic describes:

- [Port Mirroring Overview on page 808](#)
- [Port Mirroring Terminology on page 809](#)
- [Configuration Guidelines for Port Mirroring on the Switches on page 811](#)

Port Mirroring Overview

Port mirroring might be needed for traffic analysis on a switch because a switch, unlike a hub, does not broadcast packets to every port on the destination device. The switch sends packets only to the port to which the destination device is connected.

You configure port mirroring on the switch to send copies of unicast traffic to either a local analyzer port or an analyzer VLAN. Then you can analyze the mirrored traffic using a protocol analyzer application. The protocol analyzer application can run either on a computer connected to the analyzer output interface or on a remote monitoring station.

You can use port mirroring on a switch to mirror any of the following:

- **Packets entering or exiting a port**—You can mirror the packets in any combination (on up to 256 ports). For example, you can send copies of the packets entering some ports and the packets exiting other ports to the same local analyzer port or analyzer VLAN.
- **Packets entering a VLAN on an EX2200, EX3200, EX3300, EX4200, EX4500, EX4550, or EX6200 switch**—You can mirror the packets entering a VLAN on these switches to either a local analyzer port or to an analyzer VLAN. On EX3200, EX4200, EX4500, and EX4550 switches, you can configure multiple VLANs (up to 256 VLANs), including a VLAN range and PVLANS, as ingress input to an analyzer.

- **Packets exiting a VLAN on an EX8200 switch**—You can mirror the packets exiting a VLAN on an EX8200 switch to either a local analyzer port or to an analyzer VLAN. You can configure multiple VLANs (up to 256 VLANs), including a VLAN range and PVLANS, as egress input to an analyzer.
- **Statistical samples**—You can mirror a statistical sample of packets that are
 - Entering or exiting a port
 - Entering a VLAN on an EX2200, EX3200, EX3300, EX4200, EX4500, EX4550, or EX6200 switch
 - Exiting a VLAN on an EX8200 switch

You specify the sample number of packets by setting the ratio. You can send the sample to either a local analyzer port or to an analyzer VLAN.

- **Policy-based sample**—You can mirror a policy-based sample of packets that are entering a port or a VLAN. You configure a firewall filter to establish a policy to select the packets to be mirrored. You can send the sample to a local analyzer port or to an analyzer VLAN.



NOTE: Juniper Networks Junos operating system (Junos OS) for EX Series switches implements port mirroring differently than other Junos OS packages. Junos OS for EX Series switches does not include the `port-mirroring` statement found in the `edit forwarding-options` level of the hierarchy of other Junos OS packages, or the `port-mirror` action in firewall filter terms.

Port Mirroring Terminology

Table 149 on page 803 lists some port mirroring terms and their descriptions.

Table 151: Port Mirroring Terminology

Term	Description
Analyzer	<p>A port mirroring configuration on an EX Series switch. The analyzer includes:</p> <ul style="list-style-type: none"> • The name of the analyzer • Source (input) ports or VLAN (optional) • A destination for mirrored packets (either a monitor port or a monitor VLAN) • Ratio field for specifying statistical sampling of packets (optional) • Loss-priority setting

Table 151: Port Mirroring Terminology (continued)

Term	Description
Analyzer output interface (Also known as monitor port)	<p>Interface to which mirrored traffic is sent and to which a protocol analyzer application is connected.</p> <p>NOTE: Interfaces used as output for an analyzer must be configured as family ethernet-switching.</p> <p>Analyzer output interfaces have the following limitations:</p> <ul style="list-style-type: none"> • Cannot also be a source port. • Cannot be used for switching. • Do not participate in Layer 2 protocols, such as Spanning Tree Protocol (STP), when part of a port mirroring configuration. • Do not retain any VLAN associations they held before they were configured as analyzer output interfaces. <p>If the bandwidth of the analyzer output interface is not sufficient to handle the traffic from the source ports, overflow packets are dropped.</p>
Analyzer VLAN (Also known as monitor VLAN)	VLAN to which mirrored traffic is sent. The mirrored traffic can be used by a protocol analyzer application. The member interfaces in the monitor VLAN are spread across the switches in your network.
Firewall-based analyzer	An analyzer whose configuration does not specify an input source; it specifies only an output destination. A firewall-based analyzer must be used with a firewall filter to achieve the functionality of an analyzer.
Global analyzer (on EX4500 and EX4550 switches only)	An analyzer that is based on a firewall filter, VLAN, or link aggregation group (LAG) or an analyzer in which interfaces are on different port groups on the switch. A port group is a logical group of ports on the switch.
Input interface (Also known as mirrored ports or monitored interfaces)	An interface on the switch that is being mirrored, on traffic that is either entering or exiting the interface. An input interface cannot also be an output interface for an analyzer.
LAG-based analyzer	An analyzer that has a LAG specified as the input (ingress) interface in the analyzer configuration.
Local port mirroring	An analyzer configuration in which packets are mirrored to a local analyzer port.
Mirror ratio	See statistical sampling.
Monitoring station	A computer running a protocol analyzer application.
Native analyzer session	An analyzer session that has both input and output definitions in its analyzer configuration.
Policy-based mirroring	Mirroring of packets that match the match items in the defined firewall filter term. The action item analyzer analyzer-name is used in the firewall filter to send the packets to the analyzer.
Port-based analyzer	An analyzer session whose configuration defines interfaces for both input and output.

Table 151: Port Mirroring Terminology (continued)

Term	Description
Protocol analyzer application	An application used to examine packets transmitted across a network segment. Also commonly called network analyzer, packet sniffer, or probe.
Remote port mirroring	<p>Functions the same as local port mirroring, except that the mirrored traffic is not copied to a local analyzer port but is flooded to an analyzer VLAN that you create specifically for the purpose of receiving mirrored traffic.</p> <p>If you are using an intermediate (transit) switch, you can avoid flooding of the mirrored traffic to member interfaces of the VLAN by setting the ingress option to specify an interface of the VLAN for ingress-only traffic and the egress option to specify an interface of the VLAN for egress-only traffic in the [edit vlans] hierarchy level.</p>
Statistical sampling	<p>You can configure the system to mirror a sampling of the packets by setting a ratio of 1:x, where x is a value from 1 through 2047.</p> <p>For example, when x is set to 1, all packets are copied to the analyzer. When x is set to 200, 1 of every 200 packets is copied.</p>
VLAN-based analyzer	An analyzer session whose configuration uses VLANs for both input and output or for either input or output.

Configuration Guidelines for Port Mirroring on the Switches

When you configure port mirroring, we recommend that you follow certain guidelines to ensure that you obtain optimum benefit from the port mirroring feature. Additionally, we recommend that you disable port mirroring when you are not using it and that you select specific interfaces for which packets must be mirrored (that is, select specific interfaces as input to the analyzer) in preference to using the **all** keyword option, which will enable port mirroring on all interfaces. You can also limit the amount of mirrored traffic by using statistical sampling, setting a ratio to select a statistical sample, or using a firewall filter. Mirroring only the necessary packets reduces any potential performance impact.

With local port mirroring, traffic from multiple ports is replicated to the analyzer output interface. If the output interface for an analyzer reaches capacity, packets are dropped. Thus, while configuring an analyzer, you must consider whether the traffic being mirrored exceeds the capacity of the analyzer output interface.

Table 150 on page 805 summarizes further configuration guidelines for port mirroring on the switches.

Table 152: Configuration Guidelines for Port Mirroring

Guideline	Description	Comment
NOTE: “All other switches” or “All switches” in the Description column applies to switch platforms that support port mirroring. For details on platform support, see <i>EX Series Switch Software Features Overview</i> .		
Number of VLANs that you can use as ingress input to an analyzer	<ul style="list-style-type: none"> 1—EX2200 switches 256—EX3200, EX4200, EX4500, EX4550, and EX6200 switches Does not apply—EX8200 switches 	

Table 152: Configuration Guidelines for Port Mirroring (continued)

Guideline	Description	Comment
Number of analyzers that you can enable concurrently (applies to both standalone switches and to Virtual Chassis)	<ul style="list-style-type: none"> 1—EX2200, EX3200, EX4200, EX3300, and EX6200 switches 7 port-based or 1 global—EX4500 and EX4550 switches 7 total, with one based on a VLAN, firewall filter, or LAG and with the remaining 6 based on firewall filters—EX8200 switches <p>NOTE: An analyzer configured using a firewall filter does not support mirroring of packets that are egressing ports.</p>	<ul style="list-style-type: none"> You can <i>configure</i> more than the specified number of analyzers on the switch, but you can <i>enable</i> only the specified number for a session. Use disable ethernet-switching-options analyzer name to disable an analyzer. See Table 149 on page 803 for a description of global analyzers. See the next row entry in this table for the exception to the number of firewall-filter-based analyzers allowed on EX4500 and EX4550 switches. On an EX4550 Virtual Chassis, you can configure only one analyzer if ports in the input and output definitions are on different switches in a Virtual Chassis. To configure multiple analyzers, an entire analyzer session must be configured on the same switch of a Virtual Chassis.
Number of firewall-filter-based analyzers that you can configure on EX4500 and EX4550 switches	<ul style="list-style-type: none"> 1—EX4500 and EX4550 switches 	If you configure multiple analyzers, you cannot attach any of them to a firewall filter.
Types of ports on which you cannot mirror traffic	<ul style="list-style-type: none"> Virtual Chassis ports (VCPs) Management Ethernet ports (me0 or vme0) Routed VLAN interfaces (RVIs) VLAN-tagged Layer 3 interfaces 	
If port mirroring is configured to mirror packets exiting 10-Gigabit Ethernet ports on EX8200 switches, packets are dropped in both network and mirrored traffic when the mirrored packets exceed 60 percent of the 10-Gigabit Ethernet port traffic.	<ul style="list-style-type: none"> EX8200 switches 	
Traffic directions for which you can specify a ratio	<ul style="list-style-type: none"> Ingress only—EX8200 switches Ingress and egress—All other switches 	
Protocol families that you can include in a firewall-filter-based remote analyzer	<ul style="list-style-type: none"> Any except inet and inet6—EX8200 switches Any—All other switches 	You can use inet and inet6 on EX8200 switches in a local analyzer.
Traffic directions that you can configure for mirroring on ports in firewall-filter-based configurations	<ul style="list-style-type: none"> Ingress only—All switches 	

Table 152: Configuration Guidelines for Port Mirroring (continued)

Guideline	Description	Comment
Mirrored packets on tagged interfaces might contain an incorrect VLAN ID or Ethertype.	<ul style="list-style-type: none"> Both VLAN ID and Ethertype—EX2200 switches VLAN ID only—EX3200 and EX4200 switches Ethertype only—EX4500 and EX4550 switches Does not apply—EX8200 switches 	
Mirrored packets exiting an interface do not reflect rewritten class-of-service (CoS) DSCP or 802.1p bits.	<ul style="list-style-type: none"> All switches 	
The analyzer appends an incorrect 802.1Q (dot1q) header to the mirrored packets on the routed traffic or does not mirror any packets on the routed traffic when an egress VLAN that belongs to a routed VLAN interface (RVI) is configured as the input for that analyzer.	<ul style="list-style-type: none"> EX8200 switches Does not apply—All other switches 	As a workaround, configure an analyzer that uses each port (member interface) of the VLAN as egress input.
Packets with physical layer errors are not sent to the local or remote analyzer.	<ul style="list-style-type: none"> All switches 	Packets with these errors are filtered out and thus are not sent to the analyzer.
Port mirroring configuration on a Layer 3 interface with the output configured to a VLAN is not available on EX8200 switches.	<ul style="list-style-type: none"> EX8200 switches Does not apply—All other switches 	
Port mirroring does not support line-rate traffic.	<ul style="list-style-type: none"> All switches 	Port mirroring for line-rate traffic is done on a best-effort basis.
In an EX8200 Virtual Chassis, if you need to mirror traffic across the Virtual Chassis, then the output port must be a LAG.	<ul style="list-style-type: none"> EX8200 Virtual Chassis Does not apply—All other switches 	<p>In an EX8200 Virtual Chassis:</p> <ul style="list-style-type: none"> You can configure LAG as a monitor port only for native analyzers. You cannot configure LAG as a monitor port for analyzers based on firewall filters. If an analyzer configuration contains LAG as a monitor port, then you cannot configure VLAN in the input definition of an analyzer.
In standalone EX8200 switches, you can configure LAG in the output definition.	<ul style="list-style-type: none"> EX8200 standalone switches Does not apply—All other switches 	<p>In EX8200 standalone switches:</p> <ul style="list-style-type: none"> You can configure a LAG as a monitor port on both native and firewall-based analyzers. If a configuration contains LAG as a monitor port, then you cannot configure VLAN in the input definition of an analyzer.

- Related Documentation**
- [Example: Configuring Port Mirroring for Local Monitoring of Employee Resource Use on EX Series Switches](#)
 - [Firewall Filter Match Conditions, Actions, and Action Modifiers for EX Series Switches](#)

Understanding Port Mirroring on Routers with an Internet Processor II ASIC or T Series Internet Processor

On routers containing an Internet Processor II application-specific integrated circuit (ASIC) or T Series Internet Processor, you can send a copy of an IP version 4 (IPv4) or IP version 6 (IPv6) packet from the router to an external host address or a packet analyzer for analysis. This is known as *port mirroring*.

Port mirroring is different from traffic sampling. In traffic sampling, a sampling key based on the IPv4 header is sent to the Routing Engine. There, the key can be placed in a file, or cflowd packets based on the key can be sent to a cflowd server. In port mirroring, the entire packet is copied and sent out through a next-hop interface.

You can configure simultaneous use of sampling and port mirroring, and set an independent sampling rate and run-length for port-mirrored packets. However, if a packet is selected for both sampling and port mirroring, only one action can be performed and port mirroring takes precedence. For example, if you configure an interface to sample every packet input to the interface and a filter also selects the packet to be port mirrored to another interface, only the port mirroring takes effect. All other packets not matching the explicit filter port-mirroring criteria continue to be sampled when forwarded to their final destination.

- Related Documentation**
- [Configuring Port Mirroring on M, T MX, and PTX Series Routers](#)
 - [Example: Configuring Multiple Port Mirroring with Next-Hop Groups on M, MX and T Series Routers on page 998](#)

Understanding Port Mirroring

- [Port Mirroring Overview on page 814](#)
- [Port Mirroring Instance Types on page 815](#)
- [Port-Mirroring Terminology on page 816](#)
- [Port Mirroring and STP on page 817](#)
- [Port Mirroring Constraints and Limitations on page 817](#)

Port Mirroring Overview

Port mirroring copies packets entering or exiting a port or entering a VLAN and sends the copies to a local interface for local monitoring or to a VLAN for remote monitoring. Use port mirroring to send traffic to applications that analyze traffic for purposes such as monitoring compliance, enforcing policies, detecting intrusions, monitoring and predicting traffic patterns, correlating events, and so on.

Port mirroring is needed for traffic analysis on a switch because a switch normally sends packets only to the port to which the destination device is connected. You configure port mirroring on the switch to send copies of unicast traffic to a local interface or a VLAN and run an analyzer application on a device connected to the interface or VLAN. You configure port mirroring by using the **analyzer** statement.

Keep performance in mind when configuring port mirroring. For example, If you mirror traffic from multiple ports, the mirrored traffic may exceed the capacity of the output interface. We recommend that you limit the amount of copied traffic by selecting specific interfaces instead of using the **all** keyword. You can also limit the amount of mirrored traffic by using a firewall filter to send specific traffic to a port mirroring instance. Mirroring only the necessary packets reduces the possibility of a performance impact.

You can use port mirroring to copy any of the following:

- All packets entering or exiting an interface (in any combination)—For example, you can send copies of the packets entering some interfaces and the packets exiting other interfaces to the same local interface or VLAN. If you configure port mirroring to copy packets exiting an interface, traffic that originates on that switch or Node device (in a QFabric system) is not copied when it egresses. Only switched traffic is copied on egress. (See the limitation on egress mirroring below.)
- All packets entering a VLAN—You cannot use port mirroring to copy packets exiting a VLAN.
- Firewall-filtered sample—Sample of packets entering a port or VLAN. Configure a firewall filter to select certain packets for mirroring.



NOTE: Firewall filters are not supported on egress ports; therefore, you cannot specify policy-based sampling of packets exiting an interface.

Port Mirroring Instance Types

To configure port mirroring, you configure an instance of one of the following types:

- Analyzer instance: You must specify the input and output for the instance. This instance type is useful for ensuring that all traffic transiting an interface or VLAN is mirrored and sent to the analyzer device.
- Port-mirroring instance: You do not specify an input for this instance type. Instead, you, create a firewall filter that specifies the required traffic and directs it to the mirror. This instance type is useful for controlling which types of traffic should be mirrored. When you use a port-mirroring instance, you can direct traffic to it in the following ways:
 - Specify the name of the port-mirroring instance in the firewall filter using the **port-mirror-instance *instance-name*** action. You should use this approach if there are multiple port-mirroring instances defined.
 - Configure the filter to send the mirrored packets to the output interface defined in the instance using the **port-mirror** action. You can use this approach if there is only one port-mirroring instance defined.

Port-Mirroring Terminology

Table 153 on page 816 lists the terms used in the documentation about port mirroring and provides definitions.

Table 153: Port Mirroring Terms and Definitions

Term	Description
Analyzer instance	Port-mirroring configuration that includes a name, source interfaces or source VLAN, and a destination for mirrored packets (either a local access interface or a VLAN).
Port mirroring instance NOTE: Port mirroring instance feature is not supported on NFX150 devices.	A port-mirroring configuration that does not specify an input.. A firewall filter must be used to send traffic to the port mirror. Use the action port-mirror-instance instance-name in the firewall filter configuration to send packets to the port mirror.
Output interface (also known as monitor interface)	<p>Access interface to which packet copies are sent and to which a device running an analyzer application is connected.</p> <p>The following limitations apply to an output interface:</p> <ul style="list-style-type: none"> • Cannot also be a source port. • Cannot be used for switching. • Cannot be an aggregated Ethernet interface (LAG). • Does not participate in Layer 2 protocols, such as Spanning Tree Protocol (STP). • Loses any existing VLAN associations when you configure it as an analyzer output interface. <p>If the capacity of the output interface is insufficient to handle the traffic from the source ports, overflow packets are dropped.</p>
Output IP address	<p>IP address of the device running an analyzer application. The device can be on a remote network. When you use this feature, the mirrored packets are GRE-encapsulated. The analyzer device must be able to de-encapsulate GRE-encapsulated packets, or the GRE-encapsulated packets must be de-encapsulated before reaching the analyzer device. (You can use a network sniffer to de-encapsulate the packets.)</p> <ul style="list-style-type: none"> • An output IP address cannot be in the same subnetwork as any of the switch's management interfaces. • If you create virtual routing instances and also create an analyzer configuration that includes an output IP address, the output address belongs to the default virtual routing instance (inet.0 routing table).

Table 153: Port Mirroring Terms and Definitions (continued)

Output VLAN (also known as monitor or analyzer VLAN)	<p>VLAN to which copies are sent and to which a device running an analyzer application is connected. The analyzer VLAN can span multiple switches.</p> <p>The following limitations apply to an output VLAN:</p> <ul style="list-style-type: none"> • Cannot be a private VLAN or VLAN range. • Cannot be shared by multiple analyzer statements. • An output VLAN interface cannot be a member of any other VLAN. • An output VLAN interface cannot be an aggregated Ethernet interface (LAG). • On some switches, only one interface can be a member of the analyzer VLAN. This limitation does not apply on the QFX10000 switch if traffic is mirrored on ingress. In this case, multiple QFX10000 interfaces can belong to the output VLAN, and traffic is mirrored to all of those interfaces. If traffic is mirrored on egress on a QFX10000 switch, only one interface can be a member of the analyzer VLAN.
Input interface (also known as mirrored or monitored interface)	Interface that provides traffic to be mirrored. This traffic can be entering or exiting the interface. (Ingress or egress traffic can be mirrored.) An input interface cannot also be an output interface for an analyzer.
Monitoring station	Computer running an analyzer application.
Local port mirroring	Port-mirroring configuration in which the mirrored packets are sent to an interface on the same switch.
Remote port mirroring	Flooding mirrored packets to an output (analyzer) VLAN that you create to receive mirror traffic or sending the mirrored packets to a remote IP address. (You cannot send mirrored packets to a remote IP address on a QFabric system.)
Policy-based mirroring	Mirroring of packets that match the match a firewall filter term. The action analyzer analyzer-name is used in the firewall filter to send the packets to the analyzer.

Port Mirroring and STP

The behavior of STP in a port-mirroring configuration depends on the version of Junos OS you are using:

- Junos OS 13.2X50, Junos OS 13.2X51-D25 or earlier, Junos OS 13.2X52: If you enable STP, port mirroring might not work because STP might block the mirrored packets.
- Junos OS 13.2X51-D30, Junos OS 14.1X53: STP is disabled for mirrored traffic. You must ensure that your topology prevents loops for this traffic.

Port Mirroring Constraints and Limitations

- [Local and Remote Port Mirroring on page 818](#)
- [Remote Port Mirroring Only on page 819](#)
- [Port Mirroring Constraints on OCX Series Switches on page 820](#)

Local and Remote Port Mirroring

The following constraints and limitations apply to local and remote port mirroring:

- You can create a total of four port-mirroring configurations.
- You can create a total of four port-mirroring configurations on each Node group in a QFabric system, subject to the following constraints:
 - As many as four of the configurations can be for local port mirroring.
 - As many as three of the configurations can be for remote port mirroring.
- Regardless of whether you are configuring a standalone switch or a Node group, the following limits apply:
 - There can be no more than two configurations that mirror ingress traffic. (If you configure a firewall filter to send traffic to a port mirror—that is, you use the **analyzer** action modifier in a filter term—this counts as an ingress mirroring configuration for switch or Node group on which the filter is applied.)
 - There can be no more than two configurations that mirror egress traffic.



NOTE: On QFabric systems, there is no system-wide limit on the total number of mirror sessions.

- You can configure no more than one type of output in one port-mirroring configuration. That is, you can use no more than one of the following to complete a **set analyzer name output** statement:
 - **interface**
 - **ip-address**
 - **vlan**
- If you configure Junos OS to mirror egress packets, do not configure more than 2000 VLANs on a standalone switch or QFabric system. If you do so, some VLAN packets might contain incorrect VLAN IDs. This applies to any VLAN packets—not only the mirrored copies.
- The **ratio** and **loss-priority** options are not supported.
- Packets with physical layer errors are filtered out and are not sent to the output port or VLAN.
- If you use sFlow monitoring to sample traffic, it does not sample the mirror copies when they exit from the output interface.
- You cannot mirror packets exiting or entering the following ports:
 - Dedicated Virtual Chassis interfaces
 - Management interfaces (me0 or vme0)

- Fibre Channel interfaces
- Integrated routing and bridging (IRB) interfaces (also known as routed VLAN interfaces, or RVIs)
- An aggregated Ethernet interface cannot be an output interface if the input is a VLAN or if traffic is sent to the analyzer by a firewall filter.
- When packet copies are sent out the output interface, they are not modified for any changes that are normally applied on egress, such as CoS rewriting.
- An interface can be the input interface for only one mirroring configuration. Do not use the same interface as the input interface for multiple mirroring configurations.
- CPU-generated packets (such as ARP, ICMP, BPDU, and LACP packets) cannot be mirrored on egress.
- VLAN-based mirroring is not supported for STP traffic.
- (QFabric systems only) If you configure a QFabric analyzer to mirror egress traffic and the input and output interfaces are on different Node devices, the mirrored copies have incorrect VLAN IDs. This limitation does not apply if you configure a QFabric analyzer to mirror egress traffic and the input and output interfaces are on the *same* Node device. In this case the mirrored copies have the correct VLAN IDs (as long as you do not configure more than 2000 VLANs on the QFabric system).
- True egress mirroring is defined as mirroring the exact number of copies and the exact packet modifications that went out the egress switched port. Because the processor on QFX5xxx (including QFX5100, QFX5110, QFX5120, QFX5200, and QFX5210) and EX4600 (including EX4600 and EX4650) switches implements egress mirroring in the ingress pipeline, those switches do not provide accurate egress packet modifications, so egress mirrored traffic can carry incorrect VLAN tags that differ from the tags in the original traffic.
- If you configure a port-mirroring instance to mirror traffic exiting from an interface that performs VXLAN encapsulation, the source and destination MAC addresses of the mirrored packets will not be the same as those of the original traffic.
- Mirroring on member interfaces of a LAG is not supported.
- Egress VLAN mirroring is not supported.

Remote Port Mirroring Only

The following constraints and limitations apply to remote port mirroring:

- If you configure an output IP address, the address cannot be in the same subnetwork as any of the switch's management interfaces.
- If you create virtual routing instances and also create an analyzer configuration that includes an output IP address, the output address belongs to the default virtual routing instance (inet.0 routing table).
- An output VLAN cannot be a private VLAN or VLAN range.
- An output VLAN cannot be shared by multiple **analyzer** statements.

- An output VLAN interface cannot be a member of any other VLAN.
- An output VLAN interface cannot be an aggregated Ethernet interface.
- If the output VLAN has more than one member interface, then traffic is mirrored only to the first member of the VLAN, and other members of the same VLAN do not carry any mirrored traffic.
- If you attempt to configure more than one analyzer session for remote port mirroring to an IP address (GRE encapsulation) and the IP addresses of the analyzers are reachable through the same interface, then only one analyzer session is configured.

Port Mirroring Constraints on OCX Series Switches

The following constraints and limitations apply to port mirroring on OCX Series switches:

- You can create a total of four port-mirroring configurations. The following constraints also apply:
 - There can be no more than two configurations that mirror ingress traffic.
 - There can be no more than two configurations that mirror egress traffic.
- If you use sFlow monitoring to sample traffic, it does not sample the mirror copies when they exit from the output interface.
- You can create only one port-mirroring session.
- You cannot mirror packets exiting or entering the following ports:
 - Dedicated Virtual Chassis interfaces
 - Management interfaces (me0 or vme0)
 - Fibre Channel interfaces
 - Routed VLAN interfaces or IRB interfaces
- An aggregated Ethernet interface cannot be an output interface.
- Do not include an 802.1Q subinterface that has a unit number other than 0 in a port mirroring configuration. Port mirroring does not work with subinterfaces if their unit number is not 0. (You configure 802.1Q subinterfaces using the **vlan-tagging** statement.)
- When packet copies are sent out the output interface, they are not modified for any changes that are normally applied on egress, such as CoS rewriting.
- An interface can be the input interface for only one mirroring configuration. Do not use the same interface as the input interface for multiple mirroring configurations.
- CPU-generated packets (such as ARP, ICMP, BPDU, and LACP packets) cannot be mirrored on egress.
- VLAN-based mirroring is not supported for STP traffic.

- See Also**
- [Understanding Port Mirroring on page 821](#)
 - [Example: Mirroring Employee Web Traffic with a Firewall Filter on page 952](#)

- [Configuring Port Mirroring](#)

Related Documentation

- [Configuring Port Mirroring on page 1017](#)
- [Examples: Configuring Port Mirroring for Local Analysis on page 1020](#)
- [Examples: Configuring Port Mirroring for Local Analysis on page 1020](#)
- [Example: Configuring Port Mirroring for Remote Analysis on page 1032](#)
- [Troubleshooting Port Mirroring on page 1039](#)

Understanding Port Mirroring

- [Port Mirroring Overview on page 821](#)
- [Port-Mirroring Terminology on page 821](#)

Port Mirroring Overview

Use port mirroring to send traffic to devices that analyze traffic for purposes such as monitoring compliance, enforcing policies, detecting intrusions, monitoring and predicting traffic patterns, correlating events, and so on. Port mirroring is needed when you want to perform traffic analysis because a switch normally sends packets only to the port to which the destination device is connected. You probably do not want to send the original packets for analysis before they are forwarded because of the delay that this would cause, so the common alternative is to configure port mirroring to send copies of unicast traffic to another interface and run an analyzer application on a device connected to that interface. .

To configure port mirroring, you configure a port-mirroring instance. You do not specify an input for this instance. Instead, you create a firewall filter that specifies the required traffic and directs it to the instance by including the **port-mirror** action in a **then** term of the filter. The firewall filter must be configured as **family inet**.

Keep performance in mind when configuring port mirroring. Configuring the firewall filter to mirror only the necessary packets reduces the possibility of a performance impact.

Port-Mirroring Terminology

[Table 153 on page 816](#) lists the terms used in the documentation about port mirroring and provides definitions.

Table 154: Port Mirroring Terms and Definitions

Term	Description
Port mirroring instance	A port-mirroring configuration that does not specify an input.. A firewall filter must be used to send traffic to the port mirror. Use the action port-mirror action in the firewall filter configuration to send packets to the port mirror.

Table 154: Port Mirroring Terms and Definitions (continued)

Output interface (also known as monitor interface)	<p>Access interface to which packet copies are sent and to which a device running an analyzer application is connected.</p> <p>The following limitations apply to an output interface:</p> <ul style="list-style-type: none"> • Cannot also be a source port. • Cannot be used for switching. • Cannot be an aggregated Ethernet interface (LAG). <p>If the capacity of the output interface is insufficient to handle the traffic from the source ports, overflow packets are dropped.</p>
Output IP address	<p>IP address of the device running an analyzer application. The device can be on a remote network. When you use this feature, the mirrored packets are GRE-encapsulated. The analyzer device must be able to de-encapsulate GRE-encapsulated packets, or the GRE-encapsulated packets must be de-encapsulated before reaching the analyzer device. (You can use a network sniffer to de-encapsulate the packets.)</p> <ul style="list-style-type: none"> • An output IP address cannot be in the same subnet as any of the switch's management interfaces. • If you create virtual routing instances and also create an analyzer configuration that includes an output IP address, the output address belongs to the default virtual routing instance (inet.0 routing table).
Monitoring station	Computer running an analyzer application.
Local port mirroring	Port-mirroring configuration in which the mirrored packets are sent to an interface on the same switch.

- Related Documentation**
- [Configuring Port Mirroring](#)
 - [Example: Mirroring Employee Web Traffic with a Firewall Filter on page 952](#)
 - [Troubleshooting Port Mirroring on page 1039](#)

Understanding Layer 2 Port Mirroring

On routing platforms and switches that contain an Internet Processor II ASIC, you can send a copy of any incoming packet from the routing platform or switch to an external host address or a packet analyzer for analysis. This is known as *port mirroring*. In Junos OS Release 9.3 and later, Juniper Networks MX Series 5G Universal Routing Platforms in a Layer 2 environment support port mirroring for Layer 2 bridging traffic and virtual private LAN service (VPLS) traffic. In Junos OS Release 9.4 and later, MX Series routers in a Layer 2 environment also support port mirroring for Layer 2 VPN traffic over a circuit cross-connect (CCC) that transparently connects logical interfaces of the same type. In Junos OS Release 12.3R2, Juniper Networks EX Series switches support port mirroring for Layer 2 bridging traffic.

Layer 2 port mirroring enables you to specify the manner in which incoming and outgoing packets at specified ports are monitored and the manner in which copies of selected packets are forwarded to another destination, where the packets can be analyzed. MX

Series routers and EX Series switches support Layer 2 port mirroring by performing flow monitoring functions using a class-of-service (CoS) architecture that is in concept similar to, but in particulars different from, other routing platforms and switches.

Like the M120 Multiservice Edge Router and M320 Multiservice Edge Routers, MX Series routers and EX Series switches support port mirroring of IPv4, IPv6, and VPLS packets simultaneously.

In a Layer 3 environment, MX Series routers and EX Series switches support port mirroring of IPv4 (**family inet**) and IPv6 (**family inet6**) traffic. For information about Layer 3 port mirroring, see the *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide*.

Related Documentation

- [Understanding Layer 2 Port Mirroring Properties on page 823](#)
- [Restrictions on Layer 2 Port Mirroring](#)
- [Application of Layer 2 Port Mirroring Types](#)
- [Application of Layer 2 Port Mirroring Types](#)

Understanding Layer 2 Port Mirroring Properties

Port mirroring specifies the following types of properties:

- [Packet-Selection Properties on page 823](#)
- [Packet Address Family on page 823](#)
- [Mirror Destination Properties on page 824](#)
- [Mirror-Once Option on page 824](#)

Packet-Selection Properties

The packet-selection properties of Layer 2 port-mirroring specify how the sampled packets are to be selected for mirroring:

- The number of packets in each sample.
- The number of packets to mirror from each sample.
- The length to which mirrored packets are to be truncated.

Packet Address Family

The packet address family type specifies the type of traffic to be mirrored. In a Layer 2 environment, MX Series routers and EX Series switches support port mirroring for the following packet address families:

- Family type **ethernet-switching**—For mirroring VPLS traffic when the physical interface is configured with encapsulation type **ethernet-bridge**.
- Family type **ccc**—For mirroring Layer 2 VPN traffic.
- Family type **vpls**—For mirroring VPLS traffic.



NOTE: In typical applications, you send mirrored packets directly to an analyzer or a workstation for analysis, not to another router or switch. If you must send mirrored packets over a network, you should use tunnels. For Layer 2 VPN implementations, you can use the Layer 2 VPN routing instance type `l2vpn` to tunnel the packets to a remote destination.

For information about configuring a routing instance for Layer 2 VPN, see the *Junos OS VPNs Library for Routing Devices*. For a detailed Layer 2 VPN example configuration, see *Junos OS*. For information about tunnel interfaces, see the *Junos OS Network Interfaces Library for Routing Devices*.

Mirror Destination Properties

For a given packet address family, the mirror destination properties of a Layer 2 port-mirroring instance specify how the selected packets are to be sent on a particular physical interface:

- The physical interface on which to send the selected packets.
- Whether filter checking is to be disabled for the mirror destination interface. By default, filter checking is enabled on all interfaces.



NOTE: If you apply a filter to an interface that is also a Layer 2 port-mirroring destination, a commit failure occurs unless you have disabled filter checking for that mirror destination interface.

Mirror-Once Option

If port mirroring is enabled at both ingress and egress interfaces, you can prevent the MX Series router and an EX Series switch from sending duplicate packets to the same destination (which would complicate the analysis of the mirrored traffic).



NOTE: The mirror-once port-mirroring option is a global setting. The option is independent of the packet selection properties and the packet family type-specific mirror destination properties.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Restrictions on Layer 2 Port Mirroring](#)
- [Application of Layer 2 Port Mirroring Types](#)

Application of Layer 2 Port Mirroring Types

You can apply different sets of Layer 2 port-mirroring properties to the VPLS packets at different ingress or egress points of an MX Series or of an EX Series route.

[Table 155 on page 825](#) describes the three types of Layer 2 port mirroring you can configure on an MX Series router and EX Series switch: the global instance, named instances, and firewall filters.

Table 155: Application of Layer 2 Port Mirroring Types

Type of Layer2PortMirroring Definition	Point of Application	Scope of Mirroring	Description	Configuration Details
Global Instance of Layer2PortMirroring	All ports in the MX Series router (or switch) chassis	VPLS packets received on all ports in the MX Series router (or switch) chassis	If configured, the global port-mirroring properties implicitly apply to all VPLS packets received on all ports in the router (or switch) chassis.	See <i>Configuring the Global Instance of Layer 2 Port Mirroring</i>
Named Instance of Layer2PortMirroring	Ports grouped at the FPC level See "Binding Layer 2 Port Mirroring to Ports Grouped at the FPC Level" on page 929.	VPLS packets received on ports associated with a specific DPC or FPC and its Packet Forwarding Engines.	Overrides any port-mirroring properties configured by the global port-mirroring instance.	See <i>Defining a Named Instance of Layer 2 Port Mirroring</i> . NOTE: The number of port-mirroring destinations supported for an MX Series router and for an EX Series switch is limited to the number of Packet Forwarding Engines contained on the DPCs or FPCs installed in the router or switch chassis.
	Ports grouped at the PIC level See "Binding Layer 2 Port Mirroring to Ports Grouped at the PIC Level" on page 931.	VPLS packets received on ports associated with a specific Packet Forwarding Engine.	Overrides any port-mirroring properties configured at the FPC level or in the global port-mirroring instance.	

Table 155: Application of Layer 2 Port Mirroring Types (continued)

Type of Layer2PortMirroring Definition	Point of Application	Scope of Mirroring	Description	Configuration Details
Layer2PortMirroring Firewall Filter	Logical interface (including an aggregated Ethernet interface)	VPLS packets received or sent on a logical interface.	In the firewall filter configuration, include <i>action</i> and <i>action-modifier</i> terms to apply to the packets selected for mirroring:	See “Defining a Layer 2 Port-Mirroring Firewall Filter” on page 944.
	See “Applying Layer 2 Port Mirroring to a Logical Interface” on page 964.		<ol style="list-style-type: none"> 1. The accept action is recommended. 2. Specify port mirroring by Including one of the following modifiers: <ul style="list-style-type: none"> • The port-mirror modifier implicitly references the port-mirroring properties currently bound to the underlying physical interfaces. • The port-mirror-instance <i>pm-instance-name</i> modifier explicitly references a named instance of port mirroring. 3. (Optional) For tunnel interface input packets only, to mirror the packets to additional destinations, include the next-hop-group <i>next-hop-group-name</i> modifier. This modifier references a next-hop-group that specifies the next-hop addresses (for sending additional copies of packets to an analyzer). 	<p>NOTE: Layer 2 port-mirroring firewall filters are not supported for logical systems.</p> <p>For mirroring tunnel interface input packets to multiple destinations, also see “Defining a Next-Hop Group for Layer 2 Port Mirroring” on page 994.</p>
	VLAN forwarding table or flood table	Layer 2 traffic forwarded or flooded to a VLAN		See “Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a Bridge Domain” on page 967.
	VPLS routing instance forwarding table or flood table	Layer 2 traffic forwarded or flooded to a VPLS routing instance		See “Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VPLS Routing Instance” on page 969.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Restrictions on Layer 2 Port Mirroring](#)
- [Precedence of Multiple Levels of Layer 2 Port Mirroring on a Physical Interface on page 927](#)
- [Understanding Layer 2 Port Mirroring of PE Router Logical Interfaces on page 956](#)
- [Understanding Layer 2 Port Mirroring of PE Router Aggregated Ethernet Interfaces on page 957](#)

Restrictions on Layer 2 Port Mirroring

The following restrictions apply to Layer 2 port mirroring:

- Only Layer 2 transit data (packets that contain chunks of data transiting the routing platform or switch as they are forwarded from a source to a destination) can be mirrored. Layer 2 local data (packets that contain chunks of data that are destined for or sent by the Routing Engine, such as Layer 2 control packets) are not mirrored.
- If you apply a port-mirroring filter to the output of a logical interface, only unicast packets are mirrored. To mirror broadcast packets, multicast packets, unicast packets with an unknown destination media access control (MAC) address, or packets with MAC entry in the destination MAC (DMAC) routing table, apply a filter to the input to the flood table of a VLAN or virtual private LAN service (VPLS) routing instance.
- The mirror destination device should be on a dedicated VLAN and should not participate in any bridging activity: The mirror destination device should not have a bridge to the ultimate traffic destination, and the mirror destination device should not send the mirrored packets back to the source address.
- For either the global port-mirroring instance or a named port-mirroring instance, you can configure only one mirror output interface per port-mirroring instance and packet address family. If you include more than one **interface** statement under the **family (ethernet-switching | ccc | vpls) output** statement, the previous **interface** statement is overridden.
- Layer 2 port-mirroring firewall filtering is not supported for logical systems.

In a Layer 2 port-mirroring firewall filter definition, the filter **action-modifier (port-mirror or port-mirror-instance pm-instance-name)** relies on port-mirroring properties defined in the global instance or named instances of Layer 2 port mirroring, which are configured under the **[edit forwarding-options port-mirroring]** hierarchy. Therefore, the filter **term** cannot support Layer 2 port mirroring for logical systems.

- For a Layer 2 port mirroring firewall filter in which you implicitly reference Layer 2 port mirroring properties by including the **port-mirror** statement, if multiple named instances of Layer 2 port mirroring are bound to the underlying physical interface, then only the first binding in the stanza (or the only binding) is used at the logical interface. This is done mainly for backward compatibility.
- Layer 2 port-mirroring firewall filters do not support the use of next-hop subgroups for load-balancing mirrored traffic.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Application of Layer 2 Port Mirroring Types](#)
- [Precedence of Multiple Levels of Layer 2 Port Mirroring on a Physical Interface on page 927](#)
- [Understanding Layer 2 Port Mirroring of PE Router Logical Interfaces on page 956](#)

- [Understanding Layer 2 Port Mirroring of PE Router Aggregated Ethernet Interfaces on page 957](#)

Port Mirroring Constraints and Limitations

- [Local and Remote Port Mirroring on page 828](#)
- [Remote Port Mirroring Only on page 830](#)
- [Port Mirroring Constraints on OCX Series Switches on page 830](#)

Local and Remote Port Mirroring

The following constraints and limitations apply to local and remote port mirroring:

- You can create a total of four port-mirroring configurations.
- You can create a total of four port-mirroring configurations on each Node group in a QFabric system, subject to the following constraints:
 - As many as four of the configurations can be for local port mirroring.
 - As many as three of the configurations can be for remote port mirroring.
- Regardless of whether you are configuring a standalone switch or a Node group, the following limits apply:
 - There can be no more than two configurations that mirror ingress traffic. (If you configure a firewall filter to send traffic to a port mirror—that is, you use the **analyzer** action modifier in a filter term—this counts as an ingress mirroring configuration for switch or Node group on which the filter is applied.)
 - There can be no more than two configurations that mirror egress traffic.



NOTE: On QFabric systems, there is no system-wide limit on the total number of mirror sessions.

- You can configure no more than one type of output in one port-mirroring configuration. That is, you can use no more than one of the following to complete a **set analyzer name output** statement:
 - **interface**
 - **ip-address**
 - **vlan**
- If you configure Junos OS to mirror egress packets, do not configure more than 2000 VLANs on a standalone switch or QFabric system. If you do so, some VLAN packets might contain incorrect VLAN IDs. This applies to any VLAN packets—not only the mirrored copies.
- The **ratio** and **loss-priority** options are not supported.

- Packets with physical layer errors are filtered out and are not sent to the output port or VLAN.
- If you use sFlow monitoring to sample traffic, it does not sample the mirror copies when they exit from the output interface.
- You cannot mirror packets exiting or entering the following ports:
 - Dedicated Virtual Chassis interfaces
 - Management interfaces (me0 or vme0)
 - Fibre Channel interfaces
 - Integrated routing and bridging (IRB) interfaces (also known as routed VLAN interfaces, or RVIs)
- An aggregated Ethernet interface cannot be an output interface if the input is a VLAN or if traffic is sent to the analyzer by a firewall filter.
- When packet copies are sent out the output interface, they are not modified for any changes that are normally applied on egress, such as CoS rewriting.
- An interface can be the input interface for only one mirroring configuration. Do not use the same interface as the input interface for multiple mirroring configurations.
- CPU-generated packets (such as ARP, ICMP, BPDUs, and LACP packets) cannot be mirrored on egress.
- VLAN-based mirroring is not supported for STP traffic.
- (QFabric systems only) If you configure a QFabric analyzer to mirror egress traffic and the input and output interfaces are on different Node devices, the mirrored copies have incorrect VLAN IDs. This limitation does not apply if you configure a QFabric analyzer to mirror egress traffic and the input and output interfaces are on the *same* Node device. In this case the mirrored copies have the correct VLAN IDs (as long as you do not configure more than 2000 VLANs on the QFabric system).
- True egress mirroring is defined as mirroring the exact number of copies and the exact packet modifications that went out the egress switched port. Because the processor on QFX5xxx (including QFX5100, QFX5110, QFX5120, QFX5200, and QFX5210) and EX4600 (including EX4600 and EX4650) switches implements egress mirroring in the ingress pipeline, those switches do not provide accurate egress packet modifications, so egress mirrored traffic can carry incorrect VLAN tags that differ from the tags in the original traffic.
- If you configure a port-mirroring instance to mirror traffic exiting from an interface that performs VXLAN encapsulation, the source and destination MAC addresses of the mirrored packets will not be the same as those of the original traffic.
- Mirroring on member interfaces of a LAG is not supported.
- Egress VLAN mirroring is not supported.

Remote Port Mirroring Only

The following constraints and limitations apply to remote port mirroring:

- If you configure an output IP address, the address cannot be in the same subnetwork as any of the switch's management interfaces.
- If you create virtual routing instances and also create an analyzer configuration that includes an output IP address, the output address belongs to the default virtual routing instance (inet.0 routing table).
- An output VLAN cannot be a private VLAN or VLAN range.
- An output VLAN cannot be shared by multiple **analyzer** statements.
- An output VLAN interface cannot be a member of any other VLAN.
- An output VLAN interface cannot be an aggregated Ethernet interface.
- If the output VLAN has more than one member interface, then traffic is mirrored only to the first member of the VLAN, and other members of the same VLAN do not carry any mirrored traffic.
- If you attempt to configure more than one analyzer session for remote port mirroring to an IP address (GRE encapsulation) and the IP addresses of the analyzers are reachable through the same interface, then only one analyzer session is configured.

Port Mirroring Constraints on OCX Series Switches

The following constraints and limitations apply to port mirroring on OCX Series switches:

- You can create a total of four port-mirroring configurations. The following constraints also apply:
 - There can be no more than two configurations that mirror ingress traffic.
 - There can be no more than two configurations that mirror egress traffic.
- If you use sFlow monitoring to sample traffic, it does not sample the mirror copies when they exit from the output interface.
- You can create only one port-mirroring session.
- You cannot mirror packets exiting or entering the following ports:
 - Dedicated Virtual Chassis interfaces
 - Management interfaces (me0 or vme0)
 - Fibre Channel interfaces
 - Routed VLAN interfaces or IRB interfaces
- An aggregated Ethernet interface cannot be an output interface.

- Do not include an 802.1Q subinterface that has a unit number other than 0 in a port mirroring configuration. Port mirroring does not work with subinterfaces if their unit number is not 0. (You configure 802.1Q subinterfaces using the **vlan-tagging** statement.)
- When packet copies are sent out the output interface, they are not modified for any changes that are normally applied on egress, such as CoS rewriting.
- An interface can be the input interface for only one mirroring configuration. Do not use the same interface as the input interface for multiple mirroring configurations.
- CPU-generated packets (such as ARP, ICMP, BPDU, and LACP packets) cannot be mirrored on egress.
- VLAN-based mirroring is not supported for STP traffic.

**Related
Documentation**

- [Understanding Port Mirroring on page 821](#)
- [Example: Mirroring Employee Web Traffic with a Firewall Filter on page 952](#)
- *Configuring Port Mirroring*

Configuring Port Mirroring Analyzers

- [Understanding Port Mirroring Analyzers on page 834](#)
- [Configuring Mirroring on EX9200 Switches to Analyze Traffic \(CLI Procedure\) on page 839](#)
- [Configuring Mirroring on EX4300 Switches to Analyze Traffic \(CLI Procedure\) on page 847](#)
- [Configuring Port Mirroring to Analyze Traffic \(CLI Procedure\) on page 850](#)
- [Verifying Input and Output for Port Mirroring Analyzers on EX Series Switches on page 854](#)
- [Example: Configuring Port Mirroring Analyzers for Local Monitoring of Employee Resource Use on page 855](#)
- [Example: Configuring Port Mirroring for Remote Monitoring of Employee Resource Use on page 859](#)
- [Example: Configuring Mirroring to Multiple Interfaces for Remote Monitoring of Employee Resource Use on EX9200 Switches on page 870](#)
- [Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use Through a Transit Switch on EX9200 Switches on page 879](#)
- [Example: Configuring Mirroring for Local Monitoring of Employee Resource Use on EX4300 Switches on page 886](#)
- [Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use on EX4300 Switches on page 893](#)
- [Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use Through a Transit Switch on EX4300 Switches on page 903](#)

Understanding Port Mirroring Analyzers

Port mirroring can be used for traffic analysis on routers and switches that, unlike hubs, do not broadcast packets to every port on the destination device. Port mirroring sends copies of all packets or policy-based sample packets to local or remote analyzers where you can monitor and analyze the data.

In the context of port mirroring analyzers, we use the term *switching device*. The term indicates that the device (including routers) is performing a switching function.

You can use analyzers on a packet level to help you:

- Monitor network traffic
- Enforce network usage policies
- Enforce file sharing policies
- Identify causes of problems
- Identify stations or applications with heavy or abnormal bandwidth usage

You can configure an analyzer to mirror:

- Bridged packets (Layer 2 packets)
- Routed packets (Layer 3 packets)

Mirrored packets can be copied to either a local interface for local monitoring or a VLAN or bridge domain for remote monitoring.

The following packets can be copied:

- **Packets entering or exiting a port**—You can mirror packets entering or exiting ports, in any combination, for up to 256 ports. For example, you can send copies of the packets entering some ports and the packets exiting other ports to the same local analyzer port or analyzer VLAN.
- **Packets entering or exiting a VLAN or bridge domain**—You can mirror the packets entering or exiting a VLAN or bridge domain to either a local analyzer port or to an analyzer VLAN or bridge domain. You can configure multiple VLANs (up to 256 VLANs) or bridge domains as ingress inputs to an analyzer, including a VLAN range and private VLANs (PVLANS).
- **Policy-based sample packets**—You can mirror a policy-based sample of packets that are entering a port, VLAN, or bridge domain. You configure a firewall filter with a policy to select the packets to be mirrored. You can send the sample to a port-mirroring instance or to an analyzer VLAN or bridge domain.

This topic describes:

- [Analyzer Overview on page 835](#)
- [Statistical Analyzer Overview on page 835](#)

- [Default Analyzer Overview on page 835](#)
- [Port Mirroring at a Group of Ports Bound to Multiple Statistical Analyzers on page 835](#)
- [Port Mirroring Analyzer Terminology on page 835](#)
- [Configuration Guidelines for Port Mirroring Analyzers on page 837](#)

Analyzer Overview

You can configure an analyzer to define both the input traffic and the output traffic in the same analyzer configuration. The input traffic to be analyzed can be either traffic that enters or traffic that exits an interface or VLAN. The analyzer configuration enables you to send this traffic to an output interface, instance, next-hop group, VLAN, or bridge domain. You can configure an analyzer at the **[edit forwarding-options analyzer]** hierarchy level.

Statistical Analyzer Overview

You can define a set of mirroring properties, such as mirroring rate and maximum packet length for traffic, that you can explicitly bind to physical ports on the router or switch. This set of mirroring properties constitutes a statistical analyzer (also called a nondefault analyzer). At this level, you can bind a named instance to the physical ports associated with a specific FPC.

Default Analyzer Overview

You can configure an analyzer without configuring any mirroring properties (such as mirroring rate or maximum packet length). By default, the mirroring rate is set to 1 and the maximum packet length is set to the complete length of the packet. These properties are applied at the global level and need not be bound to a specific FPC.

Port Mirroring at a Group of Ports Bound to Multiple Statistical Analyzers

You can apply up to two statistical analyzers to the same port groups on the switching device. By applying two different statistical analyzer instances to the same FPC or Packet Forwarding Engine, you can bind two distinct Layer 2 mirroring specifications to a single port group. Mirroring properties that are bound to an FPC override any analyzer (default analyzer) properties bound at the global level on the switching device. Default analyzer properties are overridden by binding a second analyzer instance on the same port group.

Port Mirroring Analyzer Terminology

[Table 149 on page 803](#) lists some port mirroring analyzer terms and their descriptions.

Table 156: Analyzer Terminology

Term	Description
Analyzer	In a mirroring configuration, the analyzer includes: <ul style="list-style-type: none">• The name of the analyzer• Source (input) ports, VLANs, or bridge domains

Table 156: Analyzer Terminology (continued)

Term	Description
	<ul style="list-style-type: none"> A destination for mirrored packets (either a monitor port, VLAN, or bridge domain)
Analyzer output interface (Also known as a monitor port)	<p>Interface to which mirrored traffic is sent and to which a protocol analyzer application is connected.</p> <p>NOTE: Interfaces used as output for an analyzer must be configured under the forwarding-options hierarchy level.</p> <p>Analyzer output interfaces have the following limitations:</p> <ul style="list-style-type: none"> They cannot also be a source port. They do not participate in Layer 2 protocols, such as the Spanning Tree Protocol (STP), when part of a port-mirroring configuration. If the bandwidth of the analyzer output interface is not sufficient to handle the traffic from the source ports, overflow packets are dropped.
Analyzer VLAN or bridge domain (Also known as a monitor VLAN or bridge domain)	VLAN or bridge domain to which mirrored traffic is sent. The mirrored traffic can be used by a protocol analyzer application. The member interfaces in the monitor VLAN or bridge domain are spread across the switching devices in your network.
Bridge-domain-based analyzer	An analyzer session whose configuration uses bridge domains for both input and output or for either input or output.
Default analyzer	An analyzer with default mirroring parameters. By default, the mirroring rate is 1 and the maximum packet length is the length of the complete packet.
Input interface (Also known as mirrored ports or monitored interfaces)	An interface on the switching device that is being mirrored. Traffic that is either entering or exiting this interface is mirrored.
LAG-based analyzer	An analyzer that has a link aggregation group (LAG) specified as the input (ingress) interface in the analyzer configuration.
Local mirroring	An analyzer configuration in which packets are mirrored to a local analyzer port.
Monitoring station	A computer running a protocol analyzer application.
Analyzer based on next-hop group	An analyzer session configuration that uses the next-hop group as the analyzer output.
Port-based analyzer	An analyzer session configuration that defines interfaces for both input and output.
Protocol analyzer application	An application used to examine packets transmitted across a network segment. Also commonly called a network analyzer, packet sniffer, or probe.
Remote mirroring	Functions the same way as local mirroring, except that the mirrored traffic is not copied to a local analyzer port but is flooded to an analyzer VLAN or bridge domain that you create specifically for the purpose of receiving mirrored traffic. Mirrored packets have an additional outer tag of the analyzer VLAN or bridge domain.

Table 156: Analyzer Terminology (continued)

Term	Description
Statistical analyzer (Also known as a nondefault analyzer)	You can define a set of mirroring properties that you can explicitly bind to physical ports on the switch. This set of analyzer properties is known as a statistical analyzer.
VLAN-based analyzer	An analyzer session whose configuration uses VLANs for both input and output or for either input or output.

Configuration Guidelines for Port Mirroring Analyzers

When you configure port mirroring analyzers, we recommend that you follow these guidelines to ensure optimum benefit. We recommend that you disable mirroring when you are not using it, and that you select specific interfaces as input to the analyzer rather than using the **all** keyword option, which enables mirroring on all interfaces. Mirroring only necessary packets reduces any potential performance impact.

You can also limit the amount of mirrored traffic by:

- Using statistical sampling
- Using a firewall filter
- Setting a ratio to select a statistical sample

With local mirroring, traffic from multiple ports is replicated to the analyzer output interface. If the output interface for an analyzer reaches capacity, packets are dropped. You must consider whether the traffic being mirrored exceeds the capacity of the analyzer output interface.

Table 150 on page 805 summarizes further configuration guidelines for analyzers.

Table 157: Configuration Guidelines for Port Mirroring Analyzers

Guideline	Value or Support Information	Comment
Number of analyzers that you can enable concurrently.	64—Default analyzers 2 per FPC—Statistical analyzer	<ul style="list-style-type: none"> • Statistical analyzers must be bound to an FPC for mirroring traffic on ports belonging to that FPC. <p>NOTE: Default analyzer properties are implicitly bound on the last (or second to last) instance on all FPCs in the system. Therefore, when you explicitly bind a second statistical analyzer on the FPC, the default analyzer properties are overridden.</p>
Number of interfaces, VLANs, or bridge domains that you can use as ingress input to an analyzer.	256	—

Table 157: Configuration Guidelines for Port Mirroring Analyzers (continued)

Guideline	Value or Support Information	Comment
Types of ports on which you cannot mirror traffic.	<ul style="list-style-type: none"> Virtual Chassis ports (VCPs) Management Ethernet ports (me0 or vme0) Integrated routing and bridging (IRB) interfaces VLAN-tagged Layer 3 interfaces 	
Protocol families that you can include in an analyzer.	ethernet-switching for EX Series switches and bridge for MX Series routers.	Analyzer mirrors only bridged traffic. For mirroring routed traffic, use the port mirroring configuration with family as inet or inet6 .
Packets with physical layer errors are not sent to the local or remote analyzer.	Applicable	Packets with these errors are filtered out and thus are not sent to the analyzer.
Analyzer does not support line-rate traffic.	Applicable	Mirroring for line-rate traffic is done on a best-effort basis.
Analyzer output on a LAG interface.	Supported	
Analyzer output interface mode as trunk mode.	Supported	<ul style="list-style-type: none"> The trunk interface has to be a member of all VLANs or bridge domains that are related to the input configuration of analyzer. You must use the mirror-once option if the input has been configured as VLAN or bridge domain and the output is a trunk interface. <p>NOTE: With the mirror-once option, if the input is for both ingress and egress mirroring, only ingress traffic is mirrored. If both ingress and egress mirroring are required, the output interface cannot be a trunk. In such cases, configure the interface as an access interface.</p>
Egress mirroring of host-generated control packets.	Not supported	
Configuring Layer 3 logical interfaces in the input stanza of an analyzer.	Not supported	
The analyzer input and output stanzas containing members of the same VLAN or the VLAN itself must be avoided.	Applicable	
Support for VLAN and its member interfaces in different analyzer sessions	Not supported	If mirroring is configured, either of the analyzers is active.

Table 157: Configuration Guidelines for Port Mirroring Analyzers (continued)

Guideline	Value or Support Information	Comment
Egress mirroring of aggregated Ethernet (ae) interfaces and its child logical interfaces configured for different analyzers.	Not supported	

- Related Documentation

 - [Example: Configuring Port Mirroring Analyzers for Local Monitoring of Employee Resource Use on page 855](#)
 - [Example: Configuring Port Mirroring for Remote Monitoring of Employee Resource Use on page 859](#)
 - [Configuring Mirroring on EX9200 Switches to Analyze Traffic \(CLI Procedure\) on page 839](#)

Configuring Mirroring on EX9200 Switches to Analyze Traffic (CLI Procedure)

EX9200 switches enable you to configure mirroring to send copies of packets to either a local interface for local monitoring or to a VLAN for remote monitoring. You can use mirroring to copy the following packets:

- Packets entering or exiting a port
- Packets entering or exiting a VLAN



BEST PRACTICE: Mirror only necessary packets to reduce potential performance impact. We recommend that you:

- Disable the analyzers that you have configured when you are not using them.
- Specify individual interfaces as input to analyzers rather than specifying all interfaces as input.
- Limit the amount of mirrored traffic by:
 - Using statistical sampling.
 - Setting ratios to select statistical samples.
 - Using firewall filters.



NOTE: If you want to create additional analyzers without deleting the existing analyzers, then disable the existing analyzers by using the `disable analyzer analyzer-name` statement from the command-line-interface (CLI) or from the J-Web configuration page for mirroring.



NOTE: Interfaces used as output for an analyzer must be configured under the `ethernet-switching` family, and must be associated to a VLAN.

- [Configuring an Analyzer for Local Traffic Analysis on page 840](#)
- [Configuring an Analyzer for Remote Traffic Analysis on page 840](#)
- [Configuring a Statistical Analyzer for Local Traffic Analysis on page 841](#)
- [Configuring a Statistical Analyzer for Remote Traffic Analysis on page 843](#)
- [Binding Statistical Analyzers to Ports Grouped at the FPC Level on page 844](#)
- [Configuring an Analyzer with Multiple Destinations by Using Next-Hop Groups on page 845](#)
- [Defining a Next-Hop Group for Layer 2 Mirroring on page 845](#)

Configuring an Analyzer for Local Traffic Analysis

To mirror interface traffic or VLAN traffic on the switch to an interface on the switch by using analyzers:

1. Choose a name for the analyzer and specify the input:

```
[edit forwarding-options]
user@switch# set analyzer (Port Mirroring) analyzer-name input ingress interface
interface-name
```

For example, create an analyzer called **employee-monitor** for which the input traffic comprises packets entering interfaces `ge-0/0/0.0` and `ge-0/0/1.0`:

```
[edit forwarding-options]
user@switch# set analyzer (Port Mirroring) employee-monitor input ingress interface
ge-0/0/0.0
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
```

2. Configure the destination interface for the mirrored packets:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name output interface interface-name
```

For example, configure `ge-0/0/10.0` as the destination interface for the **employee-monitor** analyzer:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor output interface ge-0/0/10.0
```

Configuring an Analyzer for Remote Traffic Analysis

To mirror traffic that is traversing interfaces or a VLAN on the switch to a VLAN for analysis from a remote location (by using analyzers):

1. Configure a VLAN to carry the mirrored traffic:

```
[edit]
user@switch# set vlans analyzer-name vlan-id vlan-ID
```

For example, define an analyzer VLAN called **remote-analyzer** and assign it the VLAN ID **999**:

```
[edit]
user@switch# set vlans remote-analyzer vlan-id 999
```

2. Set the uplink module interface that is connected to the distribution switch to access mode and associate it with the analyzer VLAN:

```
[edit]
user@switch# set interfaces interface-name unit 0 family ethernet-switching interface-mode
access vlan members vlan-ID
```

For example, set the interface ge-0/1/1 to access mode and associate it with the analyzer VLAN ID **999**:

```
[edit]
user@switch# set interfaces ge-0/1/1 unit 0 family ethernet-switching interface-mode access
vlan members 999
```

3. Configure the analyzer:
 - a. Define an analyzer and specify the traffic to be mirrored:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name input ingress interface interface-name
```

For example, define the **employee-monitor** analyzer for which traffic to be mirrored comprises packets entering interfaces ge-0/0/0.0 and ge-0/0/1.0:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/0.0
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
```

- b. Specify the analyzer VLAN as the output for the analyzer:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name output vlan vlan-ID
```

For example, specify the **remote-analyzer** VLAN as the output analyzer for the **employee-monitor** analyzer:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor output vlan 999
```

Configuring a Statistical Analyzer for Local Traffic Analysis

To mirror interface traffic or VLAN traffic on the switch to an interface on the switch by using a statistical analyzer:

1. Choose a name for the analyzer and specify the input interfaces:

```
[edit forwarding-options]
user@switch# set analyzer (Port Mirroring) analyzer-name input ingress interface
interface-name
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
```

For example, specify an analyzer called **employee-monitor** and specify the input interfaces ge-0/0/0 and ge-0/0/1:

```
[edit forwarding-options]
user@switch# set analyzer (Port Mirroring) employee-monitor input ingress interface
ge-0/0/0.0
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
```

2. Configure the destination interface for the mirrored packets:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor output interface interface-name
```

For example, configure ge-0/0/10.0 as the destination interface for the mirrored packets:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor output interface ge-0/0/10.0
```

3. Specify mirroring properties.

- a. Specify the mirroring rate—that is, the number of packets to be mirrored per second:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input rate number
```

The valid range is 1 through 65,535.

- b. Specify the length to which mirrored packets are to be truncated:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input maximum-packet-length number
```

The valid range is 0 through 9216. The default value is 0, which indicates that mirrored packets are not truncated.

Configuring a Statistical Analyzer for Remote Traffic Analysis

To mirror traffic that is traversing interfaces or a VLAN on the switch to a VLAN for analysis from a remote location by using a statistical analyzer:

1. Configure a VLAN to carry the mirrored traffic:

```
[edit]
user@switch# set vlans vlan-name vlan-id vlan-ID
```

For example, configure a VLAN called **remote-analyzer** with VLAN ID **999**:

```
[edit]
user@switch# set vlans remote-analyzer vlan-id 999
```

2. Set the uplink module interface that is connected to the distribution switch to access mode and associate it with the VLAN:

```
[edit]
user@switch# set interfaces interface-name unit 0 family ethernet-switching interface-mode
access vlan members vlan-ID
```

For example, set the uplink module interface **ge-0/1/1.0** that is connected to the distribution switch to access mode and associate it with the **remote-analyzer** VLAN:

```
[edit]
user@switch# set interfaces ge-0/1/1.0 unit 0 family ethernet-switching interface-mode
access vlan members 999
```

3. Configure the statistical analyzer:
 - a. Specify the traffic to be mirrored:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name input ingress interface interface-name
```

For example, specify the packets entering ports **ge-0/0/0.0** and **ge-0/0/1.0** to be mirrored:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/0.0
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
```

- b. Specify an output for the analyzer:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name output vlan vlan-ID
```

For example, specify the **remote-analyzer** VLAN as the output for the analyzer:

```
[edit forwarding-options]
```

```
user@switch# set analyzer employee-monitor output vlan 999
```

4. Specify mirroring properties.

- a. Specify the mirroring rate—that is, the number of packets to be mirrored per second:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input rate number
```

The valid range is 1 through 65,535.

- b. Specify the length to which mirrored packets are to be truncated:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input maximum-packet-length number
```

The valid range is 0 through 9216. The default value is 0, which means the mirrored packets are not truncated.

Binding Statistical Analyzers to Ports Grouped at the FPC Level

You can bind a statistical analyzer to a specific FPC in the switch, that is, you can bind the statistical analyzer instance at the FPC level of the switch. The mirroring properties specified in the statistical analyzer are applied to all physical ports associated with all Packet Forwarding Engines on the specified FPC.

To bind a named instance of Layer 2 analyzer to an FPC:

1. Enable configuration of switch chassis properties:

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

2. Enable configuration of an FPC (and its installed PICs):

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

3. Bind a statistical analyzer instance to the FPC:

```
[edit chassis fpc slot-number]
user@switch# set port-mirror-instance stats_analyzer-1
```

4. (Optional) To bind a second statistical analyzer instance of Layer 2 mirroring to the same FPC, repeat Step 3 and specify a different statistical analyzer name:

```
[edit chassis fpc slot-number]
user@switch# set port-mirror-instance stats_analyzer-2
```

5. Verify the minimum configuration of the binding:

```
[edit chassis fpc slot-number port-mirror-instance analyzer_name]
user@switch# top
[edit]
user@switch# show chassis
```

```
chassis {
  fpc slot-number { # Bind two statistical analyzers or port mirroring
                    named instances at the FPC level.
    port-mirror-instance stats_analyzer-1;
    port-mirror-instance stats_analyzer-2;
  }
}
```



NOTE: On binding a second instance (stats_analyzer-2 in this example), the mirroring properties of this session, if configured, overrides any default analyzer.

Configuring an Analyzer with Multiple Destinations by Using Next-Hop Groups

On EX9200 switches, you can mirror traffic to multiple destinations by configuring next-hop groups as analyzer output. The mirroring of packets to multiple destinations is also known as multipacket port mirroring.

To mirror interface traffic or VLAN traffic on the switch to an interface on the switch (by using analyzers):

1. Choose a name for the analyzer and specify the input:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name input ingress interface interface-name
```

For example, create an analyzer called **employee-monitor** for which the input traffic comprises packets entering interfaces ge-0/0/0.0 and ge-0/0/1.0:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/0.0
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
```

2. Configure the destination interface for the mirrored packets:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name output next-hop-group next-hop-group-name
```

For example, configure the next-hop group **nhg** as the destination for the **employee-monitor** analyzer:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor output next-hop-group nhg
```

Defining a Next-Hop Group for Layer 2 Mirroring

On EX9200 switches, the next-hop group configuration at the **[edit forwarding-options]** configuration level enables you to define a next-hop group name, the type of addresses to be used in the next-hop group, and the logical interfaces that form the multiple destinations to which traffic can be mirrored. By default, the next-hop group is specified

using Layer 3 addresses using the `[edit forwarding-options next-hop-group next-hop-group-name group-type inet]` statement. To specify a next-hop group using Layer 2 addresses instead, include the `[edit forwarding-options next-hop-group next-hop-group-name group-type layer-2]` statement.

To define a next-hop group for Layer 2 mirroring:

1. Enable configuration of a next-hop group for Layer 2 mirroring:

```
[edit forwarding-options ]
user@switch# set next-hop-group next-hop-group-name
```

For example, configure **next-hop-group** with name **nhg**:

```
[edit forwarding-options]
user@switch# set next-hop-group nhg
```

2. Specify the type of addresses to be used in the next-hop group configuration:

```
[edit forwarding-options next-hop-group next-hop-group-name]
user@switch# set group-type layer-2
```

For example, configure **next-hop-group type** as **layer-2** because the analyzer output must be **layer-2** only:

```
[edit forwarding-options]
user@switch# set next-hop-group nhg group-type layer-2
```

3. Specify the logical interfaces of the next-hop group:

```
[edit forwarding-options next-hop-group next-hop-group-name]
user@switch# set interface logical-interface-name-1
user@switch# set interface logical-interface-name-2
```

For example, to specify ge-0/0/10.0 and ge-0/0/11.0 as the logical interfaces of the next-hop group **nhg**:

```
[edit forwarding-options]
user@switch# set next-hop-group nhg interface ge-0/0/10.0
user@switch# set next-hop-group nhg interface ge-0/0/11.0
```

Related Documentation

- [Example: Configuring Port Mirroring Analyzers for Local Monitoring of Employee Resource Use on page 855](#)
- [Example: Configuring Port Mirroring for Remote Monitoring of Employee Resource Use on page 859](#)
- [Understanding Port Mirroring Analyzers on page 834](#)

Configuring Mirroring on EX4300 Switches to Analyze Traffic (CLI Procedure)



NOTE: This task uses Junos OS for EX Series switches with support for the Enhanced Layer 2 Software (ELS) configuration style.

EX4300 switches enable you to configure mirroring to send copies of packets to either a local interface for local monitoring or to a VLAN for remote monitoring. You can use mirroring to copy these packets:

- Packets entering or exiting a port
- Packets entering a VLAN



BEST PRACTICE: Mirror only necessary packets to reduce potential performance impact. We recommend that you:

- Disable your configured mirroring configurations when you are not using them.
- Specify individual interfaces as input to analyzers rather than specifying all interfaces as input.
- Limit the amount of mirrored traffic by using firewall filters.



NOTE: If you want to create additional analyzers without deleting the existing analyzers, then disable the existing analyzers by using the `disable analyzer analyzer-name` statement from the command-line interface or the J-Web configuration page for mirroring.



NOTE: Interfaces used as output for an analyzer must be configured under the `ethernet-switching` family.

- [Configuring an Analyzer for Local Traffic Analysis on page 847](#)
- [Configuring an Analyzer for Remote Traffic Analysis on page 848](#)
- [Configuring Port Mirroring on page 849](#)

Configuring an Analyzer for Local Traffic Analysis

To mirror interface traffic or VLAN traffic on the switch to an interface on the switch (by using analyzers):

1. Choose a name for the analyzer and specify the input:

```
[edit forwarding-options]
```

```
user@switch# set analyzer (Port Mirroring) analyzer-name input ingress interface
interface-name
```

For example, create an analyzer called **employee-monitor** for which the input traffic is packets entering interfaces ge-0/0/0.0 and ge-0/0/1.0:

```
[edit forwarding-options]
user@switch# set analyzer (Port Mirroring) employee-monitor input ingress interface
ge-0/0/0.0
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
```

2. Configure the destination interface for the mirrored packets:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name output interface interface-name
```

For example, configure ge-0/0/10.0 as the destination interface for the **employee-monitor** analyzer:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor output interface ge-0/0/10.0
```

Configuring an Analyzer for Remote Traffic Analysis

To mirror traffic that is traversing interfaces or a VLAN on the switch to a VLAN for analysis from a remote location (by using analyzers):

1. Configure a VLAN to carry the mirrored traffic:

```
[edit]
user@switch# set vlans analyzer-name vlan-id vlan-ID
```

For example, define an analyzer VLAN called **remote-analyzer** and assign it a VLAN ID of **999**:

```
[edit]
user@switch# set vlans remote-analyzer vlan-id 999
```

2. Set the uplink module interface that is connected to the distribution switch to trunk mode and associate it with the analyzer VLAN:

```
[edit]
user@switch# set interfaces interface-name unit 0 family ethernet-switching interface-mode
trunk vlan members vlan-ID
```

For example, set the interface ge-0/1/1 to trunk mode and associate it with the analyzer VLAN ID **999**:

```
[edit]
user@switch# set interfaces ge-0/1/1 unit 0 family ethernet-switching interface-mode trunk
vlan members 999
```

3. Configure the analyzer:

- a. Define an analyzer and specify the traffic to be mirrored:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name input ingress interface interface-name
```

For example, define the **employee-monitor** analyzer for which traffic to be mirrored is packets entering interfaces ge-0/0/0.0 and ge-0/0/1.0:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/0.0
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
```

- b. Specify the analyzer VLAN as the output for the analyzer:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name output vlan vlan-ID
```

For example, specify the **remote-analyzer** VLAN as the output analyzer for the **employee-monitor** analyzer:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor output vlan 999
```

Configuring Port Mirroring

To filter packets to be mirrored to a port-mirroring instance, create the instance and then use it as the action in the firewall filter. You can use firewall filters in both local and remote mirroring configurations.

If the same port-mirroring instance is used in multiple filters or terms, the packets are copied to the analyzer output port or analyzer VLAN only once.

To filter mirrored traffic, create a port-mirroring instance under the **[edit forwarding-options]** hierarchy level, and then create a firewall filter. The filter can use any of the available match conditions and must have **port-mirror-instance *instance-name*** as an action. This action in the firewall filter configuration provides the input to the port-mirroring instance.

To configure a port-mirroring instance with firewall filters:

1. Configure the port-mirroring instance name (here, **employee-monitor**) and the output:
 - a. For local analysis, set the output to the local interface to which you will connect the computer running the protocol analyzer application:

```
[edit forwarding-options]
user@switch# set port-mirroring instance employee-monitor output interface
ge-0/0/10.0
```

- b. For remote analysis, set the output to the **remote-analyzer** VLAN:

```
[edit forwarding-options]
user@switch# set port-mirroring instance employee-monitor output vlan 999
```

2. Create a firewall filter by using any of the available match conditions and assign **employee-monitor** to the **port-mirror-instance** action:

This step shows a firewall filter **example-filter**, with two terms (**no-analyzer** and **to-analyzer**):

- a. Create the first term to define the traffic that should not pass through to the port-mirroring instance **employee-monitor**:

```
[edit firewall family ethernet-switching]
user@switch# set filter example-filter term no-analyzer from source-address
ip-address
user@switch# set filter example-filter term no-analyzer from destination-address
ip-address
user@switch# set filter example-filter term no-analyzer then accept
```

- b. Create the second term to define the traffic that should pass through to the port-mirroring instance **employee-monitor**:

```
[edit firewall family ethernet-switching]
user@switch# set filter example-filter term to-analyzer from destination-port 80
user@switch# set filter example-filter term to-analyzer then port-mirror-instance
employee-monitor
user@switch# set filter example-filter term to-analyzer then accept
```

3. Apply the firewall filter to the interfaces or VLAN that provide input to the port-mirroring instance:

```
[edit]
user@switch# set interfaces ge-0/0/0 unit 0 family ethernet-switching filter input
example-filter
ser@switch# set vlan remote-analyzer filter input example-filter
```

Related Documentation

- [Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use on EX4300 Switches on page 893](#)
- [Example: Configuring Firewall Filters for Port, VLAN, and Router Traffic on EX Series Switches](#)
- [Firewall Filters for EX Series Switches Overview](#)

Configuring Port Mirroring to Analyze Traffic (CLI Procedure)

EX Series switches allow you to configure port mirroring to send copies of packets to either a local interface for local monitoring or to a VLAN for remote monitoring. You can use port mirroring to copy these packets:

- Packets entering or exiting a port
- Packets entering a VLAN on EX2200, EX3200, EX3300, EX4200, EX4500, or EX6200 switches
- Packets exiting a VLAN on EX8200 switches



BEST PRACTICE: Mirror only necessary packets to reduce potential performance impact. We recommend that you:

- Disable your configured port mirroring analyzers when you are not using them.
- Specify individual interfaces as input to analyzers rather than specifying all interfaces as input.
- Limit the amount of mirrored traffic by:
 - Using statistical sampling.
 - Setting ratios to select statistical samples.
 - Using firewall filters.



NOTE: If you want to create additional analyzers without deleting the existing analyzer, first disable the existing analyzer using the `disable analyzer analyzer-name` command or the J-Web configuration page for port mirroring.



NOTE: Interfaces used as output for an analyzer must be configured as family `ethernet-switching`.

- [Configuring Port Mirroring for Local Traffic Analysis on page 851](#)
- [Configuring Port Mirroring for Remote Traffic Analysis on page 852](#)
- [Filtering the Traffic Entering an Analyzer on page 853](#)

Configuring Port Mirroring for Local Traffic Analysis

To mirror interface traffic or VLAN traffic on the switch to an interface on the switch:

1. Choose a name for the analyzer—in this case, **employee-monitor**—and specify the input—in this case, packets entering `ge-0/0/0` and `ge-0/0/1`:

```
[edit ethernet-switching-options]
user@switch# set analyzer (Port Mirroring) employee-monitor input (Port Mirroring) ingress
interface ge-0/0/0.0
[edit ethernet-switching-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
```

2. Optionally, you can specify a statistical sampling of the packets by setting a ratio:

```
[edit ethernet-switching-options]
user@switch# set analyzer employee-monitor ratio 200
```

When the ratio is set to 200, 1 of every 200 packets is mirrored to the analyzer. You can use statistical sampling to reduce the volume of mirrored traffic, as a high volume of mirrored traffic can be performance intensive for the switch. On EX8200 switches, you can set a ratio only for ingress packets.

3. Configure the destination interface for the mirrored packets:

```
[edit ethernet-switching-options]
user@switch# set analyzer employee-monitor output (Port Mirroring) interface ge-0/0/10.0
```

Configuring Port Mirroring for Remote Traffic Analysis

To mirror traffic that is traversing interfaces or a VLAN on the switch to a VLAN for analysis from a remote location:

1. Configure a VLAN to carry the mirrored traffic. This VLAN is called **remote-analyzer** and given the ID of 999 by convention in this documentation:

```
[edit]
user@switch# set vlans remote-analyzer vlan-id 999
```

2. Set the uplink module interface that is connected to the distribution switch to trunk mode and associate it with the **remote-analyzer** VLAN:

```
[edit]
user@switch# set interfaces ge-0/1/1 unit 0 family ethernet-switching port-mode trunk vlan
members 999
```

3. Configure the analyzer:

- a. Choose a name and set the loss priority to high. Loss priority should always be set to high when configuring for remote port mirroring:

```
[edit ethernet-switching-options]
user@switch# set analyzer (Port Mirroring) employee-monitor loss-priority (Port Mirroring)
high
```

- b. Specify the traffic to be mirrored—in this example the packets entering ports **ge-0/0/0** and **ge-0/0/1**:

```
[edit ethernet-switching-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/0.0
[edit ethernet-switching-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
```

- c. Specify the **remote-analyzer** VLAN as the output for the analyzer:

```
[edit ethernet-switching-options]
user@switch# set analyzer employee-monitor output (Port Mirroring) vlan 999
```

4. Optionally, you can specify a statistical sampling of the packets by setting a ratio:

```
[edit ethernet-switching-options]
user@switch# set analyzer employee-monitor ratio 200
```

When the ratio is set to 200, 1 out of every 200 packets is mirrored to the analyzer. You can use this to reduce the volume of mirrored traffic as a very high volume of mirrored traffic can be performance intensive for the switch.

Filtering the Traffic Entering an Analyzer

To filter which packets are mirrored to an analyzer, create the analyzer and then use it as the action in the firewall filter. You can use firewall filters in both local and remote port mirroring configurations.

If the same analyzer is used in multiple filters or terms, the packets are copied to the analyzer output port or analyzer VLAN only once.

To filter mirrored traffic, create an analyzer and then create a firewall filter. The filter can use any of the available match conditions and must have an action of **analyzer *analyzer-name***. The action of the firewall filter provides the input to the analyzer.

To configure port mirroring with filters:

1. Configure the analyzer name (here, **employee-monitor**) and the output:
 - a. For local analysis, set the output to the local interface to which you will connect the computer running the protocol analyzer application:

```
[edit ethernet-switching-options]
user@switch# set analyzer (Port Mirroring) employee-monitor output interface ge-0/0/10.0
```

- b. For remote analysis, set the loss priority to high and set the output to the **remote-analyzer** VLAN:

```
[edit ethernet-switching-options]
user@switch# set analyzer employee-monitor loss-priority high output vlan 999
```

2. Create a firewall filter using any of the available match conditions and specify the action as **analyzer *employee-monitor***:

This step shows a firewall filter called **example-filter**, with two terms:

- a. Create the first term to define the traffic that should not pass through to the analyzer:

```
[edit firewall family ethernet-switching]
user@switch# set filter (Firewall Filters) example-filter term no-analyzer from
source-address ip-address
[edit firewall family ethernet-switching]
user@switch# set filter example-filter term no-analyzer from destination-address
ip-address
[edit firewall family ethernet-switching]
user@switch# set filter example-filter term no-analyzer then accept
```

- b. Create the second term to define the traffic that should pass through to the analyzer:

```
[edit firewall family ethernet-switching]
user@switch# set filter example-filter term to-analyzer from destination-port 80
[edit firewall family ethernet-switching]
user@switch# set filter example-filter term to-analyzer then analyzer employee-monitor
[edit firewall family ethernet-switching]
user@switch# set filter example-filter term to-analyzer then accept
```

3. Apply the firewall filter to the interfaces or VLAN that are input to the analyzer:

```
[edit]
user@switch# set interfaces ge-0/0/0 unit 0 family ethernet-switching filter input
example-filter
[edit]
user@switch# set vlan remote-analyzer filter input example-filter
```

- Related Documentation**
- *Example: Configuring Port Mirroring for Local Monitoring of Employee Resource Use on EX Series Switches*
 - *Example: Configuring Firewall Filters for Port, VLAN, and Router Traffic on EX Series Switches*
 - *Firewall Filters for EX Series Switches Overview*

Verifying Input and Output for Port Mirroring Analyzers on EX Series Switches

- Purpose** Verify that an analyzer has been created on the switch and has the appropriate output interfaces, and appropriate output interface.

Action You can verify the port mirror analyzer is configured as expected using the **show analyzer** command.

```
[edit]
user@switch> show analyzer

Analyzer name           : employee-monitor
Output VLAN             : remote-analyzer
Mirror ratio            : 1
Loss priority           : High
Ingress monitored interfaces : ge-0/0/0.0
Ingress monitored interfaces : ge-0/0/1.0
```

You can view all of the port mirror analyzers configured on the switch, including any that are disabled, using the **show ethernet-switching-options** command in configuration mode.

```
user@switch# show ethernet-switching-options

inactive: analyzer employee-web-monitor {
    loss-priority high;
    output {

analyzer employee-monitor {
    loss-priority high;
    input {
        ingress {
            interface ge-0/0/0.0;
            interface ge-0/0/1.0;
        }
    }
    output {
        vlan {
            remote-analyzer;
        }
    }
}
```

Meaning This output shows that the employee-monitor analyzer has a ratio of 1 (mirroring every packet, the default), a loss priority of high (set this option to high whenever the analyzer output is to a VLAN), is mirroring the traffic entering **ge-0/0/0** and **ge-0/0/1**, and sending the mirrored traffic to the analyzer called remote-analyzer.

Related Documentation

- *Example: Configuring Port Mirroring for Local Monitoring of Employee Resource Use on EX Series Switches*

Example: Configuring Port Mirroring Analyzers for Local Monitoring of Employee Resource Use

Juniper Networks devices allow you to configure port mirroring to send copies of packets to either a local interface for local monitoring or to a VLAN or bridge domain for remote monitoring. You can use mirroring to copy these packets:

- Packets entering or exiting a port
- Packets entering or exiting a VLAN or bridge domain

You can then analyze the mirrored traffic locally or remotely using a protocol analyzer application. You can install analyzers on a system connected to the local destination interface, or running on a remote monitoring station if you are sending mirrored traffic to an analyzer VLAN or bridge domain.

This topic describes how to configure local mirroring on a switching device. The examples in this topic describe how to configure a switching device to mirror traffic entering interfaces connected to employee computers to an analyzer output interface on that same device.

- [Requirements on page 856](#)
- [Overview and Topology on page 856](#)
- [Mirroring All Employee Traffic for Local Analysis on page 857](#)
- [Verification on page 858](#)

Requirements

Use either one of the following hardware and software components:

- One EX9200 switch with Junos OS Release 13.2 or later
- One MX Series router with Junos OS Release 14.1 or later

Before you configure port mirroring, be sure you have an understanding of mirroring concepts. For information about analyzers, see [“Understanding Port Mirroring Analyzers” on page 834](#). For information about port mirroring, see [“Understanding Layer 2 Port Mirroring” on page 822](#).

Overview and Topology

This topic describes how to mirror all traffic entering ports on the switching device to a destination interface on the same device (local mirroring). In this case, the traffic is entering ports connected to employee computers.



NOTE: Mirroring all traffic requires significant bandwidth and should only be done during an active investigation.

The interfaces ge-0/0/0 and ge-0/0/1 serve as connections for employee computers.

The interface ge-0/0/10 is reserved for analysis of mirrored traffic. Connect a PC running a protocol analyzer application to the analyzer output interface to analyze the mirrored traffic.

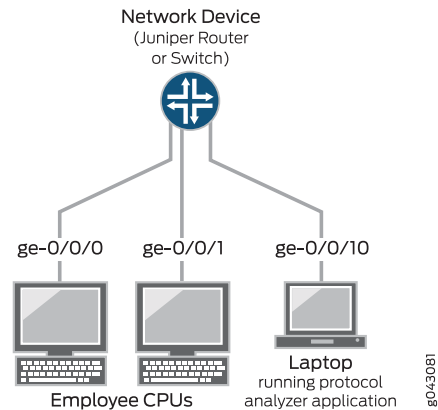
Connect a PC running a protocol analyzer application to the analyzer output interface to analyze the mirrored traffic.



NOTE: Multiple ports mirrored to one interface can cause buffer overflow and dropped packets.

Figure 21 on page 857 shows the network topology for this example.

Figure 21: Network Topology for Local Port Mirroring Example



Mirroring All Employee Traffic for Local Analysis

CLI Quick Configuration To quickly configure local mirroring for ingress traffic sent to the two ports connected to employee computers, copy either the following commands for EX Series switches or for MX Series routers and paste them into the switching device's terminal window:

EX Series

```
[edit]
set interfaces ge-0/0/0 unit 0 family ethernet-switching
set interfaces ge-0/0/1 unit 0 family ethernet-switching
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor output interface ge-0/0/10.0
```

MX Series

```
[edit]
set interfaces ge-0/0/0 unit 0 family bridge interface-mode access vlan-id 99
set interfaces ge-0/0/1 unit 0 family bridge interface-mode access vlan-id 98
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor output interface ge-0/0/10.0
```

Step-by-Step Procedure To configure an analyzer called **employee-monitor** and specify both the input (source) interfaces and the analyzer output interface:

1. Configure each interface you are to use in the analyzer configuration. Use the family protocol that is correct for your platform.

```
[edit]
set interfaces ge-0/0/0 unit 0 family ethernet-switching
set interfaces ge-0/0/1 unit 0 family ethernet-switching
```

To configure **family bridge** on an interface, you need to configure **interface-mode access** or **interface-mode trunk** as well. You also must configure **vlan-id**.

```
[edit]
set interfaces ge-0/0/0 unit 0 family bridge interface-mode access vlan-id 99
set interfaces ge-0/0/1 unit 0 family bridge interface-mode access vlan-id 98
```

2. Configure each interface connected to employee computers as an input interface for the analyzer **employee-monitor**.

```
[edit forwarding-options]
set analyzer employee-monitor input ingress interface ge-0/0/0.0
set analyzer employee-monitor input ingress interface ge-0/0/1.0
```

3. Configure the output analyzer interface for the **employee-monitor** analyzer.

This will be the destination interface for the mirrored packets.

```
[edit forwarding-options]
set analyzer employee-monitor output interface ge-0/0/10.0
```

Results Check the results of the configuration.

```
[edit]
user@device# show forwarding-options
analyzer {
  employee-monitor {
    input {
      ingress {
        interface ge-0/0/0.0;
        interface ge-0/0/1.0;
      }
    }
    output {
      interface ge-0/0/10.0;
    }
  }
}
```

Verification

Verifying That the Analyzer Has Been Correctly Created

Purpose Verify that the analyzer **employee-monitor** has been created on the switching device with the appropriate input interfaces and the appropriate output interface.

Action Use the **show forwarding-options analyzer** operational command to verify whether an analyzer is configured as expected.

```
user@device> show forwarding-options analyzer

Analyzer name           : employee-monitor
Mirror rate             : 1
Maximum packet length   : 0
State                   : up
Ingress monitored interfaces : ge-0/0/0.0
Output interface        : ge-0/0/10.0
```

Meaning The output shows that the **employee-monitor** analyzer has a ratio of 1 (that is, mirroring every packet, the default setting), the maximum size of the original packet mirrored is 0 (which indicates that the entire packet is mirrored), the state of the configuration is **up**, and the analyzer is mirroring the traffic entering the ge-0/0/0 interface, and sending the mirrored traffic to the ge-0/0/10 interface.

If the state of the output interface is **down** or if the output interface is not configured, the value of **State** will be **down** and the analyzer will not be programmed for mirroring.

- Related Documentation**
- [Example: Configuring Port Mirroring for Remote Monitoring of Employee Resource Use on page 859](#)
 - [Configuring Mirroring on EX9200 Switches to Analyze Traffic \(CLI Procedure\) on page 839](#)
 - [Understanding Port Mirroring Analyzers on page 834](#)

Example: Configuring Port Mirroring for Remote Monitoring of Employee Resource Use

Juniper Networks devices allow you to configure port mirroring to send copies of packets to either a local interface for local monitoring or to a VLAN or bridge domain for remote monitoring. You can use mirroring to copy these packets:

- Packets entering or exiting a port
- Packets entering or exiting a VLAN
- Packets entering or exiting a bridge domain

If you are sending mirrored traffic to an analyzer VLAN or bridge domain, you can analyze the mirrored traffic using a protocol analyzer application running on a remote monitoring station.



BEST PRACTICE: Mirror only necessary packets to reduce potential performance impact. We recommend that you do the following:

- Disable your configured mirroring sessions when you are not using them.

- Specify individual interfaces as input to analyzers rather than specifying all interfaces as input.
- Limit the amount of mirrored traffic by:
 - Using statistical sampling.
 - Setting ratios to select statistical samples.
 - Using firewall filters.

The examples in this topic describe how to configure remote port mirroring to analyze employee resource usage.

- [Requirements on page 860](#)
- [Overview and Topology on page 860](#)
- [Mirroring Employee Traffic for Remote Analysis Using a Statistical Analyzer on page 861](#)
- [Verification on page 869](#)

Requirements

This example uses one of the following pairs of hardware and software components:

- One EX9200 switch connected to another EX9200 switch, both running Junos OS Release 13.2 or later
- One MX Series router connected to another MX Series router, both running Junos OS Release 14.1 or later

Before you configure remote mirroring, be sure that:

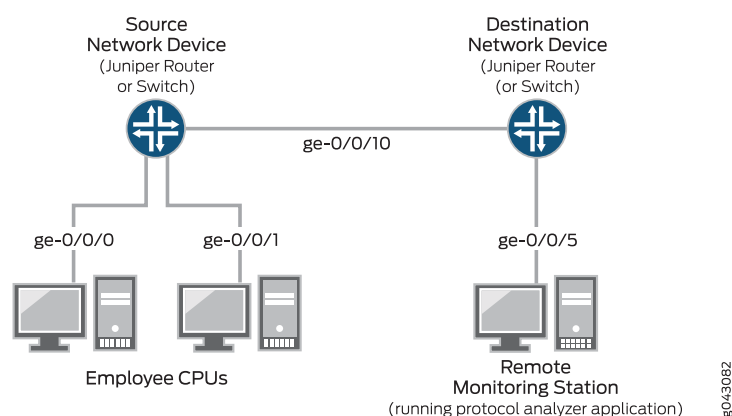
- You have an understanding of mirroring concepts. For information about analyzers, see [“Understanding Port Mirroring Analyzers” on page 834](#). For information about port mirroring, see [“Understanding Layer 2 Port Mirroring” on page 822](#).
- The interfaces that the analyzer will use as input interfaces have already been configured on the switching device.

Overview and Topology

This topic describes how to configure port mirroring to a remote analyzer VLAN or bridge domain so that analysis can be done from a remote monitoring station.

[Figure 22 on page 861](#) shows the network topology for both the EX Series example and the MX Series example scenarios.

Figure 22: Network Topology for Remote Port Mirroring and Analysis



In this example:

- Interface ge-0/0/0 is a Layer 2 interface, and interface ge-0/0/1 is a Layer 3 interface (both interfaces on the source device) that serve as connections for employee computers.
- Interface ge-0/0/10 is a Layer 2 interface that connects the source switching device to the destination switching device.
- Interface ge-0/0/5 is a Layer 2 interface that connects the destination switching device to the remote monitoring station.
- The analyzer **remote-analyzer** is configured on all switching devices in the topology to carry the mirrored traffic. The topology can use either a VLAN or a bridge domain.

Mirroring Employee Traffic for Remote Analysis Using a Statistical Analyzer

To configure a statistical analyzer for remote traffic analysis for all incoming and outgoing employee traffic, select one of the following examples:

- [Mirroring Employee Traffic for Remote Analysis for EX Series Switches on page 861](#)
- [Mirroring Employee Traffic for Remote Analysis for MX Series Routers on page 865](#)

Mirroring Employee Traffic for Remote Analysis for EX Series Switches

CLI Quick Configuration

To quickly configure a statistical analyzer for remote traffic analysis of incoming and outgoing employee traffic, copy the following commands for EX Series switches and paste them into the correct switching device's terminal window.

- Copy and paste the following commands in the *source* switching device's terminal window:

```
[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/10 unit 0 family ethernet-switching interface-mode access
```

```

set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan members 999
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor input egress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input egress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor output vlan remote-analyzer
set forwarding-options analyzer employee-monitor input rate 2
set forwarding-options analyzer employee-monitor input maximum-packet-length 128
set chassis fpc 0 port-mirror-instance employee-monitor

```

- Copy and paste the following commands in the *destination* switching device's terminal window:

```

[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/10 unit 0 family ethernet-switching interface-mode access
set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan members 999
set interfaces ge-0/0/5 unit 0 family ethernet-switching interface-mode access
set forwarding-options analyzer employee-monitor input ingress vlan remote-analyzer
set forwarding-options analyzer employee-monitor output interface ge-0/0/5.0

```

Step-by-Step Procedure

To configure basic remote mirroring:

1. On the source switching device, do the following:
 - Configure the VLAN ID for the **remote-analyzer** VLAN.

```

[edit]
user@device# set vlans remote-analyzer vlan-id 999

```

- Configure the interface on the network port connected to the destination switching device for access mode and associate it with the **remote-analyzer** VLAN.

```

[edit]
user@device# set interfaces ge-0/0/10 unit 0 family ethernet-switching
interface-mode access
user@device# set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan
members 999

```

- Configure the statistical analyzer **employee-monitor**.

```

[edit forwarding-options]
user@device# set analyzer employee-monitor input ingress interface ge-0/0/0.0
user@device# set analyzer employee-monitor input ingress interface ge-0/0/1.0
user@device# set analyzer employee-monitor input egress interface ge-0/0/0.0
user@device# set analyzer employee-monitor input egress interface ge-0/0/1.0
user@device# set analyzer employee-monitor output vlan remote-analyzer
user@device# set analyzer employee-monitor input rate 2
user@device# set analyzer employee-monitor input maximum-packet-length 128

```

- Bind the statistical analyzer to the FPC that contains the input interface.

```

[edit]

```

```
user@device# set chassis fpc 0 port-mirror-instance employee-monitor
```

2. On the destination network device, do the following:

- Configure the VLAN ID for the **remote-analyzer** VLAN.

```
[edit]
user@device# set vlans remote-analyzer vlan-id 999
```

- Configure the interface on the destination switching device for access mode and associate it with the **remote-analyzer** VLAN.

```
[edit interfaces]
user@device# set ge-0/0/10 unit 0 family ethernet-switching interface-mode
access
user@device# set ge-0/0/10 unit 0 family ethernet-switching vlan members 999
```

- Configure the interface connected to the destination switching device for access mode.

```
[edit interfaces]
user@device# set ge-0/0/5 unit 0 family ethernet-switching interface-mode
access
```

- Configure the **employee-monitor** analyzer.

```
[edit forwarding-options]
user@device# set analyzer employee-monitor input ingress vlan remote-analyzer
user@device# set analyzer employee-monitor output interface ge-0/0/5.0
```

- Specify mirroring parameters such as rate and the maximum packet length for the **employee-monitor** analyzer.

```
[edit]
user@device# set forwarding-options analyzer employee-monitor input rate 2
user@device# set forwarding-options analyzer employee-monitor input
maximum-packet-length 128
```

- Bind the **employee-monitor** analyzer to the FPC containing the input ports.

```
[edit]
user@device# set chassis fpc 0 port-mirror-instance employee-monitor
```

Results Check the results of the configuration on the source switching device:

```
[edit]
user@device# show
forwarding-options {
  analyzer employee-monitor {
    input {
      ingress {
        interface ge-0/0/0.0;
```

```
        interface ge-0/0/1.0;
      }
      egress {
        interface ge-0/0/0.0;
        interface ge-0/0/1.0;
      }
      maximum-packet-length 128;
      rate 2;
    }
    output {
      vlan {
        remote-analyzer;
      }
    }
  }
}
interfaces {
  ge-0/0/10 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
        vlan {
          members 999;
        }
      }
    }
  }
}
vlangs {
  remote-analyzer {
    vlan-id 999;
  }
}
```

Check the results of the configuration on the destination switching device.

```
[edit]
user@device# show
interfaces {
  ge0/0/5 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
      }
    }
  }
  ge-0/0/10 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
        vlan {
          members 999;
        }
      }
    }
  }
}
```

```

    }
  }
}
vllans {
  remote-analyzer {
    vlan-id 999;
    interface {
      ge-0/0/10.0;
    }
  }
}
forwarding-options {
  analyzer employee-monitor {
    input {
      ingress {
        vlan remote-analyzer;
      }
    }
    output {
      interface {
        ge-0/0/5.0;
      }
    }
  }
}
}
}

```

Mirroring Employee Traffic for Remote Analysis for MX Series Routers

CLI Quick Configuration

To quickly configure a statistical analyzer for remote traffic analysis of incoming and outgoing employee traffic, copy the following commands for MX Series routers and paste them into the correct switching device's terminal window.

- Copy and paste the following commands in the *source* switching device's terminal window:

```

[edit]
set bridge-domains remote-analyzer vlan-id 999
set interfaces ge-0/0/10 unit 0 family bridge interface-mode access
set interfaces ge-0/0/10 unit 0 family bridge vlan-id 999
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor input egress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input egress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor output bridge-domain
remote-analyzer
set forwarding-options analyzer employee-monitor input rate 2
set forwarding-options analyzer employee-monitor input maximum-packet-length 128
set chassis fpc 0 port-mirror-instance employee-monitor

```

- Copy and paste the following commands in the *destination* switching device's terminal window:

```

[edit]

```

```

set bridge-domains remote-analyzer vlan-id 999
set interfaces ge-0/0/10 unit 0 family bridge interface-mode access
set interfaces ge-0/0/10 unit 0 family bridge vlan-id 999
set interfaces ge-0/0/5 unit 0 family bridge interface-mode access
set forwarding-options analyzer employee-monitor input ingress bridge-domain
remote-analyzer
set forwarding-options analyzer employee-monitor output interface ge-0/0/5.0

```

Step-by-Step Procedure

To configure basic remote mirroring using MX Series routers:

1. On the source switching device, do the following:

- Configure the VLAN ID for the **remote-analyzer** bridge domain.

```

[edit]
user@device# set bridge-domains remote-analyzer vlan-id 999

```

- Configure the interface on the network port connected to the destination switching device for access mode and associate it with the **remote-analyzer** bridge domain.

```

[edit]
user@device# set interfaces ge-0/0/10 unit 0 family bridge interface-mode access
user@device# set interfaces ge-0/0/10 unit 0 family bridge vlan members 999

```

- Configure the statistical analyzer **employee-monitor**.

```

[edit forwarding-options]
user@device# set analyzer employee-monitor input ingress interface ge-0/0/0.0
user@device# set analyzer employee-monitor input ingress interface ge-0/0/1.0
user@device# set analyzer employee-monitor input egress interface ge-0/0/0.0
user@device# set analyzer employee-monitor input egress interface ge-0/0/1.0
user@device# set analyzer employee-monitor output bridge-domain
remote-analyzer
user@device# set analyzer employee-monitor input rate 2
user@device# set analyzer employee-monitor input maximum-packet-length 128

```

- Bind the statistical analyzer to the FPC that contains the input interface.

```

[edit]
user@device# set chassis fpc 0 port-mirror-instance employee-monitor

```

2. On the destination switching device, do the following:

- Configure the VLAN ID for the **remote-analyzer** bridge domain.

```

[edit bridge-domains]
user@device# set remote-analyzer vlan-id 999

```

- Configure the interface on the destination switching device for access mode and associate it with the **remote-analyzer** bridge domain.

```

[edit interfaces]
user@device# set ge-0/0/10 unit 0 family bridge interface-mode access

```



```
user@device# set ge-0/0/10 unit 0 family bridge vlan members 999
```

- Configure the interface connected to the destination switching device for access mode.

```
[edit interfaces]
user@device# set ge-0/0/5 unit 0 family bridge interface-mode access
```

- Configure the **employee-monitor** analyzer.

```
[edit forwarding-options]
user@device# set analyzer employee-monitor input ingress bridge-domain
remote-analyzer
user@device# set analyzer employee-monitor output interface ge-0/0/5.0
```

- Specify mirroring parameters such as rate and the maximum packet length for the **employee-monitor** analyzer.

```
[edit]
user@device# set forwarding-options analyzer employee-monitor input rate 2
user@device# set forwarding-options analyzer employee-monitor input
maximum-packet-length 128
```

- Bind the **employee-monitor** analyzer to the FPC containing the input ports.

```
[edit]
user@device# set chassis fpc 0 port-mirror-instance employee-monitor
```

Results Check the results of the configuration on the source switching device:

```
[edit]
user@device# show
bridge-domains {
  remote-analyzer {
    vlan-id 999;
  }
}
forwarding-options {
  analyzer {
    employee-monitor {
      input {
        ingress {
          interface ge-0/0/0.0;
          interface ge-0/0/1.0;
        }
        egress {
          interface ge-0/0/0.0;
          interface ge-0/0/1.0;
        }
      }
      maximum-packet-length 128;
      rate 2;
    }
  }
}
```

```
        output {
            bridge-domain {
                remote-analyzer;
            }
        }
    }
}
interfaces {
    ge-0/0/0 {
        unit 0 {
            family bridge {
                interface-mode access;
                vlan-id 99;
            }
        }
    }
    ge-0/0/1 {
        unit 0 {
            family bridge {
                interface-mode access;
                vlan-id 98;
            }
        }
    }
    ge-0/0/10 {
        unit 0 {
            family bridge {
                interface-mode access;
                vlan-id 999;
            }
        }
    }
}
```

Check the results of the configuration on the destination switching device.

```
[edit]
user@device# show
bridge-domains {
    remote-analyzer {
        vlan-id 999;
    }
}
forwarding-options {
    analyzer {
        employee-monitor {
            input {
                ingress {
                    interface ge-0/0/0.0;
                    interface ge-0/0/1.0;
                    bridge-domain remote-analyzer;
                }
            }
        }
    }
}
```

```

        output {
            interface ge-0/0/5.0;
        }
    }
}
interfaces {
    ge-0/0/5 {
        unit 0 {
            family bridge {
                interface-mode access;
            }
        }
    }
}
}

```

Verification

Verifying That the Analyzer Has Been Correctly Created

Purpose Verify that the analyzer named **employee-monitor** has been created on the device with the appropriate input interfaces and appropriate output interface.

Action To verify that the analyzer is configured as expected while monitoring all employee traffic on the source switching device, run the **show forwarding-options analyzer** command on the source switching device. The following output is displayed for this configuration example.

```
user@device> show forwarding-options analyzer
```

```

Analyzer name           : employee-monitor
Mirror rate             : 2
Maximum packet length   : 128
State                   : up
Ingress monitored interfaces : ge-0/0/0.0
Ingress monitored interfaces : ge-0/0/1.0
Egress monitored interfaces : ge-0/0/0.0
Egress monitored interfaces : ge-0/0/1.0
Output VLAN             : default-switch/remote-analyzer

```

Meaning This output shows that the **employee-monitor** instance has a ratio of 2, the maximum size of the original packet that were mirrored is 128, the state of the configuration is **up**, which indicates proper state and that the analyzer is programmed, and the analyzer is mirroring the traffic entering ge-0/0/0.0 and ge-0/0/1.0, and is sending the mirrored traffic to the VLAN called remote-analyzer.

If the state of the output interface is **down** or if the output interface is not configured, the value of **State** will be down and the analyzer will not be able to mirror traffic.

Related Documentation

- [Example: Configuring Port Mirroring Analyzers for Local Monitoring of Employee Resource Use on page 855](#)
- [Example: Configuring Mirroring to Multiple Interfaces for Remote Monitoring of Employee Resource Use on EX9200 Switches on page 870](#)
- [Configuring Mirroring on EX9200 Switches to Analyze Traffic \(CLI Procedure\) on page 839](#)
- [Understanding Port Mirroring Analyzers on page 834](#)

Example: Configuring Mirroring to Multiple Interfaces for Remote Monitoring of Employee Resource Use on EX9200 Switches

EX9200 switches allow you to configure mirroring to send copies of packets to either a local interface for local monitoring or to a VLAN for remote monitoring. You can use mirroring to copy these packets:

- Packets entering or exiting a port
- Packets entering or exiting a VLAN on

You can analyze the mirrored traffic using a protocol analyzer application running on a remote monitoring station if you are sending mirrored traffic to an analyzer VLAN.



BEST PRACTICE: Mirror only necessary packets to reduce potential performance impact. We recommend that you:

- Disable your configured mirroring analyzers when you are not using them.
- Specify individual interfaces as input to analyzers rather than specifying all interfaces as input.
- Limit the amount of mirrored traffic by:
 - Using statistical sampling.
 - Setting ratios to select statistical samples.
 - Using firewall filters.

This example describes how to configure remote mirroring to multiple interfaces on an analyzer VLAN:

- [Requirements on page 871](#)
- [Overview and Topology on page 871](#)
- [Mirroring All Employee Traffic to Multiple VLAN Member Interfaces for Remote Analysis on page 872](#)
- [Verification on page 877](#)

Requirements

This example uses the following hardware and software components:

- Three EX9200 switches
- Junos OS Release 13.2 or later for EX Series switches

Before you configure remote mirroring, be sure that:

- You have an understanding of mirroring concepts. For information about analyzers, see [“Understanding Port Mirroring Analyzers” on page 834](#). For information about port mirroring, see [“Understanding Layer 2 Port Mirroring” on page 822](#).
- The interfaces that the analyzer will use as input interfaces have been configured on the switch.

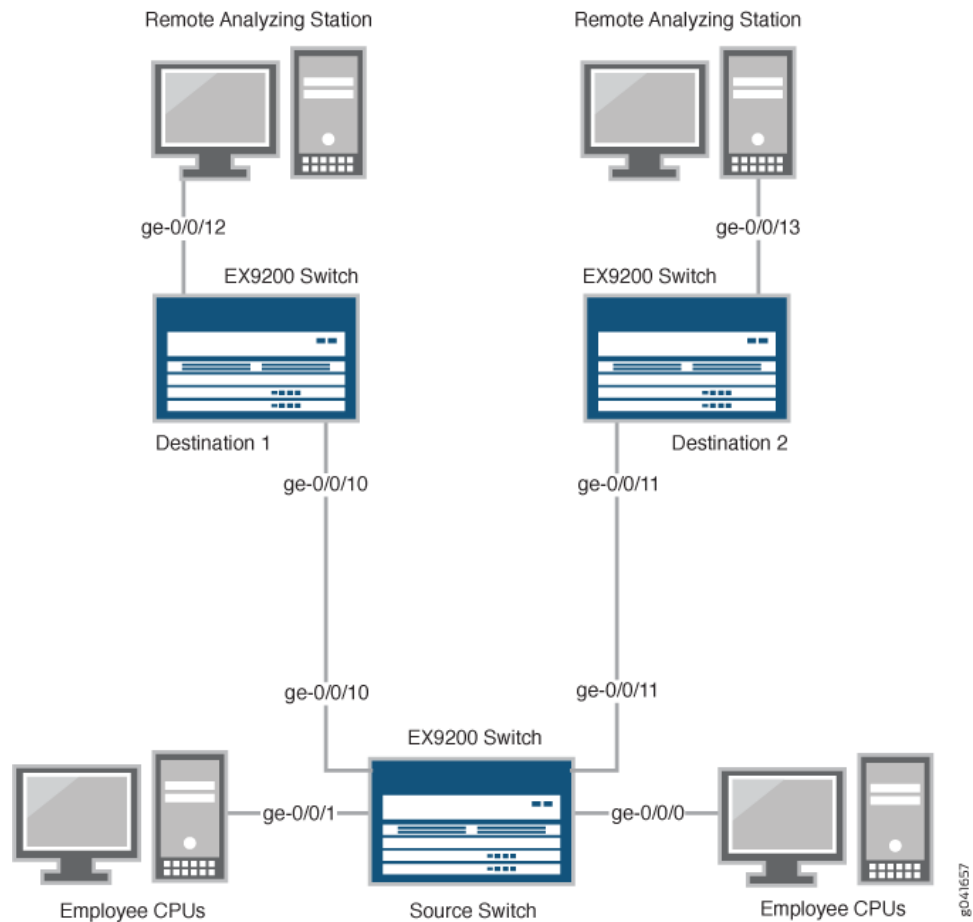
Overview and Topology

This example describes how to mirror traffic entering ports on the switch to the remote analyzer VLAN so that you can perform analysis from a remote monitoring station. The remote-analyzer VLAN in this example contains multiple member interfaces. Therefore, the same traffic is mirrored to all member interfaces of the remote-analyzer VLAN so that mirrored packets can be sent to different remote monitoring stations. You can install applications, such as sniffers and intrusion detection systems, on remote monitoring stations to analyze these mirrored packets and to obtain useful statistical data. For instance, if there are two remote monitoring stations, you can install a sniffer on one remote monitoring station and an intrusion detection system on the other station. You can use a firewall filter analyzer configuration to forward a specific type of traffic to a remote monitoring station.

This example describes how to configure an analyzer to mirror traffic to multiple interfaces in the next-hop group so that traffic is sent to different monitoring stations for analysis.

[Figure 23 on page 872](#) shows the network topology for this example.

Figure 23: Remote Mirroring Example Network Topology Using Multiple VLAN Member Interfaces in the Next-Hop Group



In this example:

- Interfaces ge-0/0/0 and ge-0/0/1 are Layer 2 interfaces (both interfaces on the source switch) that serve as connections for employee computers.
- Interfaces ge-0/0/10 and ge-0/0/11 are Layer 2 interfaces that are connected to different destination switches.
- Interface ge-0/0/12 is a Layer 2 interface that connects the Destination 1 switch to the remote monitoring station.
- Interface ge-0/0/13 is a Layer 2 interface that connects the Destination 2 switch to the remote monitoring station.
- VLAN **remote-analyzer** is configured on all switches in the topology to carry the mirrored traffic.

Mirroring All Employee Traffic to Multiple VLAN Member Interfaces for Remote Analysis

To configure mirroring to multiple VLAN member interfaces for remote traffic analysis for all incoming and outgoing employee traffic, perform these tasks:

CLI Quick Configuration To quickly configure mirroring for remote traffic analysis for incoming and outgoing employee traffic, copy the following commands and paste them into the switch terminal window:

- In the source switch terminal window, copy and paste the following commands:

```
[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/10 unit 0 family ethernet-switching interface-mode access
set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan members 999
set interfaces ge-0/0/11 unit 0 family ethernet-switching interface-mode access
set interfaces ge-0/0/11 unit 0 family ethernet-switching vlan members 999
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor input egress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input egress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor output next-hop-group remote-analyzer-nhg
set forwarding-options next-hop-group remote-analyzer-nhg interface ge-0/0/10.0
set forwarding-options next-hop-group remote-analyzer-nhg interface ge-0/0/11.0
set forwarding-options next-hop-group remote-analyzer-nhg group-type layer-2
```

- In the Destination 1 switch terminal window, copy and paste the following commands:

```
[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/10 unit 0 family ethernet-switching interface-mode access
set interfaces ge-0/0/12 unit 0 family ethernet-switching interface-mode access
set forwarding-options analyzer employee-monitor input ingress vlan remote-analyzer
set forwarding-options analyzer employee-monitor loss-priority high output interface
ge-0/0/12.0
```

- In the Destination 2 switch terminal window, copy and paste the following commands:

```
[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/11 unit 0 family ethernet-switching interface-mode access
set interfaces ge-0/0/13 unit 0 family ethernet-switching interface-mode access
set forwarding-options analyzer employee-monitor input ingress vlan remote-analyzer
set forwarding-options analyzer employee-monitor loss-priority high output interface
ge-0/0/13.0
```

Step-by-Step Procedure To configure basic remote mirroring to two VLAN member interfaces:

1. On the source switch:

- Configure the VLAN ID for the **remote-analyzer** VLAN:

```
[edit vlans]
user@switch# set remote-analyzer vlan-id 999
```

- Configure the interfaces on the network port connected to destination switches for access mode and associate it with the **remote-analyzer** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/10 unit 0 family ethernet-switching interface-mode trunk
user@switch# set ge-0/0/10 unit 0 family ethernet-switching vlan members 999
```

```
user@switch# set ge-0/0/11 unit 0 family ethernet-switching interface-mode trunk
user@switch# set ge-0/0/11 unit 0 family ethernet-switching vlan members 999
```

- Configure the **employee-monitor** analyzer:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/0.0
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
user@switch# set analyzer employee-monitor input egress interface ge-0/0/0.0
user@switch# set analyzer employee-monitor input egress interface ge-0/0/1.0
user@switch# set analyzer employee-monitor output next-hop-group
remote-analyzer-nhg
```

In this analyzer configuration, traffic that enters and exits interfaces ge-0/0/0.0 and ge-0/0/1.0 are sent to the output destination defined by the next-hop group named **remote-analyzer-nhg**.

- Configure the **remote-analyzer-nhb** next-hop group:

```
[edit forwarding-options]
user@switch# set next-hop-group remote-analyzer-nhg interface ge-0/0/10.0
user@switch# set next-hop-group remote-analyzer-nhg interface ge-0/0/11.0
user@switch# set next-hop-group remote-analyzer-nhg group-type layer-2
```

2. On the Destination 1 switch:

- Configure the VLAN ID for the **remote-analyzer** VLAN:

```
[edit vlans]
user@switch# set remote-analyzer vlan-id 999
```

- Configure the ge-0/0/10 interface on the Destination 1 switch for access mode:

```
[edit interfaces]
user@switch# set ge-0/0/10 unit 0 family ethernet-switching interface-mode access
```

- Configure the interface connected to the remote monitoring station for access mode:

```
[edit interfaces]
user@switch# set ge-0/0/12 unit 0 family ethernet-switching interface-mode access
```

- Configure the **employee-monitor** analyzer:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress vlan remote-analyzer
user@switch# set analyzer employee-monitor loss-priority high output interface
ge-0/0/12.0
```

3. On the Destination 2 switch:

- Configure the VLAN ID for the **remote-analyzer** VLAN:

```
[edit vlans]
user@switch# set remote-analyzer vlan-id 999
```

- Configure the ge-0/0/11 interface on the Destination 2 switch for access mode:


```
[edit interfaces]
user@switch# set ge-0/0/11 unit 0 family ethernet-switching interface-mode access
```

- Configure the interface connected to the remote monitoring station for access mode:

```
[edit interfaces]
user@switch# set ge-0/0/13 unit 0 family ethernet-switching interface-mode access
```

- Configure the **employee-monitor** analyzer:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress vlan remote-analyzer
user@switch# set analyzer employee-monitor loss-priority high output interface
ge-0/0/13.0
```

Results Check the results of the configuration on the source switch:

```
[edit]
user@switch# show
forwarding-options {
  analyzer employee-monitor {
    input {
      ingress {
        interface ge-0/0/0.0;
        interface ge-0/0/1.0;
      }
      egress {
        interface ge-0/0/0.0;
        interface ge-0/0/1.0;
      }
    }
    output {
      next-hop-group {
        remote-analyzer-nhg;
      }
    }
  }
}
vpls {
  remote-analyzer {
    vlan-id 999;
    interface {
      ge-0/0/10.0
      ge-0/0/11.0
    }
  }
}
interfaces {
  ge-0/0/10 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
      }
    }
  }
}
```

```
}  
}  
ge-0/0/11 {  
  unit 0 {  
    family ethernet-switching {  
      interface-mode access;  
    }  
  }  
}  
}
```

Check the results of the configuration on the Destination 1 switch:

```
[edit]  
user@switch# show  
vpls {  
  remote-analyzer {  
    vlan-id 999;  
  }  
}  
interfaces {  
  ge-0/0/10 {  
    unit 0 {  
      ethernet-switching {  
        interface-mode access;  
      }  
    }  
  }  
  ge-0/0/12 {  
    unit 0 {  
      family ethernet-switching {  
        interface-mode access;  
      }  
    }  
  }  
}  
forwarding-options {  
  analyzer employee-monitor {  
    input {  
      ingress {  
        vlan remote-analyzer;  
      }  
    }  
    loss-priority high;  
    output {  
      interface {  
        ge-0/0/12.0;  
      }  
    }  
  }  
}
```

Check the results of the configuration on the Destination 2 switch:

```
[edit]
user@switch# show
vpls {
  remote-analyzer {
    vlan-id 999;
    interface {
      ge-0/0/11.0
    }
  }
}
interfaces {
  ge-0/0/11 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
      }
    }
  }
  ge-0/0/13 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
      }
    }
  }
}
forwarding-options {
  employee-monitor {
    input {
      ingress {
        vlan remote-analyzer;
      }
    }
    loss-priority high;
    output {
      interface {
        ge-0/0/13.0;
      }
    }
  }
}
```

Verification

To confirm that the configuration is working properly, perform these tasks:

- [Verifying That the Analyzer Has Been Correctly Created on page 877](#)

Verifying That the Analyzer Has Been Correctly Created

Purpose Verify that the analyzer named **employee-monitor** has been created on the switch with the appropriate input interfaces and appropriate output interface.

Action You can verify the analyzer is configured as expected by using the **show forwarding-options analyzer** command.

To verify that the analyzer is configured as expected while monitoring all employee traffic on the source switch, run the **show forwarding-options analyzer** command on the source switch. The following output is displayed for this example configuration on the source switch:

```
user@switch> show forwarding-options analyzer
```

```
Analyzer name           : employee-monitor
Mirror rate             : 1
Maximum packet length   : 0
State                   : up
Ingress monitored interfaces : ge-0/0/0.0
Ingress monitored interfaces : ge-0/0/1.0
Egress monitored interfaces : ge-0/0/0.0
Egress monitored interfaces : ge-0/0/1.0
Output nhg              : remote-analyzer-nhg
```

```
user@switch> show forwarding-options next-hop-group
```

```
Next-hop-group: remote-analyzer-nhg
Type: layer-2
State: up
Members Interfaces:
  ge-0/0/10.0
  ge-0/0/11.0
```

Meaning This output shows that the **employee-monitor** analyzer has a ratio of 1 (mirroring every packet, which is the default behavior), the state of the configuration is **up**, which indicates proper state and that the analyzer is programmed, mirrors traffic entering or exiting interfaces ge-0/0/0 and ge-0/0/1, and sends mirrored traffic to multiple interfaces ge-0/0/10.0 and ge-0/0/11.0 through the next-hop-group **remote-analyzer-nhg**. If the state of the output interface is **down** or if the output interface is not configured, the value of state will be down and the analyzer will not be able to mirror traffic.

- Related Documentation**
- [Example: Configuring Port Mirroring Analyzers for Local Monitoring of Employee Resource Use on page 855](#)
 - [Example: Configuring Port Mirroring for Remote Monitoring of Employee Resource Use on page 859](#)
 - [Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use Through a Transit Switch on EX9200 Switches on page 879](#)
 - [Configuring Mirroring on EX9200 Switches to Analyze Traffic \(CLI Procedure\) on page 839](#)
 - [Understanding Port Mirroring Analyzers on page 834](#)

Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use Through a Transit Switch on EX9200 Switches

EX9200 switches enable you to configure mirroring to send copies of packets to either a local interface for local monitoring or to a VLAN for remote monitoring. You can use mirroring to copy these packets:

- Packets entering or exiting a port
- Packets entering or exiting a VLAN

You can analyze the mirrored traffic using a protocol analyzer application running on a remotemonitoring stationif you are sending mirrored traffic to an analyzer VLAN.

This topic includes an example that describes how to mirror traffic entering ports on the switchto the remote-analyzer VLAN through a transit switch, so that you can perform analysis from a remote monitoring station.



BEST PRACTICE: Mirror only necessary packets to reduce potential performance impact. We recommend that you:

- Disable your configured mirroring sessions when you are not using them.
- Specify individual interfaces as input to analyzers rather than specifying all interfaces as input.
- Limit the amount of mirrored traffic by:
 - Using statistical sampling.
 - Setting ratios to select statistical samples.
 - Using firewall filters.

This example describes how to configure remote mirroring through a transit switch:

- [Requirements on page 879](#)
- [Overview and Topology on page 880](#)
- [Mirroring All Employee Traffic for Remote Analysis Through a Transit Switch on page 881](#)
- [Verification on page 885](#)

Requirements

This example uses the following hardware and software components:

- An EX9200 switch connected to another EX9200 switch through a third EX9200 switch
- Junos OS Release 13.2 or later for EX Series switches

Before you configure remote mirroring, be sure that:

- You have an understanding of mirroring concepts. For information about analyzers, see [“Understanding Port Mirroring Analyzers” on page 834](#). For information about port mirroring, see [“Understanding Layer 2 Port Mirroring” on page 822](#).
- The interfaces that the analyzer will use as input interfaces have been configured on the switch.

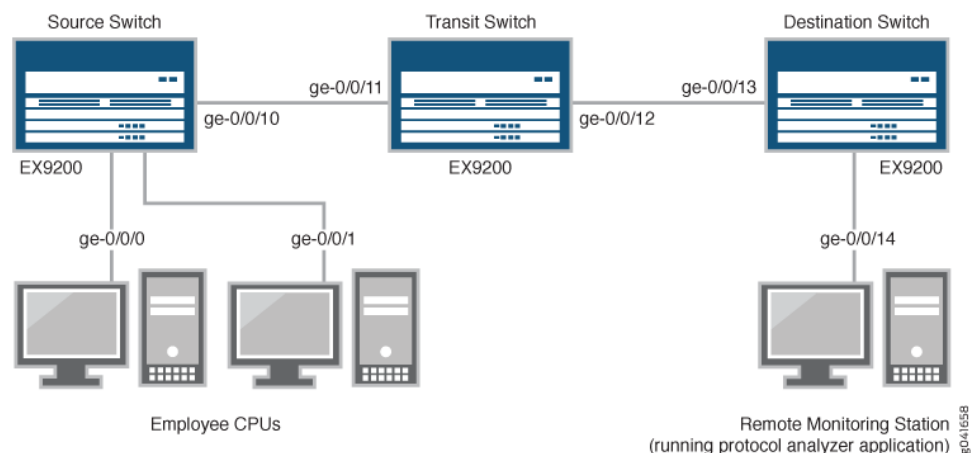
Overview and Topology

This example describes how to mirror traffic entering ports on the switch to the **remote-analyzer** VLAN through a transit switch so that you can perform analysis from a remote monitoring station. The example shows how to configure a switch to mirror all traffic from employee computers to a remote analyzer.

In this configuration, an analyzer session is required on the destination switch to mirror incoming traffic from the analyzer VLAN to the egress interface to which the remote monitoring station is connected.

[Figure 24 on page 880](#) shows the network topology for this example.

Figure 24: Network Monitoring for Remote Mirroring Through a Transit Switch



In this example:

- Interface ge-0/0/0 is a Layer 2 interface, and interface ge-0/0/1 is a Layer 3 interface (both interfaces on the source switch) that serve as connections for employee computers.
- Interface ge-0/0/10 is a Layer 2 interface that connects to the transit switch.
- Interface ge-0/0/11 is a Layer 2 interface on the transit switch.
- Interface ge-0/0/12 is a Layer 2 interface on the transit switch and connects to the destination switch.
- Interface ge-0/0/13 is a Layer 2 interface on the destination switch.

- f. Interface ge-0/0/14 is a Layer 2 interface on the destination switch and connects to the remote monitoring station.
- g. VLAN **remote-analyzer** is configured on all switches in the topology to carry the mirrored traffic.

Mirroring All Employee Traffic for Remote Analysis Through a Transit Switch

To configure mirroring for remote traffic analysis through a transit switch, for all incoming and outgoing employee traffic, perform these tasks:

CLI Quick Configuration

To quickly configure mirroring for remote traffic analysis through a transit switch, for incoming and outgoing employee traffic, copy the following commands and paste them into the switchterminal window:

- Copy and paste the following commands in the source switch (monitored switch) terminal window:

```
[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/10 unit 0 family ethernet-switching interface-mode access
set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan members 999
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor input egress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input egress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor output vlan remote-analyzer
```

- Copy and paste the following commands in the transit switch window:

```
[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/11 unit 0 family ethernet-switching interface-mode access
set vlans remote-analyzer interface ge-0/0/11
set interfaces ge-0/0/12 unit 0 family ethernet-switching interface-mode access
set vlans remote-analyzer interface ge-0/0/12
```

- Copy and paste the following commands in the destination switch window:

```
[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/13 unit 0 family ethernet-switching interface-mode access
set vlans remote-analyzer interface ge-0/0/13 ingress
set interfaces ge-0/0/14 unit 0 family ethernet-switching interface-mode access
set forwarding-options analyzer employee-monitor input ingress vlan remote-analyzer
set forwarding-options analyzer employee-monitor output interface ge-0/0/14.0
```

Step-by-Step Procedure

To configure remote mirroring through a transit switch:

1. On the source switch:
 - Configure the VLAN ID for the **remote-analyzer** VLAN:

```
[edit vlans]
user@switch# set remote-analyzer vlan-id 999
```

- Configure the interfaces on the network port connected to transit switch for access mode and associate it with the **remote-analyzer** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/10 unit 0 family ethernet-switching interface-mode access
user@switch# set ge-0/0/10 unit 0 family ethernet-switching vlan members 999
```

- Configure the **employee-monitor** analyzer:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/0.0
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
user@switch# set analyzer employee-monitor input egress interface ge-0/0/0.0
user@switch# set analyzer employee-monitor input egress interface ge-0/0/1.0
user@switch# set analyzer employee-monitor output vlan remote-analyzer
```

2. On the transit switch:

- Configure the VLAN ID for the **remote-analyzer** VLAN:

```
[edit vlans]
user@switch# set remote-analyzer vlan-id 999
```

- Configure the ge-0/0/11 interface for access mode, associate it with the **remote-analyzer** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/11 unit 0 family ethernet-switching interface-mode access
```

- Configure the ge-0/0/12 interface for access mode, associate it with the **remote-analyzer** VLAN, and set the interface for egress traffic only:

```
[edit interfaces]
user@switch# set ge-0/0/12 unit 0 family ethernet-switching interface-mode access
user@switch# set vlans remote-analyzer interface ge-0/0/12
```

3. On the destination switch:

- Configure the VLAN ID for the **remote-analyzer** VLAN:

```
[edit vlans]
user@switch# set remote-analyzer vlan-id 999
```

- Configure the ge-0/0/13 interface for access mode, associate it with the **remote-analyzer** VLAN, and set the interface for ingress traffic only:

```
[edit interfaces]
user@switch# set ge-0/0/13 unit 0 family ethernet-switching interface-mode access
user@switch# set vlans remote-analyzer interface ge-0/0/13 ingress
```

- Configure the interface connected to the remote monitoring station for access mode:

```
[edit interfaces]
user@switch# set ge-0/0/14 unit 0 family ethernet-switching interface-mode access
```


- Configure the **employee-monitor** analyzer:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress vlan remote-analyzer
user@switch# set analyzer employee-monitor output interface ge-0/0/14.0
```

Results Check the results of the configuration on the source switch:

```
[edit]
user@switch> show
forwarding-options {
  analyzer employee-monitor {
    input {
      ingress {
        interface ge-0/0/0.0;
        interface ge-0/0/1.0;
      }
      egress {
        interface ge-0/0/0.0;
        interface ge-0/0/1.0;
      }
    }
    output {
      vlan {
        remote-analyzer;
      }
    }
  }
}
vlangs {
  remote-analyzer {
    vlan-id 999;
  }
}
interfaces {
  ge-0/0/10 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
        vlan {
          member 999;
        }
      }
    }
  }
}
}
```

Check the results of the configuration on the transit switch:

```
[edit]
user@switch> show
vlangs {
  remote-analyzer {
```

```
vlan-id 999;
interface {
  ge-0/0/11.0 {
  }
  ge-0/0/12.0 {
  }
}
}
interfaces {
  ge-0/0/11 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
      }
    }
  }
  ge-0/0/12 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
      }
    }
  }
}
```

Check the results of the configuration on the destination switch:

```
[edit]
user@switch> show
vlangs {
  remote-analyzer {
    vlan-id 999;
    interface {
      ge-0/0/13.0 {
        ingress;
      }
    }
  }
}
interfaces {
  ge-0/0/13 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
      }
    }
  }
  ge-0/0/14 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
      }
    }
  }
}
```

```

    }
  }
  forwarding-options {
    analyzer employee-monitor {
      input {
        ingress {
          vlan remote-analyzer;
        }
      }
      output {
        interface {
          ge-0/0/14.0;
        }
      }
    }
  }
}

```

Verification

To confirm that the configuration is working properly, perform these tasks:

- [Verifying That the Analyzer Has Been Correctly Created on page 885](#)

Verifying That the Analyzer Has Been Correctly Created

Purpose Verify that the analyzer named **employee-monitor** has been created on the switch with the appropriate input interfaces and the appropriate output interface.

Action You can verify the analyzer is configured as expected by using the **show forwarding-options analyzer** command.

To verify that the analyzer is configured as expected while monitoring all employee traffic on the source switch, run the **show forwarding-options analyzer** command on the source switch. The following output is displayed for this example configuration:

```
user@switch> show forwarding-options analyzer
```

Analyzer name	: employee-monitor
Mirror rate	: 1
Maximum packet length	: 0
State	: up
Ingress monitored interfaces	: ge-0/0/0.0
Ingress monitored interfaces	: ge-0/0/1.0
Egress monitored interfaces	: ge-0/0/0.0
Egress monitored interfaces	: ge-0/0/1.0
Output vlan	: default-switch/remote-analyzer

Meaning This output shows that the **employee-monitor** analyzer has a mirroring ratio of 1 (mirroring every packet, the default), the state of the configuration is **up**, which indicates proper state and that the analyzer is programmed, is mirroring the traffic entering ge-0/0/0 and ge-0/0/1, and is sending the mirrored traffic to the analyzer called **remote-analyzer**. If

the state of the output interface is **down** or if the output interface is not configured, the value of state will be down and the analyzer will not be able to mirror traffic.

**Related
Documentation**

- [Example: Configuring Port Mirroring for Remote Monitoring of Employee Resource Use on page 859](#)
- [Example: Configuring Mirroring to Multiple Interfaces for Remote Monitoring of Employee Resource Use on EX9200 Switches on page 870](#)
- [Example: Configuring Port Mirroring Analyzers for Local Monitoring of Employee Resource Use on page 855](#)
- [Configuring Mirroring on EX9200 Switches to Analyze Traffic \(CLI Procedure\) on page 839](#)
- [Understanding Port Mirroring Analyzers on page 834](#)

Example: Configuring Mirroring for Local Monitoring of Employee Resource Use on EX4300 Switches



NOTE: This example uses Junos OS for EX Series switches with support for the Enhanced Layer 2 Software (ELS) configuration style. If your switch runs software that does not support ELS, see *Example: Configuring Port Mirroring for Local Monitoring of Employee Resource Use on EX Series Switches*. For ELS details, see *Getting Started with Enhanced Layer 2 Software*.

EX4300 switches enable you to configure mirroring to send copies of packets to either a local interface for local monitoring or to a VLAN for remote monitoring. You can use mirroring to copy these packets:

- Packets entering or exiting a port
- Packets entering a VLAN

You can analyze the mirrored traffic by using a protocol analyzer application installed on a system connected to the local destination interface (or running on a remote monitoring station if you are sending mirrored traffic to an analyzer VLAN).

This example describes how to configure local mirroring on an EX4300 switch. This example describes how to configure the switch to mirror traffic entering interfaces connected to employee computers to an analyzer output interface on the same switch.

- [Requirements on page 887](#)
- [Overview and Topology on page 887](#)
- [Mirroring All Employee Traffic for Local Analysis on page 888](#)
- [Mirroring Employee-to-Web Traffic for Local Analysis on page 889](#)
- [Verification on page 891](#)

Requirements

This example uses the following hardware and software components:

- One EX4300 switch
- Junos OS Release 13.2X50-D10 or later for EX Series switches

Before you configure mirroring, be sure you have an understanding of mirroring concepts.

Overview and Topology

This topic includes two examples that describe how to mirror traffic entering ports on the switch to a destination interface on the same switch (local mirroring). The first example shows how to mirror all traffic entering the ports connected to employee computers. The second example shows the same scenario, but includes a filter to mirror only the employee traffic going to the Web.

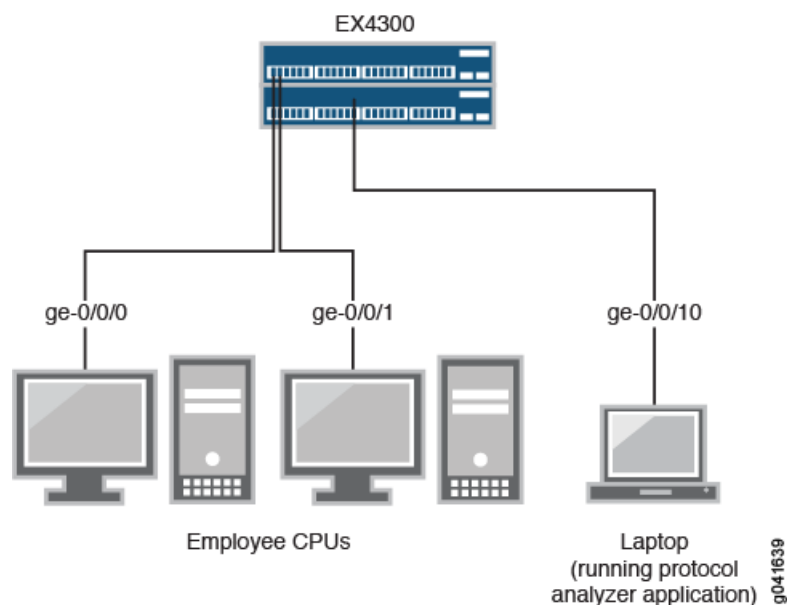
The interfaces ge-0/0/0 and ge-0/0/1 serve as connections for employee computers. The interface ge-0/0/10 is reserved for analysis of mirrored traffic. Connect a PC running a protocol analyzer application to the analyzer output interface to analyze the mirrored traffic.



NOTE: Multiple ports mirrored to one interface can cause buffer overflow and dropped packets.

Both examples use the network topology shown in [Figure 21 on page 857](#).

Figure 25: Network Topology for Local Mirroring Example



Mirroring All Employee Traffic for Local Analysis

To configure mirroring for all employee traffic for local analysis, perform these tasks:

- [\[xref target has no title\]](#)

CLI Quick Configuration

To quickly configure local mirroring for ingress traffic to the two ports connected to employee computers, copy the following commands and paste them into the switch terminal window:

```
[edit]
set interfaces ge-0/0/0 unit 0 family ethernet-switching
set interfaces ge-0/0/1 unit 0 family inet address 192.0.2.1/24
set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan members analyzer_vlan
set vlans analyzer-vlan vlan-id 1000
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor output interface ge-0/0/10.0
```

Step-by-Step Procedure

To configure an analyzer called **employee-monitor** and specify the input (source) interfaces and the analyzer output interface:

1. Configure each interface connected to employee computers as an input interface for the analyzer **employee-monitor**:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/0.0
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
```

2. Configure the output interface of the analyzer as part of a VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/10 unit 0 family ethernet-switching vlan members
analyzer_vlan
```

```
[edit vlans]
user@switch# set analyzer-vlan vlan-id 1000
```

3. Configure the output analyzer interface for the analyzer **employee-monitor**. This will be the destination interface for the mirrored packets:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor output interface ge-0/0/10.0
```

Results Check the results of the configuration:

```
[edit]
```

```

user@switch# show
forwarding-options {
  analyzer employee-monitor {
    input {
      ingress {
        interface ge-0/0/0.0;
        interface ge-0/0/1.0;}
      }
    output {
      interface {
        ge-0/0/10.0;
      }
    }
  }
}

```

Mirroring Employee-to-Web Traffic for Local Analysis

To configure mirroring for employee to Web traffic, perform these tasks:

- [\[xref target has no title\]](#)

CLI Quick Configuration

To quickly configure local mirroring of traffic from the two ports connected to employee computers, filtering so that only traffic to the external Web is mirrored, copy the following commands and paste them into the switch terminal window:

```

[edit]
set forwarding-options port-mirroring instance employee-web-monitor output interface
ge-0/0/10.0
set firewall family ethernet-switching filter watch-employee term employee-to-corp from
destination-address 192.0.2.16/24
set firewall family ethernet-switching filter watch-employee term employee-to-corp from
source-address 192.0.2.16/24
set firewall family ethernet-switching filter watch-employee term employee-to-corp then
accept
set firewall family ethernet-switching filter watch-employee term employee-to-web from
destination-port 80
set firewall family ethernet-switching filter watch-employee term employee-to-web then
port-mirroring-instance employee-web-monitor
set interfaces ge-0/0/0 unit 0 family ethernet-switching filter input watch-employee
set interfaces ge-0/0/1 unit 0 family ethernet-switching filter input watch-employee

```

Step-by-Step Procedure

To configure local mirroring of employee to Web traffic from the two ports connected to employee computers:

1. Configure the local analyzer interface:

```

[edit interfaces]
user@switch# set ge-0/0/10 unit 0 family ethernet-switching

```

2. Configure the **employee-web-monitor** output instance (the input to the instance comes from the action of the filter):

```
[edit forwarding-options port-mirroring]
user@switch# set instance employee-web-monitor output interface ge-0/0/10.0
```

3. Configure a firewall filter called **watch-employee** to send mirrored copies of employee requests to the Web to the **employee-web-monitor** instance. Accept all traffic to and from the corporate subnet (destination or source address of 192.0.2.16/24). Send mirrored copies of all packets destined for the Internet (destination port 80) to the **employee-web-monitor** instance.

```
[edit firewall family ethernet-switching]
user@switch# set filter watch-employee term employee-to-corp from
destination-address 192.0.2.16/24
user@switch# set filter watch-employee term employee-to-corp from
source-address 192.0.2.16/24
user@switch# set filter watch-employee term employee-to-corp then accept
ser@switch# set filter watch-employee term employee-to-web from destination-port
80
user@switch# set filter watch-employee term employee-to-web then
port-mirroring-instance employee-web-monitor
```

4. Apply the **watch-employee** filter to the appropriate ports:

```
[edit interfaces]
user@switch# set ge-0/0/0 unit 0 family ethernet-switching filter input
watch-employee
user@switch# set ge-0/0/1 unit 0 family ethernet-switching filter input
watch-employee
```

Results Check the results of the configuration:

```
[edit]
user@switch# show
forwarding-options {
  port-mirroring {
    instance {
      employee-web-monitor {
        family ethernet-switching {
          output {
            interface ge-0/0/10.0;
          }
        }
      }
    }
  }
}
...
firewall family ethernet-switching {
```



```

filter watch-employee {
  term employee-to-corp {
    from {
      destination-address 192.0.2.16/24;
      source-address 192.0.2.16/24;
    }
    then accept {
    }
  }
  term employee-to-web {
    from {
      destination-port 80;
    }
    then port-mirroring-instance employee-web-monitor;
  }
}
...
interfaces {
  ge-0/0/0 {
    unit 0 {
      family ethernet-switching {
        interface-mode trunk;
        vlan members [employee-vlan, voice-vlan];
        filter {
          input watch-employee;
        }
      }
    }
  }
  ge-0/0/1 {
    family ethernet-switching {
      filter {
        input watch-employee;
      }
    }
  }
}

```

Verification

To confirm that the configuration is correct, perform these tasks:

- [Verifying That the Analyzer Has Been Correctly Created on page 891](#)
- [Verifying That The Port-Mirroring Instance Is Configured Properly on page 892](#)

Verifying That the Analyzer Has Been Correctly Created

Purpose Verify that the analyzer **employee-monitor** or **employee-web-monitor** has been created on the switch with the appropriate input interfaces, and appropriate output interface.

Action You can use the **show forwarding-options analyzer** command to verify that the analyzer is configured properly.

```
user@switch> show forwarding-options analyzer

Analyzer name           : employee-monitor
Mirror rate             : 1
Maximum packet length   : 0
State                   : up
Ingress monitored interfaces : ge-0/0/0.0
Ingress monitored interfaces : ge-0/0/1.0
Output interface        : ge-0/0/10.0
```

Meaning This output shows that the analyzer **employee-monitor** has a ratio of 1 (mirroring every packet, the default setting), the maximum size of the original packet that was mirrored (0 indicates the entire packet), the state of the configuration (is up indicates that the analyzer is mirroring the traffic entering the ge-0/0/0, and ge-0/0/1 interfaces, and sending the mirrored traffic to the ge-0/0/10 interface). If the state of the output interface is down or if the output interface is not configured, the value of state will be **down** and the analyzer will not be programmed for mirroring.

Verifying That The Port-Mirroring Instance Is Configured Properly

Purpose Verify that the port-mirroring instance **employee-web-monitor** has been configured properly on the switch with the appropriate input interfaces.

Action You can verify that the port-mirroring instance is configured properly by using the **show forwarding-options port-mirroring** command.

```
user@switch> show forwarding-options port-mirroring

Instance Name: employee-web-monitor
Instance Id: 3
Input parameters:
  Rate           : 1
  Run-length     : 0
  Maximum-packet-length : 0
Output parameters:
  Family      State   Destination  Next-hop
  ethernet-switching up      ge-0/0/10.0
```

Meaning This output shows that the **employee-web-monitor** instance has a ratio of 1 (mirroring every packet, the default), the maximum size of the original packet that was mirrored (0 indicates an entire packet), the state of the configuration is up and port mirroring is programmed, and that mirrored traffic from the firewall filter action is sent out on interface ge-0/0/10.0. If the state of the output interface is down or if the interface is not configured, the value for state will be down and port mirroring will not be programmed for mirroring.

- Related Documentation**
- [Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use on EX4300 Switches on page 893](#)
 - [Configuring Mirroring on EX4300 Switches to Analyze Traffic \(CLI Procedure\) on page 847](#)

Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use on EX4300 Switches



NOTE: This example uses Junos OS for EX Series switches with support for the Enhanced Layer 2 Software (ELS) configuration style. If your switch runs software that does not support ELS, see [“Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use on EX4300 Switches” on page 893](#). For ELS details see: *Getting Started with Enhanced Layer 2 Software*.

EX4300 switches enable you to configure mirroring to send copies of packets to either a local interface for local monitoring or to a VLAN for remote monitoring. You can use mirroring to copy these packets:

- Packets entering or exiting a port
- Packets entering a VLAN on EX4300 switches

You can analyze the mirrored traffic by using a protocol analyzer application running on a remote monitoring station if you are sending mirrored traffic to an analyzer VLAN.

This topic includes two related examples that describe how to mirror traffic entering ports on the switch to the **remote-analyzer** VLAN so that you can perform analysis from a remote monitoring station. The first example shows how to mirror all traffic entering the ports connected to employee computers. The second example shows the same scenario but includes a filter to mirror only the employee traffic going to the Web.



BEST PRACTICE: Mirror only necessary packets to reduce potential performance impact. We recommend that you:

- Disable your configured mirroring sessions when you are not using them.
- Specify individual interfaces as input to analyzers rather than specifying all interfaces as input.
- Limit the amount of mirrored traffic by using firewall filters.

This example describes how to configure remote mirroring:

- [Requirements on page 894](#)
- [Overview and Topology on page 894](#)
- [Mirroring All Employee Traffic for Remote Analysis on page 895](#)

- [Mirroring Employee-to-Web Traffic for Remote Analysis on page 898](#)
- [Verification on page 902](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 13.2X50-D10 or later for EX Series switches
- An EX4300 switch connected to another EX4300 switch

The diagram shows an EX4300 Virtual Chassis connected to an EX4300 destination switch.

Before you configure remote mirroring, be sure that:

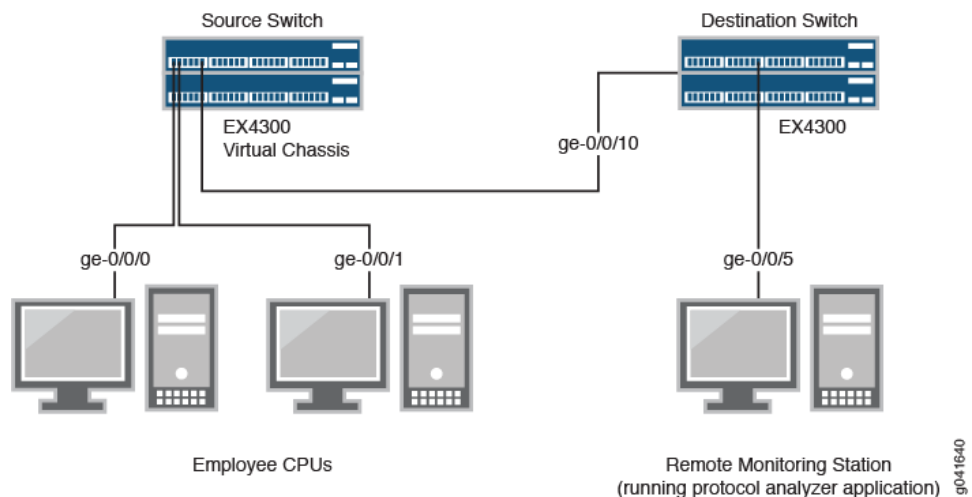
- You have an understanding of mirroring concepts.
- The interfaces that the analyzer will use as input interfaces have been configured on the switch.

Overview and Topology

This topic includes two related examples that describe how to configure mirroring to the **remote-analyzer** VLAN so that analysis can be performed from a remote monitoring station. The first example shows how to configure a switch to mirror all traffic from employee computers. The second example shows the same scenario, but the setup includes a filter to mirror only the employee traffic going to the Web.

[Figure 22 on page 861](#) shows the network topology for both these example scenarios.

Figure 26: Remote Mirroring Network Topology Example



In this example:

- a. Interface ge-0/0/0 is a Layer 2 interface, and interface ge-0/0/1 is a Layer 3 interface (both interfaces on the source switch) that serve as connections for employee computers.
- b. Interface ge-0/0/10 is a Layer 2 interface that connects the source switch to the destination switch.
- c. Interface ge-0/0/5 is a Layer 2 interface that connects the destination switch to the remote monitoring station.
- d. VLAN **remote-analyzer** is configured on all switches in the topology to carry the mirrored traffic.

Mirroring All Employee Traffic for Remote Analysis

To configure an analyzer for remote traffic analysis for all incoming and outgoing employee traffic, perform these tasks:

CLI Quick Configuration

To quickly configure an analyzer for remote traffic analysis for incoming and outgoing employee traffic, copy the following commands and paste them into the switch terminal window:

- Copy and paste the following commands in the source switch terminal window:

```
[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/10 unit 0 family ethernet-switching interface-mode trunk
set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan members 999
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor input egress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input egress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor output vlan remote-analyzer
```

- Copy and paste the following commands in the destination switch terminal window:

```
[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/10 unit 0 family ethernet-switching interface-mode trunk
set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan members 999
set interfaces ge-0/0/5 unit 0 family ethernet-switching interface-mode trunk
set forwarding-options analyzer employee-monitor input ingress vlan remote-analyzer
set forwarding-options analyzer employee-monitor output interface ge-0/0/5.0
```

Step-by-Step Procedure

To configure basic remote port mirroring:

1. On the source switch:
 - Configure the VLAN ID for the **remote-analyzer** VLAN:

```
[edit vlans]
user@switch# set remote-analyzer vlan-id 999
```

- Configure the interface on the network port connected to the destination switch for trunk mode and associate it with the **remote-analyzer** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/10 unit 0 family ethernet-switching interface-mode trunk
user@switch# set ge-0/0/10 unit 0 family ethernet-switching vlan members 999
```

- Configure the **employee-monitor** analyzer:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/0.0
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
user@switch# set instance employee-monitor input egress interface ge-0/0/0.0
user@switch# set analyzer employee-monitor input egress interface ge-0/0/1.0
user@switch# set analyzer employee-monitor output vlan remote-analyzer
```

2. On the destination switch:

- Configure the VLAN ID for the **remote-analyzer** VLAN:

```
[edit vlans]
user@switch# set remote-analyzer vlan-id 999
```

- Configure the interface on the destination switch for trunk mode and associate it with the **remote-analyzer** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/10 unit 0 family ethernet-switching interface-mode trunk
user@switch# set ge-0/0/10 unit 0 family ethernet-switching vlan members 999
```

- Configure the interface connected to the destination switch for trunk mode:

```
[edit interfaces]
user@switch# set ge-0/0/5 unit 0 family ethernet-switching interface-mode trunk
```

- Configure the **employee-monitor** analyzer:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress vlan remote-analyzer
user@switch# set analyzer employee-monitor output interface ge-0/0/5.0
```

Results Check the results of the configuration on the source switch:

```
[edit]
user@switch> show
forwarding-options {
  analyzer employee-monitor {
    input {
      ingress {
        interface ge-0/0/0.0;
        interface ge-0/0/1.0;
      }
      egress {
        interface ge-0/0/0.0;
```

```

        interface ge-0/0/1.0;
    }
}
output {
    vlan {
        remote-analyzer;
    }
}
}
}
interfaces {
    ge-0/0/10 {
        unit 0 {
            family ethernet-switching {
                interface-mode trunk;
                vlan {
                    members 999;
                }
            }
        }
    }
}
}
vlands {
    remote-analyzer {
        vlan-id 999;
        interface {
            ge-0/0/10.0
        }
    }
}
}
}

```

Check the results of the configuration on the destination switch:

```

[edit]
user@switch> show
interfaces {
    ge0/0/5 {
        unit 0 {
            family ethernet-switching {
                interface-mode trunk;
            }
        }
    }
    ge-0/0/10 {
        unit 0 {
            family ethernet-switching {
                interface-mode trunk;
                vlan {
                    members 999;
                }
            }
        }
    }
}
}

```

```

}
vpls {
  remote-analyzer {
    vlan-id 999;
    interface {
      ge-0/0/10.0
    }
  }
}
}
forwarding-options {
  analyzer employee-monitor {
    input {
      ingress {
        vlan remote-analyzer;
      }
    }
    output {
      interface {
        ge-0/0/5.0;
      }
    }
  }
}
}

```

Mirroring Employee-to-Web Traffic for Remote Analysis

To configure port mirroring for remote traffic analysis of employee- to- Web traffic, perform these tasks:

CLI Quick Configuration To quickly configure port mirroring to mirror employee traffic to the external Web, copy the following commands and paste them into the switch terminal window:

- Copy and paste the following commands in the source switch terminal window:

```

[edit]
user@switch# set forwarding-options port-mirroring instance employee-web-monitor
output vlan 999
user@switch# set vpls remote-analyzer vlan-id 999
user@switch# set interfaces ge-0/0/10 unit 0 family ethernet-switching port mode
trunk
user@switch# set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan members
999
user@switch# set firewall family ethernet-switching filter watch-employee term
employee-to-corp from destination-address 192.0.2.16/24
user@switch# set firewall family ethernet-switching filter watch-employee term
employee-to-corp from source-address 192.0.2.16/24
user@switch# set firewall family ethernet-switching filter watch-employee term
employee-to-corp then accept
user@switch# set firewall family ethernet-switching filter watch-employee term
employee-to-web from destination-port 80
user@switch# set firewall family ethernet-switching filter watch-employee term
employee-to-web then port-mirror-instance employee-web-monitor

```



```

user@switch# set interfaces ge-0/0/0 unit 0 family ethernet-switching filter input
watch-employee
user@switch# set interfaces ge-0/0/1 unit 0 family ethernet-switching filter input
watch-employee

```

- Copy and paste the following commands in the destination switch terminal window:

```

[edit]
user@switch# set vlans remote-analyzer vlan-id 999
user@switch# set interfaces ge-0/0/10 unit 0 family ethernet-switching interface-mode
trunk
user@switch# set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan members
999
user@switch# set interfaces ge-0/0/5 unit 0 family ethernet-switching interface-mode
trunk
user@switch# set forwarding-options analyzer employee-web-monitor input ingress
vlan remote-analyzer
user@switch# set forwarding-options analyzer employee-web-monitor output interface
ge-0/0/5.0

```

Step-by-Step Procedure

To configure port mirroring of all traffic from the two ports connected to employee computers to the **remote-analyzer** VLAN for use from a remote monitoring station:

1. On the source switch:

- Configure the **employee-web-monitor** port mirroring instance:

```

[edit ]
user@switch# set interfaces ge-0/0/10 unit 0 family ethernet-switching port
mode trunk
user@switch# set forwarding-options port-mirroring instance
employee-web-monitor output vlan 999

```

- Configure the VLAN ID for the **remote-analyzer** VLAN:

```

[edit vlans]
user@switch# set remote-analyzer vlan-id 999

```

- Configure the interface to associate it with the **remote-analyzer** VLAN:

```

[edit interfaces]
user@switch# set ge-0/0/10 unit 0 family ethernet-switching vlan members 999

```

- Configure the firewall filter called **watch-employee**:

```

[edit firewall family ethernet-switching]
user@switch# set filter watch-employee term employee-to-corp from
destination-address 192.0.2.16/24
user@switch# set filter watch-employee term employee-to-corp from
source-address 192.0.2.16/24
user@switch# set filter watch-employee term employee-to-corp then accept
user@switch# set filter watch-employee term employee-to-web from
destination-port 80

```

```
user@switch# set filter watch-employee term employee-to-web then
port-mirror-instance employee-web-monitor
```

- Apply the firewall filter to the employee interfaces:

```
[edit interfaces]
user@switch# set ge-0/0/0 unit 0 family ethernet-switching filter input
watch-employee
user@switch# set ge-0/0/1 unit 0 family ethernet-switching filter input
watch-employee
```

2. On the destination switch:

- Configure the VLAN ID for the **remote-analyzer** VLAN:

```
[edit vlans]
user@switch# set remote-analyzer vlan-id 999
```

- Configure the interface on the destination switch for trunk mode and associate it with the **remote-analyzer** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/10 unit 0 family ethernet-switching interface-mode
trunk
user@switch# set ge-0/0/10 unit 0 family ethernet-switching vlan members 999
```

- Configure the interface connected to the destination switch for trunk mode:

```
[edit interfaces]
user@switch# set ge-0/0/5 unit 0 family ethernet-switching interface-mode
trunk
```

- Configure the **employee-monitor** analyzer:

```
[edit forwarding-options port-mirroring]
user@switch# set instance employee-web-monitor input ingress vlan
remote-analyzer
user@switch# set instance employee-web-monitor output interface ge-0/0/5.0
```

Results Check the results of the configuration on the source switch:

```
[edit]
user@switch> show
interfaces {
  ge-0/0/10 {
    unit 0 {
      family ethernet-switching {
        interface-mode trunk;
        vlan {
          members remote-analyzer;
        }
      }
    }
  }
}
```

```
}
}
ge-0/0/0 {
  unit 0 {
    family ethernet-switching {
      filter {
        input watch-employee;
      }
    }
  }
}
ge-0/0/1 {
  unit 0 {
    family ethernet-switching {
      filter {
        input watch-employee;
      }
    }
  }
}
}
}
firewall {
  family ethernet-switching {
    filter watch-employee {
      term employee-to-corp {
        from {
          source-address {
            192.0.2.16/24;
          }
          destination-address {
            192.0.2.16/24;
          }
        }
        then accept;
      }
      term employee-to-web {
        from {
          destination-port 80;
        }
        then port-mirror-instance employee-web-monitor;
      }
    }
  }
}
forwarding-options {
  analyzer employee-web-monitor {
    output {
      vlan {
        999;
      }
    }
  }
}
vlands {
  remote-analyzer {
    vlan-id 999;
  }
}
```

```
}  
}
```

Check the results of the configuration on the destination switch:

```
[edit]  
user@switch> show  
vllans {  
  remote-analyzer {  
    vlan-id 999;  
  }  
}  
interfaces {  
  ge-0/0/10 {  
    unit 0 {  
      family ethernet-switching {  
        interface-mode trunk;  
        vlan {  
          members remote-analyzer;  
        }  
      }  
    }  
  }  
  ge-0/0/5 {  
    unit 0 {  
      family ethernet-switching {  
        interface-mode trunk;  
      }  
    }  
  }  
}  
forwarding-options {  
  port-mirroring {  
    instance employee-web-monitor {  
      input {  
        ingress {  
          vlan remote-analyzer;  
        }  
      }  
      output {  
        interface {  
          ge-0/0/5.0;  
        }  
      }  
    }  
  }  
}
```

Verification

To confirm that the configuration is working properly, perform these tasks:

- [Verifying That the Analyzer Has Been Correctly Created on page 903](#)

Verifying That the Analyzer Has Been Correctly Created

Purpose Verify that the analyzer named **employee-monitor** or **employee-web-monitor** has been created on the switch with the appropriate input interfaces and appropriate output interface.

Action You can verify the analyzer is configured as expected by using the **show forwarding-options analyzer** command. To view previously created analyzers that are disabled, go to the J-Web interface.

To verify that the analyzer is configured as expected while monitoring all employee traffic on the source switch, run the **show analyzer** command on the source switch. The following output is displayed for this configuration example:

```
user@switch> show forwarding-options analyzer
```

```
Analyzer name           : employee-monitor
Mirror rate             : 1
Maximum packet length   : 0
State                   : up
Ingress monitored interfaces : ge-0/0/0.0
Ingress monitored interfaces : ge-0/0/1.0
Egress monitored interfaces : ge-0/0/0.0
Egress monitored interfaces : ge-0/0/1.0
Output VLAN             : default-switch/remote-analyzer
```

Meaning This output shows that the **employee-monitor** instance has a ratio of 1 (mirroring every packet, the default), the maximum size of the original packet that was mirrored (0 indicates the entire packet), the state of the configuration is up (which indicates the proper state and that the analyzer is programmed, and is mirroring the traffic entering ge-0/0/0 and ge-0/0/1 and is sending the mirrored traffic to the VLAN called **remote-analyzer**). If the state of the output interface is down or if the output interface is not configured, the value of state will be down and the analyzer will not be programmed for mirroring.

Related Documentation • [Configuring Mirroring on EX4300 Switches to Analyze Traffic \(CLI Procedure\) on page 847](#)

Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use Through a Transit Switch on EX4300 Switches



NOTE: This example uses Junos OS for EX Series switches with support for the Enhanced Layer 2 Software (ELS) configuration style.

EX4300 switches enable you to configure mirroring to send copies of packets to either a local interface for local monitoring or to a VLAN for remote monitoring. You can use mirroring to copy these packets:

- Packets entering or exiting a port
- Packets entering a VLAN on EX4300 switches

You can analyze the mirrored traffic by using a protocol analyzer application running on a remote monitoring station if you are sending mirrored traffic to an analyzer VLAN.

This topic includes an example that describes how to mirror traffic entering ports on the switch to the **remote-analyzer** VLAN through a transit switch, so that you can perform analysis from a remote monitoring station.



BEST PRACTICE: Mirror only necessary packets to reduce potential performance impact. We recommend that you:

- Disable your configured mirroring sessions when you are not using them.
 - Specify individual interfaces as input to analyzers rather than specifying all interfaces as input.
 - Limit the amount of mirrored traffic by using firewall filters.
-

This example describes how to configure remote mirroring through a transit switch:

- [Requirements on page 904](#)
- [Overview and Topology on page 904](#)
- [Mirroring All Employee Traffic for Remote Analysis Through a Transit Switch on page 905](#)
- [Verification on page 910](#)

Requirements

This example uses the following hardware and software components:

- An EX4300 switch connected to another EX4300 switch through a third EX4300 switch
- Junos OS Release 13.2X50-D10 or later for EX Series switches

Before you configure remote mirroring, be sure that:

- You have an understanding of mirroring concepts.
- The interfaces that the analyzer will use as input interfaces have been configured on the switch.

Overview and Topology

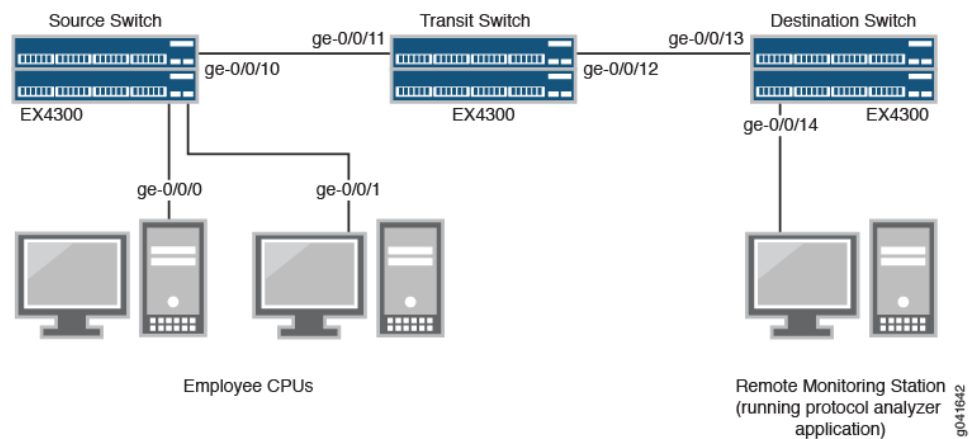
This example describes how to mirror traffic entering ports on the switch to the **remote-analyzer** VLAN through a transit switch so that you can perform analysis from a

remote monitoring station. The example shows how to configure a switch to mirror all traffic from employee computers to a remote analyzer.

In this configuration, an analyzer session is required on the destination switch to mirror incoming traffic from the analyzer VLAN to the egress interface to which the remote monitoring station is connected. You must disable MAC learning on the transit switch for the **remote-analyzer** VLAN so that MAC learning is disabled for all member interfaces of the **remote-analyzer** VLAN on the transit switch.

Figure 24 on page 880 shows the network topology for this example.

Figure 27: Remote Mirroring Through a Transit Switch Network—Sample Topology



In this example:

- Interface ge-0/0/0 is a Layer 2 interface, and interface ge-0/0/1 is a Layer 3 interface (both interfaces on the source switch) that serve as connections for employee computers.
- Interface ge-0/0/10 is a Layer 2 interface that connects to the transit switch.
- Interface ge-0/0/11 is a Layer 2 interface on the transit switch.
- Interface ge-0/0/12 is a Layer 2 interface on the transit switch and connects to the destination switch.
- Interface ge-0/0/13 is a Layer 2 interface on the destination switch .
- Interface ge-0/0/14 is a Layer 2 interface on the destination switch and connects to the remote monitoring station.
- VLAN **remote-analyzer** is configured on all switches in the topology to carry the mirrored traffic.

Mirroring All Employee Traffic for Remote Analysis Through a Transit Switch

To configure mirroring for remote traffic analysis through a transit switch, for all incoming and outgoing employee traffic, perform these tasks:

CLI Quick Configuration To quickly configure mirroring for remote traffic analysis through a transit switch, for incoming and outgoing employee traffic, copy the following commands and paste them into the switch terminal window:

- Copy and paste the following commands in the source switch (monitored switch) terminal window:

```
[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/10 unit 0 family ethernet-switching interface-mode trunk
set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan members 999
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor input egress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input egress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor output vlan remote-analyzer
```

- Copy and paste the following commands in the transit switch window:

```
[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/11 unit 0 family ethernet-switching interface-mode trunk
set vlans remote-analyzer interface ge-0/0/11
set interfaces ge-0/0/12 unit 0 family ethernet-switching interface-mode trunk
set vlans remote-analyzer interface ge-0/0/12
set vlans remote-analyzer no-mac-learning
```

- Copy and paste the following commands in the destination switch window:

```
[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/13 unit 0 family ethernet-switching interface-mode trunk
set vlans remote-analyzer interface ge-0/0/13 ingress
set interfaces ge-0/0/14 unit 0 family ethernet-switching interface-mode trunk
set forwarding-options analyzer employee-monitor input ingress vlan remote-analyzer
set forwarding-options analyzer employee-monitor output interface ge-0/0/14.0
```

Step-by-Step Procedure To configure remote mirroring through a transit switch:

1. On the source switch:

- Configure the VLAN ID for the **remote-analyzer** VLAN:

```
[edit vlans]
user@switch# set remote-analyzer vlan-id 999
```

- Configure the interfaces on the network port connected to transit switch for trunk mode and associate it with the **remote-analyzer** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/10 unit 0 family ethernet-switching interface-mode trunk
user@switch# set ge-0/0/10 unit 0 family ethernet-switching vlan members 999
```

- Configure the **employee-monitor** analyzer:


```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/0.0
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
user@switch# set analyzer employee-monitor input egress interface ge-0/0/0.0
user@switch# set analyzer employee-monitor input egress interface ge-0/0/1.0
user@switch# set analyzer employee-monitor output vlan remote-analyzer
```

2. On the transit switch:

- Configure the VLAN ID for the **remote-analyzer** VLAN:

```
[edit vlans]
user@switch# set remote-analyzer vlan-id 999
```

- Configure the **ge-0/0/11** interface for trunk mode, associate it with the **remote-analyzer** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/11 unit 0 family ethernet-switching interface-mode trunk
```

- Configure the **ge-0/0/12** interface for trunk mode, associate it with the **remote-analyzer** VLAN, and set the interface for egress traffic only:

```
[edit interfaces]
user@switch# set ge-0/0/12 unit 0 family ethernet-switching interface-mode trunk
user@switch# set vlans remote-analyzer interface ge-0/0/12
```

- Configure the **no-mac-learning** option for the **remote-analyzer** VLAN to disable MAC learning on all interfaces that are members of the **remote-analyzer** VLAN:

```
[edit interfaces]
user@switch# set vlans remote-analyzer no-mac-learning
```

3. On the destination switch:

- Configure the VLAN ID for the **remote-analyzer** VLAN:

```
[edit vlans]
user@switch# set remote-analyzer vlan-id 999
```

- Configure the **ge-0/0/13** interface for trunk mode, associate it with the **remote-analyzer** VLAN, and set the interface for ingress traffic only:

```
[edit interfaces]
user@switch# set ge-0/0/13 unit 0 family ethernet-switching interface-mode trunk
user@switch# set vlans remote-analyzer interface ge-0/0/13 ingress
```

- Configure the interface connected to the remote monitoring station for trunk mode:

```
[edit interfaces]
user@switch# set ge-0/0/14 unit 0 family ethernet-switching interface-mode trunk
```

- Configure the **employee-monitor** analyzer:

```
[edit forwarding-options]
```

```
user@switch# set analyzer employee-monitor input ingress vlan remote-analyzer
user@switch# set analyzer employee-monitor output interface ge-0/0/14.0
```

Results Check the results of the configuration on the source switch:

```
[edit]
user@switch> show
forwarding-options {
  analyzer employee-monitor {
    input {
      ingress {
        interface ge-0/0/0.0;
        interface ge-0/0/1.0;
      }
      egress {
        interface ge-0/0/0.0;
        interface ge-0/0/1.0;
      }
    }
    output {
      vlan {
        remote-analyzer;
      }
    }
  }
}
vlangs {
  remote-analyzer {
    vlan-id 999;
  }
}
interfaces {
  ge-0/0/10 {
    unit 0 {
      family ethernet-switching {
        interface-mode trunk;
        vlan {
          member 999;
        }
      }
    }
  }
}
}
```

Check the results of the configuration on the transit switch:

```
[edit]
user@switch> show
vlangs {
  remote-analyzer {
    vlan-id 999;
    interface {
      ge-0/0/11.0 {
```

```

    }
    ge-0/0/12.0 {
    }
  }
  no-mac-learning;
}
}
interfaces {
  ge-0/0/11 {
    unit 0 {
      family ethernet-switching {
        interface-mode trunk;
      }
    }
  }
  ge-0/0/12 {
    unit 0 {
      family ethernet-switching {
        interface-mode trunk;
      }
    }
  }
}
}

```

Check the results of the configuration on the destination switch:

```

[edit]
user@switch> show
vpls {
  remote-analyzer {
    vlan-id 999;
    interface {
      ge-0/0/13.0 {
        ingress;
      }
    }
  }
}
}
interfaces {
  ge-0/0/13 {
    unit 0 {
      family ethernet-switching {
        interface-mode trunk;
      }
    }
  }
  ge-0/0/14 {
    unit 0 {
      family ethernet-switching {
        interface-mode trunk;
      }
    }
  }
}
}

```

```

forwarding-options {
  analyzer employee-monitor {
    input {
      ingress {
        vlan remote-analyzer;
      }
    }
    output {
      interface {
        ge-0/0/14.0;
      }
    }
  }
}

```

Verification

To confirm that the configuration is working properly, perform these tasks:

- [Verifying That the Analyzer Has Been Correctly Created on page 910](#)

Verifying That the Analyzer Has Been Correctly Created

Purpose Verify that the analyzer named **employee-monitor** has been created on the switch with the appropriate input interfaces and the appropriate output interface.

Action You can verify whether the analyzer is configured as expected by using the **show analyzer** command. To view previously created analyzers that are disabled, go to the J-Web interface.

To verify that the analyzer is configured as expected while monitoring all employee traffic on the source switch, run the **show analyzer** command on the source switch. The following output is displayed for this example configuration:

```
user@switch> show forwarding-options analyzer
```

```

Analyzer name           : employee-monitor
Mirror rate             : 1
Maximum packet length   : 0
State                   : up
Ingress monitored interfaces : ge-0/0/0.0
Ingress monitored interfaces : ge-0/0/1.0
Egress monitored interfaces : ge-0/0/0.0
Egress monitored interfaces : ge-0/0/1.0
Output vlan             : default-switch/remote-analyzer

```

Meaning This output shows that the **employee-monitor** analyzer has a ratio of 1 (mirroring every packet, the default), is mirroring the traffic entering ge-0/0/0 and ge-0/0/1, and sending the mirrored traffic to the analyzer **remote-analyzer**.

- Related Documentation**
- [Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use on EX4300 Switches on page 893](#)
 - [Configuring Mirroring on EX4300 Switches to Analyze Traffic \(CLI Procedure\) on page 847](#)

CHAPTER 36

Configuring Port Mirroring Instances

- [Layer 2 Port Mirroring Global Instance on page 913](#)
- [Configuring the Global Instance of Layer 2 Port Mirroring on page 914](#)
- [Layer 2 Port Mirroring Named Instances on page 916](#)
- [Defining a Named Instance of Layer 2 Port Mirroring on page 919](#)
- [Disabling Layer 2 Port Mirroring Instances on page 923](#)
- [Configuring Inline Port Mirroring on page 924](#)

Layer 2 Port Mirroring Global Instance

On an MX Series router and on an EX Series switch, you can configure a set of port-mirroring properties that implicitly apply to packets received on all ports in the router (or switch) chassis. This set of port-mirroring properties is the *global instance* of Layer 2 port mirroring for the router or switch.

Within the global instance configuration, you can specify a set of mirror destination properties for each packet address family supported by Layer 2 port mirroring.

For a general description of Layer 2 port-mirroring properties, see "[Understanding Layer 2 Port Mirroring Properties](#)" on [page 823](#). For a comparison of the types of Layer 2 port mirroring available on an MX Series router and on an EX Series switch, see *Application of Layer 2 Port Mirroring Types*.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Configuring the Global Instance of Layer 2 Port Mirroring](#)
- [Examples: Layer 2 Port Mirroring at Multiple Levels of the Chassis on page 932](#)
- [Example: Layer 2 Port Mirroring with Multiple Instances](#)
- [Example: Layer 2 Port Mirroring to Multiple Destinations on page 1001](#)

Configuring the Global Instance of Layer 2 Port Mirroring

On an MX Series router and on an EX Series switch, you can configure a set of Layer 2 port-mirroring properties that implicitly apply to packets received on all ports in the router (or switch) chassis.

To configure the global instance of Layer 2 port mirroring on an MX Series router and on an EX Series switch:

1. Enable configuration of the Layer 2 port mirroring:

```
[edit]
user@host# edit forwarding-options port-mirroring
```

2. Enable configuration of the packet-selection properties:

```
[edit forwarding-options port-mirroring]
user@host# edit input
```

3. Specify global-level packet-selection properties.

- a. Specify the number of packets to select:

```
[edit forwarding-options port-mirroring input]
user@host# set rate number
```

The valid range is 1 through 65535.

- b. Specify the number of packets to mirror from each selection:

```
[edit forwarding-options port-mirroring input]
user@host# set run-length number
```

The valid range is 0 through 20. The default value is 0.

- c. Specify the length to which mirrored packets are to be truncated:

```
[edit forwarding-options port-mirroring input]
user@host# set maximum-packet-length number
```

The valid range is 0 through 9216. The default value is 0, which means the mirrored packets are not truncated.

4. Specify the global-level Layer 2 address-type family from which traffic is to be selected for mirroring:

```
[edit forwarding-options port-mirroring input]
user@host# up
```



```
[edit forwarding-options port-mirroring]
user@host# edit family family
```

The value of the *family* option can be **ethernet-switching**, **ccc**, or **vpls**.



NOTE: Under the [edit forwarding-options port-mirroring] hierarchy level, the protocol family statement **family ethernet-switching** is an alias for **family vpls**. The command-line interface (CLI) displays Layer 2 port-mirroring configurations as **family vpls**, even for Layer 2 port-mirroring configured as **family ethernet-switching**. Use **family ethernet-switching** when the physical interface is configured with encapsulation **ethernet-bridge**.

5. Enable configuration of global-level mirror destination properties for this address family:

```
[edit forwarding-options port-mirroring family family]
user@host# edit output
```

6. Specify global-level mirror destination properties for this address family.
 - a. Specify the physical interface on which to send the mirrored packets:

```
[edit forwarding-options port-mirroring family family output]
user@host# set interface interface-name
```

You can also specify an integrated routing and bridging (IRB) interface as the output interface.

- b. (Optional) Allow configuration of filters on the destination interface for the named port-mirroring instance:

```
[edit forwarding-options port-mirroring family family output]
user@host# set no-filter-check
```

7. (Optional) Specify that any packets selected for mirroring are to be mirrored only once to any mirroring destination:

```
[edit forwarding-options port-mirroring family family output]
user@host# up 2
[edit forwarding-options port-mirroring]
user@host# set mirror-once
```



TIP: Enable the **mirror-once** option when an MX Series router or an EX Series switch is configured to perform Layer 2 port mirroring at both ingress and egress interfaces, which could result in sending duplicate packets to

the same destination (which would complicate the analysis of the mirrored traffic).

.....

8. Verify the minimum configuration of the global instance of Layer 2 port mirroring:

```
[edit forwarding-options ... ]
user@host# top
[edit]
user@host# show forwarding-options

forwarding-options {
  port-mirroring {
    input { # Global packet-selection properties.
      maximum-packet-length number; # Default is 0.
      rate number;
      run-length number;
    }
    family (ccc | vpls) { # Address- type 'ethernet-switching' displays as 'vpls'.
      output { # Global mirror destination properties.
        interface interface-name;
        no-filter-check; # Optional. Allow filters on interface.
      }
    }
    mirror-once; # Optional. Mirror destinations do not receive duplicate packets.
  }
}
```

**Related
Documentation**

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Global Instance on page 913](#)
- [Examples: Layer 2 Port Mirroring at Multiple Levels of the Chassis on page 932](#)
- [Example: Layer 2 Port Mirroring with Multiple Instances](#)

Layer 2 Port Mirroring Named Instances

This topic describes the following information:

- [Layer 2 Port Mirroring Named Instances Overview on page 916](#)
- [Mirroring at Ports Grouped at the FPC Level on page 917](#)
- [Mirroring at Ports Grouped at the PIC Level on page 917](#)
- [Mirroring at a Group of Ports Bound to Multiple Named Instances on page 918](#)

Layer 2 Port Mirroring Named Instances Overview

On an MX Series router and on an EX Series switch, you can define a set of port-mirroring properties that you can explicitly bind to physical ports on the router or switch. This set of port mirroring properties is known as a *named instance* of Layer 2 port mirroring.

You can bind a named instance of Layer 2 port mirroring to physical ports associated with an MX Series router's or an EX Series switch's Packet Forwarding Engine components at different levels of the router (or switch) chassis:

- At the FPC level—You can bind a named instance to the physical ports associated with a specific Dense Port Concentrator (DPC) or to the physical ports associated with a specific Flexible Port Concentrator (FPC).
- At the PIC level—You can bind a named instance of port mirroring to a specific Packet Forwarding Engine (on a specific DPC) or to a specific PIC.



NOTE: MX Series routers support DPCs as well as FPCs and PICs. Unlike FPCs, DPCs do not support PICs. In the Junos OS CLI, however, you use FPC and PIC syntax to configure or display information about DPCs and the Packet Forwarding Engines on the DPCs.

The following points summarize the behavior of Layer 2 port mirroring based on named instances:

- The scope of packet selection is determined by the target of the binding—At the ports (or port) bound to a named instance of Layer 2 port mirroring, the router or switch selects input packets according to the packet-selection properties in the named instance.
- The destination of a selected packet is determined by the packet address family—Of the packets selected, the router or switch mirrors only the packets belonging to an address family for which the named instance of Layer 2 port mirroring specifies a set of mirror destination properties. In a Layer 2 environment, MX Series routers and EX Series switches support port mirroring of VPLS (**family ethernet-switching** or **family vpls**) traffic and Layer 2 VPN traffic with **family ccc**.

For a general description of Layer 2 port-mirroring properties, see [“Understanding Layer 2 Port Mirroring Properties” on page 823](#). For a comparison of the types of Layer 2 port mirroring available on an MX Series router and on an EX Series switch, see *Application of Layer 2 Port Mirroring Types*.

Mirroring at Ports Grouped at the FPC Level

On an MX Series router and on an EX Series switch, you can bind a named instance of Layer 2 port mirroring to a specific DPC or FPC installed in the router (or switch) chassis. The port mirroring properties in the instance are applied to all Packet Forwarding Engines (and their associated ports) on the specified DPC or to all PICs (and their associated ports) installed in the specified FPC. Port mirroring properties that are bound to a DPC or FPC override any port-mirroring properties bound at the global level or the MX Series router (or switch) chassis.

Mirroring at Ports Grouped at the PIC Level

On an MX Series router and on an EX Series switch, you can bind a named instance of Layer 2 port mirroring to a specific Packet Forwarding Engine or PIC. The port-mirroring

properties in that instance are applied to all ports associated with the specified Packet Forwarding Engine or PIC. Port-mirroring properties that are bound to a Packet Forwarding Engine or PIC override any port-mirroring properties bound at the DPC or FPC that contains them.



NOTE: For MX960 routers, there is a one-to-one mapping of Packet Forwarding Engines to Ethernet ports. Therefore, on MX960 routers only, you can configure port-specific bindings of port-mirroring instances.

Mirroring at a Group of Ports Bound to Multiple Named Instances

On an MX Series router and on an EX Series switch, you can apply up to two named instances of Layer 2 port mirroring to the same group of ports within the router (or switch) chassis. By applying two different port-mirroring instances to the same DPC, FPC, Packet Forwarding Engine, or PIC, you can bind two distinct Layer 2 port mirroring specifications to a single group of ports.



NOTE: You can configure only one global instance of Layer 2 port mirroring on an MX Series router and on an EX Series switch.



NOTE: You can configure more than two port mirroring instances for each FPC by configuring inline port mirroring. For information on inline port mirroring, see [“Configuring Inline Port Mirroring” on page 924](#).

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Defining a Named Instance of Layer 2 Port Mirroring](#)
- [Binding Layer 2 Port Mirroring to Ports Grouped at the FPC Level on page 929](#)
- [Binding Layer 2 Port Mirroring to Ports Grouped at the PIC Level on page 931](#)
- [Examples: Layer 2 Port Mirroring at Multiple Levels of the Chassis on page 932](#)
- [Example: Layer 2 Port Mirroring with Multiple Instances](#)

Defining a Named Instance of Layer 2 Port Mirroring

On an MX Series router and on an EX Series switch, you can define a set of Layer 2 port-mirroring properties that you can bind to a particular Packet Forwarding Engine (at the PIC level of the router or switch chassis) or to a group of Packet Forwarding Engines (at the DPC or FPC level of the chassis).

To define a named instance of Layer 2 port mirroring on an MX Series router or on an EX Series switch:

1. Enable configuration of a named instance of Layer 2 port mirroring :

```
[edit]
user@host# edit forwarding-options port-mirroring instance pm-instance-name
```

2. Enable configuration of the packet-sampling properties:

```
[edit forwarding-options port-mirroring instance pm-instance-name]
user@host# edit input
```

3. Specify packet-selection properties:

a. Specify the number of packets to select:

```
[edit forwarding-options port-mirroring instance pm-instance-name input]
user@host# set rate number
```

The valid range is 1 through 65535.

b. Specify the number of packets to mirror from each selection:

```
[edit forwarding-options port-mirroring instance pm-named-instance input]
user@host# set run-length number
```

The valid range is 0 through 20. The default value is 0.



NOTE: The run-length statement is not supported on MX80 routers.

c. Specify the length to which mirrored packets are to be truncated:

```
[edit forwarding-options port-mirroring instance pm-instance-name input]
user@host# set maximum-packet-length number
```

The valid range is 0 through 9216. The default value is 0, which means the mirrored packets are not truncated.



NOTE: The maximum-packet-length statement is not supported on MX80 routers.

4. Enable configuration of the mirror destination properties for Layer 2 packets that are part of bridging domain, Layer 2 switching cross-connects, or virtual private LAN service (VPLS):

a. Specify the Layer 2 address family type of traffic to be mirrored:

```
[edit forwarding-options port-mirroring instance pm-instance-name input]
user@host# up
[edit forwarding-options port-mirroring instance pm-instance-name]
user@host# edit family family
```

The value of the *family* option can be **ethernet-switching**, **ccc**, or **vpls**.



NOTE: Under the [edit forwarding-options port-mirroring] hierarchy level, the protocol family statement `family ethernet-switching` is an alias for `family vpls`. The command-line interface (CLI) displays Layer 2 port-mirroring configurations as `family vpls`, even for Layer 2 port-mirroring configured as `family ethernet-switching`. Use `family ethernet-switching` when the physical interface is configured with `encapsulation ethernet-bridge`.

- b. Enable configuration of the mirror destination properties:

```
[edit forwarding-options port-mirroring instance pm-instance-name family family]
user@host# edit output
```

5. Specify mirror destination properties.

- a. Specify the physical interface on which to send the mirrored packets:

```
[edit forwarding-options port-mirroring instance pm-instance-name family family
output]
user@host# set interface interface-name
```

- b. (Optional) Allow configuration of filters on the destination interface for the global port-mirroring instance:

```
[edit forwarding-options port-mirroring instance pm-instance-name family family
output]
user@host# set no-filter-check
```



NOTE: You cannot configure port mirroring instances on MX80 routers. You can only configure port mirroring at the global level on MX80 routers.

6. (Optional) Specify that any packets selected for mirroring are to be mirrored only once to any mirroring destination:

```
[edit forwarding-options port-mirroring instance pm-instance-name family family
output]
user@host# up 3
[edit forwarding-options port-mirroring]
user@host# set mirror-once
```



TIP: Enable the global `mirror-once` option when an MX Series router or an EX Series switch is configured to perform Layer 2 port mirroring at both

ingress and egress interfaces, which could result in sending duplicate packets to the same destination (which in turn would complicate the analysis of the mirrored traffic).

7. To configure a mirroring destination for a different packet family type, repeat steps 4 through 6.
8. Verify the minimum configuration of the named instances of Layer 2 port mirroring:

```
[edit forwarding-options ... ]
user@host# top
[edit]
user@host# show forwarding-options

forwarding-options {
  port-mirroring {
    ... optional-global-port-mirroring-configuration ...
    instance {
      pm-instance-name ( # A named instance of port mirroring
        input { # Packet-selection properties
          maximum-packet-length number; # Default is 0.
          rate number;
          run-length number;
        }
        family (ccc | vpls) { # Address- type 'ethernet-switching' displays as 'vpls'.
          output { # Mirror destination properties
            interface interface-name;
            no-filter-check; # Optional. Allow filters on interface.
          }
        }
      }
    }
    mirror-once; # Optional. Mirror destinations do not receive duplicate packets.
  }
}
```

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Named Instances](#)
- [Binding Layer 2 Port Mirroring to Ports Grouped at the FPC Level on page 929](#)
- [Binding Layer 2 Port Mirroring to Ports Grouped at the PIC Level on page 931](#)
- [Examples: Layer 2 Port Mirroring at Multiple Levels of the Chassis on page 932](#)
- [Example: Layer 2 Port Mirroring with Multiple Instances](#)

Disabling Layer 2 Port Mirroring Instances

You can disable the global instance of Layer 2 port mirroring, a particular named instance, or all instances of port mirroring:

- To disable the global instance of Layer 2 port mirroring, include the **disable** statement at the **[edit forwarding-options port-mirroring]** hierarchy level:

```
[edit]
forwarding-options {
  port-mirroring {
    disable; Disables the global instance of Layer 2 port mirroring.
    ...global-instance-of-layer-2-port-mirroring-configuration...
  }
}
```

- To disable the definition of a particular named instance of Layer 2 port mirroring, include the **disable** statement at the **[edit forwarding-options port-mirroring instance instance-name]** hierarchy level:

```
[edit]
forwarding-options {
  port-mirroring {
    ...optional-configuration-of-the-global-instance-of-layer-2-port-mirroring...
    instance {
      port-mirroring-instance-name {
        disable; Disables this named instance of Layer 2 port mirroring.
        ...definition-of-a-named-instance-of-layer-2-port-mirroring...
      }
    }
  }
}
```

- To disable the global instance and all named instances of Layer 2 port mirroring, include the **disable-all-instances** statement at the **[edit forwarding-options port-mirroring]** hierarchy level:

```
[edit]
forwarding-options {
  port-mirroring {
    disable-all-instances; Disables all instances of Layer 2 port mirroring.
    ...optional-configuration-of-the-global-instance-of-layer-2-port-mirroring...
    instance {
      port-mirroring-instance-name {
        ...definition-of-a-named-instance-of-layer-2-port-mirroring...
      }
    }
  }
}
```

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)

- [Layer 2 Port Mirroring Global Instance on page 913](#)
- [Layer 2 Port Mirroring Named Instances](#)
- [Displaying Layer 2 Port-Mirroring Instance Settings and Status on page 1037](#)

Configuring Inline Port Mirroring

Inline port mirroring provides you with the ability to specify instances that are not bound to the flexible PIC concentrator (FPC) in the firewall filter's **then port-mirror-instance** action. This way, you are not limited to only two port-mirror instances per FPC. Inline port mirroring decouples the port-mirror destination from the input parameters like **rate**. While the input parameters are programmed in the switch interface board, the next-hop destination of the mirrored packet is available in the packet itself. Inline port mirroring is supported only on Trio-based modular port concentrators (MPCs).

Using inline port mirroring, a port-mirror instance will have an option to inherit input parameters from another instance that specifies it, as shown in the following CLI configuration example:

```
instance pm2 {
  + input-parameters-instance pm1;
  family inet {
    output {
      interface ge-1/2/3.0 {
        next-hop 192.0.2.10;
      }
    }
  }
}
```

Multiple levels of inheritance are not allowed. One instance can be referred by multiple instances. An instance can refer to another instance that is defined before it. Forward references are not allowed and an instance cannot refer to itself, doing so will cause an error during configuration parsing.

The user can specify an instance that is not bound to the FPC in the firewall filter. The specified filter should inherit one of the two instances that have been bound to the FPC. If it does not, the packet is not marked for port-mirroring. If it does, then the packet will be sampled using the input parameters specified by the referred instance but the copy will be sent to the its own destination.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
- [Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a Bridge Domain on page 967](#)
- [Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VPLS Routing Instance on page 969](#)

- [Example: Layer 2 Port Mirroring at a Logical Interface on page 979](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN on page 984](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links on page 986](#)

Configuring Port Mirroring for Physical Interfaces

- [Precedence of Multiple Levels of Layer 2 Port Mirroring on a Physical Interface on page 927](#)
- [Binding Layer 2 Port Mirroring to Ports Grouped at the FPC Level on page 929](#)
- [Binding Layer 2 Port Mirroring to Ports Grouped at the PIC Level on page 931](#)
- [Examples: Layer 2 Port Mirroring at Multiple Levels of the Chassis on page 932](#)
- [Configuring Layer 2 Port Mirroring Over GRE Interface on page 934](#)
- [Example: Configuring Layer 2 Port Mirroring Over a GRE Interface on page 935](#)

Precedence of Multiple Levels of Layer 2 Port Mirroring on a Physical Interface

You can bind different sets of Layer 2 port mirroring properties (the global instance and one or more named instances) at various levels of an MX Series router or of an EX Series switch chassis (at the chassis level, at the FPC level, or at the PIC level). Therefore, it is possible for a single group of physical interfaces to be bound to multiple Layer 2 port mirroring definitions.

If a group of ports (or, in the case of a PIC-level binding in an MX960 router, a single port) is bound to multiple Layer 2 port mirroring definitions, the router (or switch) applies the Layer 2 port-mirroring properties to those ports as follows:

1. **Chassis-level port-mirroring properties implicitly apply to all ports in the chassis.** If an MX Series router or an EX Series switch is configured with the global port-mirroring instance, those port mirroring properties apply to all ports. See *Configuring the Global Instance of Layer 2 Port Mirroring*.
2. **FPC-level port-mirroring properties override chassis-level properties.** If a DPC or FPC is bound to a named instance of port mirroring, those port mirroring properties apply to all ports associated with that DPC or FPC, overriding any port mirroring properties bound at the chassis level. See [“Binding Layer 2 Port Mirroring to Ports Grouped at the FPC Level” on page 929](#).
3. **PIC-level port-mirroring properties override FPC-level properties.** If a Packet Forwarding Engine or PIC is bound to a named instance of port-mirroring, those port mirroring properties apply to all ports associated with the Packet Forwarding Engine

or PIC, overriding any port-mirroring properties bound to those ports at the FPC level. See [“Binding Layer 2 Port Mirroring to Ports Grouped at the PIC Level”](#) on page 931.

**Related
Documentation**

- [Understanding Layer 2 Port Mirroring on page 822](#)
- *Restrictions on Layer 2 Port Mirroring*
- *Application of Layer 2 Port Mirroring Types*
- [Understanding Layer 2 Port Mirroring of PE Router Logical Interfaces on page 956](#)
- [Understanding Layer 2 Port Mirroring of PE Router Aggregated Ethernet Interfaces on page 957](#)

Binding Layer 2 Port Mirroring to Ports Grouped at the FPC Level

On an MX Series router and on an EX Series switch, you can bind a named instance of Layer 2 port mirroring to a specific DPC or to a specific FPC in the router (or switch) chassis. This is known as binding a named instance of Layer 2 port mirroring *at the FPC level* of the router (or switch) chassis. The port mirroring properties specified in the named instance are applied to all physical ports associated with all Packet Forwarding Engines on the specified DPC or FPC.



NOTE: You can also bind a named instance of Layer 2 port mirroring to a specific Packet Forwarding Engine on a DPC or FPC in the router (or switch) chassis.

For any packet-type family supported by Layer 2 port mirroring

- Port-mirroring properties bound to a specific DPC or FPC override any port-mirroring properties configured at the global level.
- Port-mirroring properties bound to a specific Packet Forwarding Engine override any port-mirroring properties configured at the DPC or FPC level.

You can apply up to two named instances of Layer 2 port mirroring to the same group of ports within the router (or switch) chassis. By applying two different port-mirroring instances to the same DPC or FPC, you can bind two distinct Layer 2 port-mirroring specifications to a single group of ports.

Before you begin, complete the following tasks:

- Define a named instance of Layer 2 port mirroring. See *Defining a Named Instance of Layer 2 Port Mirroring*.
- Display information about the number and types of DPCs or FPCs in the MX Series router and in the EX Series switch, the number of Packet Forwarding Engines on each, and the number and types of ports per Packet Forwarding Engine.

To bind a named instance of Layer 2 port mirroring to a DPC or FPC and its Packet Forwarding Engines:

1. Enable configuration of the router (or switch) chassis properties:

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

2. Enable configuration of a DPC (and its corresponding Packet Forwarding Engines) or an FPC (and its installed PICs):

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

3. Bind a named instance of Layer 2 port mirroring (*pm-instance-name*) to the DPC or FPC:

```
[edit chassis fpc slot-number]
user@host# set port-mirror-instance pm-instance-name
```

4. (Optional) To bind a second named instance of Layer 2 port mirroring to the same DPC or FPC, repeat step 3 and specify a different named instance of Layer 2 port mirroring.
5. Verify the minimum configuration of the binding:

```
[edit chassis fpc slot-number port-mirror-instance pm-instance-name]
user@host# top
[edit]
user@host# show chassis

chassis {
  fpc slot-number { # Bind two port mirroring named instances at the FPC level.
    port-mirror-instance pm-instance-name-1;
    port-mirror-instance pm-instance-name-2;
  }
}
```

**Related
Documentation**

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Named Instances](#)
- [Defining a Named Instance of Layer 2 Port Mirroring](#)
- [Binding Layer 2 Port Mirroring to Ports Grouped at the PIC Level on page 931](#)
- [Examples: Layer 2 Port Mirroring at Multiple Levels of the Chassis on page 932](#)
- [Example: Layer 2 Port Mirroring with Multiple Instances](#)

Binding Layer 2 Port Mirroring to Ports Grouped at the PIC Level

On an MX Series router and on an EX Series switch, you can bind a named instance of Layer 2 port mirroring to the ports associated with a specific Packet Forwarding Engine (on a DPC) or to the ports associated with a specific PIC (installed in an FPC). This is known as binding a named instance of Layer 2 port mirroring *at the PIC level* of the router (or switch) chassis. The port-mirroring properties specified in the named instance are applied to all physical ports associated with the specified Packet Forwarding Engine.



NOTE: You can also bind a named instance of Layer 2 port mirroring to a specific DPC or FPC in the router (or switch) chassis.

For any packet-type family supported by Layer 2 port mirroring:

- Port-mirroring properties bound to a specific Packet Forwarding Engine override any port-mirroring properties configured at the DPC or FPC level.
- Port-mirroring properties bound to a specific DPC or FPC override any port-mirroring properties configured at the global level.

You can apply up to two named instances of Layer 2 port-mirroring to the same group of ports within the router (or switch) chassis. By applying two different port-mirroring instances to the same Packet Forwarding Engine or PIC, you can bind two distinct Layer 2 port mirroring specifications to a single group of ports.

For MX960 routers, there is a one-to-one mapping of Packet Forwarding Engines to Ethernet ports. Therefore, on MX960 routers only, you can bind a named instance of Layer 2 port mirroring to a *specific port* by binding the instance to the Packet Forwarding Engine associated with the port.

Before you begin, complete the following tasks:

- Define a named instance of Layer 2 port mirroring. See *Defining a Named Instance of Layer 2 Port Mirroring*.
- Display information about the number and types of DPCs in the MX Series router or in the EX Series switch, the number of Packet Forwarding Engines on each DPC, and the number and types of ports per Packet Forwarding Engine.

To bind a named instance of Layer 2 port mirroring to a Packet Forwarding Engine:

1. Enable configuration of the router (or switch) chassis properties:

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

2. Enable configuration of a Packet Forwarding Engine or PIC:

```
[edit chassis]
```

```
user@host# edit fpc slot-number
user@host# edit pic slot-number
```

3. Bind a named instance of Layer 2 port mirroring (*pm-instance-name*) to the Packet Forwarding Engine or PIC:

```
[edit chassis fpc slot-number pic slot-number]
user@host# set port-mirror-instance pm-instance-name
```

4. (Optional) To bind a second named instance of Layer 2 port mirroring to the same Packet Forwarding Engine or PIC, repeat step 3 and specify a different named instance of Layer 2 port mirroring.
5. Verify the minimum configuration of the binding:

```
[edit forwarding-options ... ]
user@host# top
[edit]
user@host# show chassis
chassis {
  fpc slot-number {
    ... optional-binding-of-a-port-mirroring-instance-at-the-dpc-level ...
    pic slot-number { # Bind two port-mirroring named instances at the PIC level.
      port-mirror-instance pm-instance-name-1;
      port-mirror-instance pm-instance-name-2;
    }
  }
}
```

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Named Instances](#)
- [Defining a Named Instance of Layer 2 Port Mirroring](#)
- [Binding Layer 2 Port Mirroring to Ports Grouped at the FPC Level on page 929](#)
- [Examples: Layer 2 Port Mirroring at Multiple Levels of the Chassis on page 932](#)
- [Example: Layer 2 Port Mirroring with Multiple Instances](#)

Examples: Layer 2 Port Mirroring at Multiple Levels of the Chassis

On an MX Series router or on an EX Series switch, you can apply named instances of Layer 2 port mirroring at the FPC or DPC level of the chassis or at the PIC level of the

chassis. However, you can configure (and implicitly apply) only one global instance of Layer 2 port mirroring to the entire chassis.

- [Layer 2 Port Mirroring at the FPC Level on page 933](#)
- [Layer 2 Port Mirroring at the PIC Level on page 933](#)
- [Layer 2 Port Mirroring at the FPC and PIC Levels on page 933](#)

Layer 2 Port Mirroring at the FPC Level

In this example configuration of an MX Series router or of an EX Series switch chassis, a named instance of Layer 2 port mirroring (**pm1**) is bound to physical ports grouped at the FPC level:

```
[edit]
chassis {
  fpc 2 {
    port-mirror-instance pm1;
  }
}
```

This is not a complete configuration. The physical interfaces associated with the FPC or DPC in slot 2 must be configured at the **[edit interfaces]** hierarchy level. The Layer 2 port mirroring named instance **pm1** must be configured at the **[edit forwarding-options port-mirroring instance]** hierarchy level.

Layer 2 Port Mirroring at the PIC Level

In this example configuration of an MX Series router or of an EX Series switch chassis, a named instance of Layer 2 port mirroring (**pm2**) is bound to the physical ports grouped at the PIC level:

```
[edit]
chassis {
  fpc 2 {
    pic 0 {
      port-mirror-instance pm2;
    }
  }
}
```

This is not a complete configuration. The physical interfaces associated with the FPC or DPC in slot 2 must be configured at the **[edit interfaces]** hierarchy level. The Layer 2 port mirroring named instance **pm2** must be configured at the **[edit forwarding-options port-mirroring instance]** hierarchy level.

Layer 2 Port Mirroring at the FPC and PIC Levels

In this example configuration of an MX Series router chassis or an EX Series switch, one named instance of Layer 2 port mirroring (**pm1**) is applied at the FPC level of the router (or switch) chassis. A second named instance (**pm2**) is applied at the PIC level:

```
[edit]
chassis {
```

```
fpc 2 {  
  port-mirror-instance pm1;  
  pic 0 {  
    port-mirror-instance pm2;  
  }  
}
```

This is not a complete configuration. Physical interfaces associated with the FPC or DPC in slot 2, including physical interfaces associated with **pic 0**, must be configured at the **[edit interfaces]** hierarchy level. The Layer 2 port mirroring named instances **pm1** and **pm2** must be configured at the **[edit forwarding-options port-mirroring instance]** hierarchy level.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Global Instance on page 913](#)
- *Layer 2 Port Mirroring Named Instances*
- *Configuring the Global Instance of Layer 2 Port Mirroring*
- *Defining a Named Instance of Layer 2 Port Mirroring*

Configuring Layer 2 Port Mirroring Over GRE Interface

Port mirroring is the ability of a router to send a copy of a packet to an external host address or a packet analyzer for analysis. One application for port mirroring sends a duplicate packet to a virtual tunnel. A next-hop group can then be configured to forward copies of this duplicate packet to several interfaces. Junos OS supports Layer 2 port mirroring to a remote collector over a GRE interface.

To configure layer 2 port-mirroring over GRE interface, do the following:

1. Configure GRE interface with the source and destination address.

```
[edit interfaces interface-name unit unit-number tunnel]  
set source ip-address  
set destination ip-address
```

2. Configure family bridge parameters on the GRE interface

```
[edit interfaces interface-name unit unit-number family bridge]  
set interface-mode trunk  
set vlan-id valn-id
```

3. Configure the rate at which the input packets are port mirrored.

```
[edit forwarding-options port-mirroring]  
set f input rate rate
```

4. Configure the output interface for family vpls for the GRE interface.

```
[edit forwarding-options family vpls]
set output interface gre-interface-name
```

5. Configure firewall filter term for family bridge to count packets arriving at the interface.

```
[edit firewall family bridge]
set filter f1 term term then count count
```

6. Configure firewall filter term for family bridge to port mirror the packets.

```
[edit firewall family bridge]
set filter filter-name term term then port-mirror
```

Related Documentation

- [Example: Configuring Layer 2 Port Mirroring Over a GRE Interface on page 935](#)
- [Tunnel Services Overview](#)

Example: Configuring Layer 2 Port Mirroring Over a GRE Interface

This example shows how to configure Layer 2 port mirroring over a GRE interface for analysis.

- [Requirements on page 935](#)
- [Overview on page 935](#)
- [Configuration on page 936](#)
- [Verification on page 940](#)

Requirements

This example uses the following hardware and software components:

- One MX Series router
- Junos OS Release 16.1 or later running on all devices

Overview

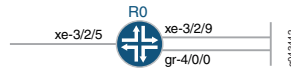
Port mirroring is the ability of a router to send a copy of a packet to an external host address or a packet analyzer for analysis. One application for port mirroring sends a duplicate packet to a virtual tunnel. A next-hop group can then be configured to forward copies of this duplicate packet to several interfaces. Starting with Junos OS Release 16.1, Layer 2 port mirroring to a remote collector over a GRE interface is supported.

Topology

[Figure 28 on page 936](#) shows port mirroring configured over a GRE interface. The interface `gr-4/0/0` is configured as family bridge. Firewall family bridge filter `f1` is configured as

port-mirror. Mirror destination is configured as gr-4/0/0. Firewall family bridge filter f1 is applied at the ingress and egress of the xe-3/2/5.0 interface, which mirrors packets to mirror destination gr-4/0/0.

Figure 28: Example Layer 2 Port Mirroring over GRE Interface



Configuration

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

```

R0
set chassis fpc4 pic0 tunnel-services bandwidth 10g
set chassis network-services enhanced-ip
set interfaces ge-1/0/3 unit 0 family inet address 10.1.1.24 arp 10.1.1.2 mac
  00:11:22:33:44:55
set interfaces xe-3/2/5 flexible-vlan-tagging
set interfaces xe-3/2/5 encapsulation flexible-ethernet-services
set interfaces xe-3/2/5 unit 0 encapsulation vlan-bridge
set interfaces xe-3/2/5 unit 0 vlan-id 100
set interfaces xe-3/2/5 unit 0 family bridge filter input f1
set interfaces xe-3/2/5 unit 0 family bridge filter output f1
set interfaces xe-3/2/9 flexible-vlan-tagging
set interfaces xe-3/2/9 encapsulation flexible-ethernet-services
set interfaces xe-3/2/9 unit 0 encapsulation vlan-bridge
set interfaces xe-3/2/9 unit 0 vlan-id 100
set interfaces gr-4/0/0 unit 0 tunnel source 10.1.1.1
set interfaces gr-4/0/0 unit 0 tunnel destination 10.1.1.2
set interfaces gr-4/0/0 unit 0 family bridge interface-mode trunk
set interfaces gr-4/0/0 unit 0 family bridge vlan-id 100
set forwarding-options port-mirroring input rate 1
set forwarding-options family vpls output interface gr-4/0/0.0
set firewall family bridge filter f1 term t then count c
set firewall family bridge filter f1 term t then port-mirror
set bridge-domains b vlan-id 100
set bridge-domains b interface xe-3/2/5.0
set bridge-domains b interface xe-3/2/9.0

```

Configuring R0

Step-by-Step Procedure The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see “Using the CLI Editor in Configuration Mode” in the *Junos OS CLI User Guide*.

To configure Device R0:

1. Configure flexible PIC concentrator parameters of the chassis.

```
[edit chassis]
user@R0# set fpc4 pic0 tunnel-services bandwidth 10g
user@R0# set network-services enhanced-ip
```

2. Configure enhanced-ip network services of the chassis.

```
[edit chassis]
user@R0# set network-services enhanced-ip
```

3. Configure the interfaces.

```
[edit interfaces]
user@R0# set ge-1/0/3 unit 0 family inet address 10.1.1.1/24 arp 10.1.1.2 mac
  00:11:22:33:44:55

user@R0# set xe-3/2/5 flexible-vlan-tagging
user@R0# set xe-3/2/5 encapsulation flexible-ethernet-services
user@R0# set xe-3/2/5 unit 0 encapsulation vlan-bridge
user@R0# set xe-3/2/5 unit 0 vlan-id 100
user@R0# set xe-3/2/5 unit 0 family bridge filter input f1
user@R0# set xe-3/2/5 unit 0 family bridge filter output f1

user@R0# set xe-3/2/9 flexible-vlan-tagging
user@R0# set xe-3/2/9 encapsulation flexible-ethernet-services
user@R0# set xe-3/2/9 unit 0 encapsulation vlan-bridge
user@R0# set xe-3/2/9 unit 0 vlan-id 100

user@R0# set gr-4/0/0 unit 0 tunnel source 10.1.1.1
user@R0# set gr-4/0/0 unit 0 tunnel destination 10.1.1.2
user@R0# set gr-4/0/0 unit 0 family bridge interface-mode trunk
user@R0# set gr-4/0/0 unit 0 family bridge vlan-id 100
```

4. Configure the rate of input packets to be sampled for port mirroring of traffic.

```
[edit forwarding-options]
user@R0# set port-mirroring input rate 1
```

5. Configure the output interface for the VPLS address family of packets to mirror.

```
[edit forwarding-options]
user@R0# set family vpls output interface gr-4/0/0.0
```

6. Configure protocol family BRIDGE for the firewall filter.

```
[edit firewall]
user@R0# set family bridge filter f1 term t then count c
user@R0# set family bridge filter f1 term t then port-mirror
```

7. Configure the VLAN ID for the bridge domain.

```
[edit bridge-domains]
user@R0# set b vlan-id 100
user@R0# set b interface xe-3/2/5.0
user@R0# set b interface xe-3/2/9.0
```

8. Configure the interface for the bridge domain.

```
[edit bridge-domains]
user@R0# set b interface xe-3/2/5.0
user@R0# set b interface xe-3/2/9.0
```

Results

From configuration mode, confirm your configuration by entering the **show bridge-domains**, **show chassis**, **show forwarding-options**, **show firewall**, and **show interfaces** commands. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
user@R0# show chassis
fpc 4 {
  pic 0 {
    tunnel-services {
      bandwidth 10g;
    }
  }
}
network-services enhanced-ip;
```

```
user@R0# show interfaces
ge-1/0/3 {
  unit 0 {
    family inet {
      address 10.1.1.1/24 {
        arp 10.1.1.2 mac 00:11:22:33:44:55;
      }
    }
  }
}
xe-3/2/5 {
  flexible-vlan-tagging;
  encapsulation flexible-ethernet-services;
  unit 0 {
    encapsulation vlan-bridge;
    vlan-id 100;
    family bridge {
      filter {
        input f1;
      }
    }
  }
}
```



```

        output f1;
    }
}
}
xe-3/2/9 {
    flexible-vlan-tagging;
    encapsulation flexible-ethernet-services;
    unit 0 {
        encapsulation vlan-bridge;
        vlan-id 100;
    }
}
gr-4/0/0 {
    unit 0 {
        tunnel {
            source 10.1.1.1;
            destination 10.1.1.2;
        }
        family bridge {
            interface-mode trunk;
            vlan-id 100;
        }
    }
}
}

```

```

user@R0# show forwarding-options
port-mirroring {
    input {
        rate 1;
    }
    family vpls {
        output {
            interface gr-4/0/0.0;
        }
    }
}

```

```

user@R0# show firewall
family bridge {
    filter f1 {
        term t {
            then {
                count c;
                port-mirror;
            }
        }
    }
}

```

```

user@R0# show bridge-domains
b {
    vlan-id 100;
}

```

```

interface xe-3/2/5.0;
interface xe-3/2/9.0;
}

```

Verification

Confirm that the configuration is working properly.

- [Verifying Port Mirroring of Traffic on page 940](#)

Verifying Port Mirroring of Traffic

Purpose Display port mirroring of traffic information.

Action On Device R0, from operational mode, run the **show forwarding-options port-mirroring** command to display port mirroring of traffic information.

```
user@R0> show forwarding-options port-mirroring
```

```

Instance Name: & globalinstance
Instance Id: 1
Input parameters:
  Rate           : 1
  Run-length     : 0
  Maximum-packet-length : 0
Output parameters:
  Family      State      Destination      Next-hop
  vpls        up         gr-4/0/0.0
Instance Name: pm_instance
Instance Id: 2
Input parameters:
  Rate           : 10
  Run-length     : 0
  Maximum-packet-length : 0
Output parameters:
  Family      State      Destination      Next-hop
  vpls        up         gr-4/0/0.0

```

Meaning The output shows the port mirroring of traffic information.

- Related Documentation**
- [Tunnel Services Overview](#)
 - [Configuring Layer 2 Port Mirroring Over GRE Interface on page 934](#)

Configuring Port Mirroring for Logical Interfaces

- [Layer 2 Port Mirroring Firewall Filters on page 942](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 947](#)
- [Configuring Protocol-Independent Firewall Filter for Port Mirroring on page 950](#)
- [Example: Mirroring Employee Web Traffic with a Firewall Filter on page 952](#)
- [Understanding Layer 2 Port Mirroring of PE Router Logical Interfaces on page 956](#)
- [Understanding Layer 2 Port Mirroring of PE Router Aggregated Ethernet Interfaces on page 957](#)
- [Layer 2 Port Mirroring of PE Router or PE Switch Logical Interfaces on page 958](#)
- [Layer 2 Port Mirroring of PE Router or PE Switch Aggregated Ethernet Interfaces on page 960](#)
- [Applying Layer 2 Port Mirroring to a Logical Interface on page 961](#)
- [Applying Layer 2 Port Mirroring to a Logical Interface on page 964](#)
- [Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a Bridge Domain on page 967](#)
- [Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VPLS Routing Instance on page 969](#)
- [Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VPLS Routing Instance on page 971](#)
- [Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VLAN on page 974](#)
- [Example: Layer 2 Port Mirroring at a Logical Interface on page 976](#)
- [Example: Layer 2 Port Mirroring at a Logical Interface on page 979](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN on page 981](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN on page 984](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links on page 986](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links on page 989](#)

Layer 2 Port Mirroring Firewall Filters

This topic describes the following information:

- [Layer 2 Port Mirroring Firewall Filters Overview on page 942](#)
- [Mirroring of Packets Received or Sent on a Logical Interface on page 943](#)
- [Mirroring of Packets Forwarded or Flooded to a VLAN on page 943](#)
- [Mirroring of Packets Forwarded or Flooded to a VPLS Routing Instance on page 944](#)

Layer 2 Port Mirroring Firewall Filters Overview

On an MX Series router and on an EX Series switch, you can configure a firewall filter *term* to specify that Layer 2 port mirroring is to be applied to all packets at the interface to which the firewall filter is applied.

You can apply a Layer 2 port-mirroring firewall filter to the input or output logical interfaces (including aggregated Ethernet logical interfaces), to traffic forwarded or flooded to a VLAN, or traffic forwarded or flooded to a VPLS routing instance.

MX Series routers and EX Series switches support Layer 2 port mirroring of VPLS (**family ethernet-switching** or **family vpls**) traffic and Layer 2 VPN traffic with **family ccc** in a Layer 2 environment.

Within a firewall filter **term**, you can specify the Layer 2 port-mirroring properties under the **then** statement in either of the following ways:

- Implicitly reference the Layer 2 port mirroring properties in effect on the port.
- Explicitly reference a particular named instance of Layer 2 port mirroring.



NOTE: When configuring a Layer 2 port-mirroring firewall filter, do not include the optional **from** statement that specifies match conditions based on the route source address. Omit this statement so that all packets are considered to match and all *actions* and *action-modifiers* specified in the **then** statement are taken.

If you want to mirror all incoming packets, then you must not use the **from** statement; /* comment: one configure filter terms with **from** if they are interested in mirroring only a subset of packet.

For a general description of Layer 2 port-mirroring properties, see [“Understanding Layer 2 Port Mirroring Properties” on page 823](#). For a comparison of the types of Layer 2 port mirroring available on an MX Series router and on an EX Series switch, see *Application of Layer 2 Port Mirroring Types*.



NOTE: If you associate integrated routing and bridging (IRB) with the VLAN (or VPLS routing instance), and also configure within the VLAN (or VPLS routing instance) a forwarding table filter with the `port-mirror` or `port-mirror-instance` action, then the IRB packet is mirrored as a Layer 2 packet. You can disable this behavior by configuring the `no-irb-layer-2-copy` statement in the VLAN (or VPLS routing instance).

For a detailed description of how to configure a Layer 2 port-mirroring firewall filter, see [“Defining a Layer 2 Port-Mirroring Firewall Filter” on page 944](#).

For detailed information about how you can use Layer 2 port-mirroring firewall filters with MX Routers and EX Series switches configured as provider edge (PE) routers or PE switches, see [“Understanding Layer 2 Port Mirroring of PE Router Logical Interfaces” on page 956](#). For detailed information about configuring firewall filters in general (including in a Layer 3 environment), see the *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide*.

Mirroring of Packets Received or Sent on a Logical Interface

To mirror Layer 2 traffic received or sent on a logical interface, apply a port-mirroring firewall filter to the input or output of the interface.

A port-mirroring firewall filter can also be applied to an aggregated-Ethernet logical interface. For details, see [“Understanding Layer 2 Port Mirroring of PE Router Aggregated Ethernet Interfaces” on page 957](#).



NOTE: If port-mirroring firewall filters are applied at both the input and output of a logical interface, two copies of each packet are mirrored. To prevent the router or switch from forwarding duplicate packets to the same destination, you can enable the “mirror-once” option for Layer 2 port mirroring in the global instance for the Layer 2 packet address family.

Mirroring of Packets Forwarded or Flooded to a VLAN

To mirror Layer 2 traffic forwarded to or flooded to a VLAN, apply a port-mirroring firewall filter to the input to the forwarding table or flood table. Any packet received for the VLAN forwarding or flood table and that matches the filter conditions is mirrored.

For more information about VLANs, see *Understanding Layer 2 Bridge Domains*. For information about flooding behavior in a VLAN, see *Understanding Layer 2 Learning and Forwarding for Bridge Domains*.



NOTE: When you configure port mirroring on any interface under one VLAN, the mirrored packet can move to an external analyzer located under different VLANs.

Mirroring of Packets Forwarded or Flooded to a VPLS Routing Instance

To mirror Layer 2 traffic forwarded to or flooded to a VPLS routing instance, apply a port-mirroring firewall filter to the input to the forwarding table or flood table. Any packet received for the VPLS routing instance forwarding or flood table and that matches the filter condition is mirrored.

For more information about VPLS routing instances, see *Configuring a VPLS Routing Instance* and *Configuring VLAN Identifiers for Bridge Domains and VPLS Routing Instances*. For information about flooding behavior in VPLS, see the *Junos OS VPNs Library for Routing Devices*.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
- [Example: Layer 2 Port Mirroring at a Logical Interface on page 979](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN on page 984](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links on page 986](#)
- [Example: Layer 2 Port Mirroring to Multiple Destinations on page 1001](#)

Defining a Layer 2 Port-Mirroring Firewall Filter

For virtual private LAN service (VPLS) traffic (**family bridge** or **family vpls**) and for Layer 2 VPNs with family **cccon** MX Series routers and on EX Series switches only, you can define a firewall filter that specifies Layer 2 port mirroring as the action to be performed if a packet matches the conditions configured in the firewall filter term

You can use a Layer 2 port-mirroring firewall filter in the following ways:

- To mirror packets received or sent on a logical interface.
- To mirror packets forwarded or flooded to a bridge domain.
- To mirror packets forwarded or flooded to a VPLS routing instance.
- To mirror tunnel interface input packets only to multiple destinations.

For a summary of the three types of Layer 2 port-mirroring you can configure on an MX Series router, see *Application of Layer 2 Port Mirroring Types*.

To define a firewall filter with a Layer 2 port-mirroring action:

1. Enable configuration of firewall filters for Layer 2 packets that are part of a bridge domain, a Layer 2 switching cross-connect, or a virtual private LAN service (VPLS):

```
[edit]
user@host# edit firewall family family
```

The value of the **family** option can be **bridge**, **ccc**, or **vpls**.

2. Enable configuration of a firewall filter *pm-filter-name*:

```
[edit firewall family family]
user@host# edit filter pm-filter-name
```

3. Enable configuration of a firewall filter term *pm-filter-term-name*:

```
[edit firewall family family filter pm-filter-name]
user@host# edit term pm-filter-term-name
```

4. (Optional) Specify the firewall filter match conditions based on the route source address *only if* you want to mirror a subset of the sampled packets.
 - For detailed information about Layer 2 bridging firewall filter match conditions (which are supported on MX Series routers only), see *Firewall Filter Match Conditions for Layer 2 Bridging Traffic*.
 - For detailed information about VPLS firewall filter match conditions, see *Firewall Filter Match Conditions for VPLS Traffic*.
 - For detailed information about Layer 2 circuit cross-connect (CCC) firewall filter match conditions, see *Firewall Filter Match Conditions for Layer 2 CCC Traffic*.



NOTE: If you want all sampled packets to be considered to match (and be subjected to the actions specified in the **then** statement), then omit the **from** statement altogether.

5. Enable configuration of the *action* and *action-modifier* to apply to matching packets:

```
[edit firewall family family filter pm-filter-name term pm-filter-term-name]
user@host# edit then
```

6. Specify the actions to be taken on matching packets:

```
[edit firewall family family filter pm-filter-name term pm-filter-term-name then]
user@host# set action
```

The recommended value for the *action* is **accept**. If you do not specify an action, or if you omit the **then** statement entirely, all packets that match the conditions in the **from** statement are accepted.

7. Specify Layer 2 port mirroring or a next-hop group as the **action-modifier**:

- To reference the Layer 2 port mirroring properties currently in effect for the Packet Forwarding Engine or PIC associated with the underlying physical interface, use the **port-mirror** statement:

```
[edit firewall family family filter pm-filter-name term pm-filter-term-name then]
user@host# set port-mirror
```

- To reference the Layer 2 port mirroring properties configured in a specific named instance, use the **port-mirror-instance** *pm-instance-name* action modifier:

```
[edit firewall family family filter pm-filter-name term pm-filter-term-name then]
user@host# set port-mirror-instance pm-instance-name
```

If the underlying physical interface is not bound to a named instance of Layer 2 port mirroring but instead is implicitly bound to the global instance of Layer 2 port mirroring, then traffic at the logical interface is mirrored according to the properties specified in the named instance referenced by the **port-mirror-instance** action modifier.

- To reference a next-hop group that specifies the next-hop addresses (for sending additional copies of packets to an analyzer), use the **next-hop-group** *pm-next-hop-group-name* action modifier:

```
[edit firewall family family filter pm-filter-name term pm-filter-term-name then]
user@host# set next-hop-group pm-next-hop-group-name
```

For configuration information about next-hop groups, see [“Defining a Next-Hop Group for Layer 2 Port Mirroring” on page 994](#). If you specify a next-hop group for Layer 2 port mirroring, the firewall filter term applies to the tunnel interface input only.

8. Verify the minimum configuration of the Layer 2 port-mirroring firewall filter:

```
[edit firewall ... ]
user@host# top
[edit]
user@host# show firewall

family (bridge | ccc | mpls | vpls) { # Type of packets to mirror
  filter pm-filter-name { # Firewall filter name
    term pm-filter-term-name {
      from { # Do not specify match conditions based on route source address
      }
      then {
        action; # Recommended action is 'accept'
        action-modifier; # Three options for Layer 2 port mirroring
      }
    }
  }
}
```


In the firewall filter term **then** statement, the *action-modifier* can be **port-mirror**, **port-mirror-instance *pm-instance-name***, or **next-hop-group *pm-next-hop-group-name***.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Firewall Filters](#)
- [Understanding Layer 2 Port Mirroring to Multiple Destinations Using Next-Hop Groups on page 993](#)
- [Example: Layer 2 Port Mirroring at a Logical Interface on page 979](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN on page 984](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links on page 986](#)
- [Example: Layer 2 Port Mirroring to Multiple Destinations on page 1001](#)

Defining a Layer 2 Port-Mirroring Firewall Filter

For virtual private LAN service (VPLS) traffic (**family ethernet-switching** or **family vpls**) and for Layer 2 VPNs with **family ccc** on MX Series routers and on EX Series switches only, you can define a firewall filter that specifies Layer 2 port mirroring as the action to be performed if a packet matches the conditions configured in the firewall filter term.

You can use a Layer 2 port-mirroring firewall filter in the following ways:

- To mirror packets received or sent on a logical interface.
- To mirror packets forwarded or flooded to a VLAN.
- To mirror packets forwarded or flooded to a VPLS routing instance.
- To mirror tunnel interface input packets only to multiple destinations.

For a summary of the three types of Layer 2 port-mirroring you can configure on an MX Series router and on an EX Series switch, see *Application of Layer 2 Port Mirroring Types*.

To define a firewall filter with a Layer 2 port-mirroring action:

1. Enable configuration of firewall filters for Layer 2 packets that are part of a VLAN, a Layer 2 switching cross-connect, or a virtual private LAN service (VPLS):

```
[edit]
user@host# edit firewall family family
```

The value of the ***family*** option can be **ethernet-switching**, **ccc**, or **vpls**.

2. Enable configuration of a firewall filter ***pm-filter-name***:

```
[edit firewall family family]
user@host# edit filter pm-filter-name
```

3. Enable configuration of a firewall filter term *pm-filter-term-name*:

```
[edit firewall family family filter pm-filter-name]  
user@host# edit term pm-filter-term-name
```

4. (Optional) Specify the firewall filter match conditions based on the route source address *only if* you want to mirror a subset of the sampled packets.
- For detailed information about Layer 2 bridging firewall filter match conditions (which are supported on MX Series routers and EX Series switches only), see *Firewall Filter Match Conditions for Layer 2 Bridging Traffic*.
 - For detailed information about VPLS firewall filter match conditions, see *Firewall Filter Match Conditions for VPLS Traffic*.
 - For detailed information about Layer 2 circuit cross-connect (CCC) firewall filter match conditions, see *Firewall Filter Match Conditions for Layer 2 CCC Traffic*.



NOTE: If you want all sampled packets to be considered to match (and be subjected to the actions specified in the then statement), then omit the **from** statement altogether.

5. Enable configuration of the **action** and **action-modifier** to apply to matching packets:

```
[edit firewall family family filter pm-filter-name term pm-filter-term-name]  
user@host# edit then
```

6. Specify the actions to be taken on matching packets:

```
[edit firewall family family filter pm-filter-name term pm-filter-term-name then]  
user@host# set action
```

The recommended value for the **action** is **accept**. If you do not specify an action, or if you omit the **then** statement entirely, all packets that match the conditions in the **from** statement are accepted.

7. Specify Layer 2 port mirroring or a next-hop group as the **action-modifier**:

- To reference the Layer 2 port mirroring properties currently in effect for the Packet Forwarding Engine or PIC associated with the underlying physical interface, use the **port-mirror** statement:

```
[edit firewall family family filter pm-filter-name term pm-filter-term-name then]  
user@host# set port-mirror
```

- To reference the Layer 2 port mirroring properties configured in a specific named instance, use the **port-mirror-instance** *pm-instance-name* action modifier:

```
[edit firewall family family filter pm-filter-name term pm-filter-term-name then]
user@host# set port-mirror-instance pm-instance-name
```

If the underlying physical interface is not bound to a named instance of Layer 2 port mirroring but instead is implicitly bound to the global instance of Layer 2 port mirroring, then traffic at the logical interface is mirrored according to the properties specified in the named instance referenced by the **port-mirror-instance** action modifier.

- To reference a next-hop group that specifies the next-hop addresses (for sending additional copies of packets to an analyzer), use the **next-hop-group** *pm-next-hop-group-name* action modifier:

```
[edit firewall family family filter pm-filter-name term pm-filter-term-name then]
user@host# set next-hop-group pm-next-hop-group-name
```

For configuration information about next-hop groups, see [“Defining a Next-Hop Group for Layer 2 Port Mirroring” on page 994](#). If you specify a next-hop group for Layer 2 port mirroring, the firewall filter term applies to the tunnel interface input only.

8. Verify the minimum configuration of the Layer 2 port-mirroring firewall filter:

```
[edit firewall ... ]
user@host# top
[edit]
user@host# show firewall

family (ethernet-switching | ccc | vpls) { # Type of packets to mirror
  filter pm-filter-name { # Firewall filter name
    term pm-filter-term-name {
      from { # Do not specify match conditions based on route source address
      }
      then {
        action; # Recommended action is 'accept'
        action-modifier; # Three options for Layer 2 port mirroring
      }
    }
  }
}
```

In the firewall filter term **then** statement, the *action-modifier* can be **port-mirror**, **port-mirror-instance** *pm-instance-name*, or **next-hop-group** *pm-next-hop-group-name*.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Firewall Filters](#)
- [Understanding Layer 2 Port Mirroring to Multiple Destinations Using Next-Hop Groups on page 993](#)

- [Example: Layer 2 Port Mirroring at a Logical Interface on page 979](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN on page 984](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links on page 986](#)
- [Example: Layer 2 Port Mirroring to Multiple Destinations on page 1001](#)

Configuring Protocol-Independent Firewall Filter for Port Mirroring

On MX Series routers with MPCs, you can configure a firewall filter to mirror Layer 2 and Layer 3 packets at a global level and at an instance level. When port mirror is configured at ingress or egress, the packet entering or exiting an interface is copied and the copies are sent to the local interface for local monitoring.



NOTE: Starting with Junos OS Release 13.3R6, only MPC interfaces support family **any** to do port mirroring. DPC interfaces do not support family **any**.

Typically, the firewall filter is configured such that it mirrors either Layer 2 or Layer 3 packets based on the family configured at the interface. However, in case of an integrated routing and bridging (IRB) interface, Layer 2 packets are not completely mirrored because IRB interfaces are configured to mirror only Layer 3 packets. On such an interface, you can configure a firewall filter and port mirroring parameters in the family **any** to ensure that a packet is completely mirrored irrespective of whether it is a Layer 2 or a Layer 3 packet.



NOTE:

- For port mirroring at an instance, you can configure one or more families such as **inet**, **inet6**, **ccc**, and **vpls** simultaneously for the same instance.
- In case of Layer 2 port mirroring, VLAN tags, MPLS headers are retained and can be seen in the mirrored copy at egress.
- For VLAN normalization, the information before normalization is seen for a mirrored packet at ingress. Similarly, at egress, the information after normalization is seen for the mirrored packet.

Before you begin configuring port mirroring, you must configure valid physical interfaces.

To configure a protocol-independent firewall filter for port mirroring:

1. Configure a global firewall filter for port-mirroring egress or ingress traffic.

```
[edit firewall family any]
user@host# set filter filter-name {
  term term-name {
    then {
      port-mirror;
      accept;
```

```

    }
  }
}

```

2. Configure a firewall filter to port-mirror traffic for an instance.

```

[edit firewall family any]
user@host# set filter filter-name {
  term term-name {
    then {
      port-mirror-instance instance-name;
      accept;
    }
  }
}

```

3. Configure port-mirroring parameters for egress and ingress traffic.

```

[edit forwarding-options port-mirroring]
user@host# input {
  maximum-packet-length bytes
  rate rate;
}
family any {
  output {
    (next-hop-group group-name | interface interface-name);
  }
}

```

4. Configure port-mirroring parameters for an instance. In this configuration, you can specify the output or destination for the Layer 2 packets to be either a valid next-hop group or a Layer 2 interface.

```

[edit forwarding-options port-mirroring]
user@host# instance instance-name {
  family any {
    output {
      (next-hop-group group-name | interface interface-name);
    }
  }
}

```

5. Configure the firewall filter at the ingress or egress interface on which the packets are transmitted.

```

[edit interface interface-name unit]
user@host# filter {
  output filter-name;
  input filter-name;
}

```

Release History Table

Release	Description
13.3R6	Starting with Junos OS Release 13.3R6, only MPC interfaces support family any to do port mirroring.

Related Documentation

- *Configuring Ethernet Physical Interface Properties*
- *Configuring Port Mirroring on M, T MX, and PTX Series Routers*

Example: Mirroring Employee Web Traffic with a Firewall Filter

- [Requirements on page 952](#)
- [Overview on page 952](#)
- [Configuring on page 953](#)
- [Verification on page 955](#)

Requirements

This example uses the following hardware and software components:

- One switch
- Junos 14.1X53-D20

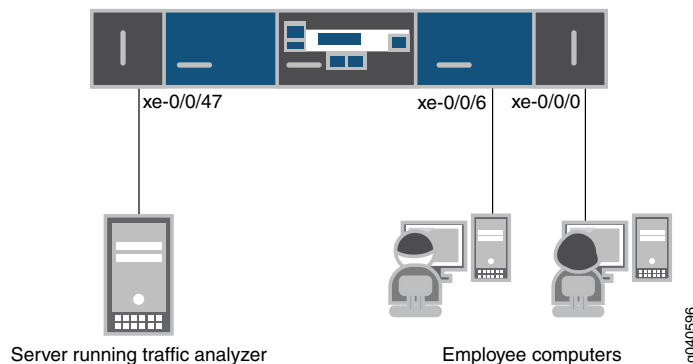
Overview

In this example, **xe-0/0/0** and **xe-0/0/6** serve as connections for employee computers. Interface **xe-0/0/47** is connected to a device running an analyzer application.

Rather than mirror all traffic, it is usually desirable to mirror only certain traffic. This is a more-efficient use of your bandwidth and hardware and might be necessary because of constraints on these assets. This example mirrors only traffic sent from employee computers to the Web.

[Figure 29 on page 952](#) shows the network topology for this example.

Figure 29: Network Topology for Local Port Mirroring Example



Configuring

To specify that the only traffic that will be mirrored is traffic sent by employees to the Web, perform the tasks explained in this section. To select this traffic for mirroring, you use a firewall filter to specify this traffic and direct it to a port-mirroring instance.

CLI Quick Configuration

To quickly configure local port mirroring of traffic from employee computers that is destined for the Web, copy the following commands and paste them into a switch terminal window:

```
[edit]
set forwarding-options port-mirroring family inet output interface xe-0/0/47.0 next-hop
192.0.2.100/24
set firewall family inet filter watch-employee term employee-to-corp from destination-address
192.0.2.16/24
set firewall family inet filter watch-employee term employee-to-corp from source-address
192.0.2.16/24
set firewall family inet filter watch-employee term employee-to-corp then accept
set firewall family inet filter watch-employee term employee-to-web from destination-port 80
set firewall family inet filter watch-employee term employee-to-web then port-mirror
set interfaces xe-0/0/0 unit 0 family address 192.0.1.1/24
set interfaces xe-0/0/6 unit 0 family address 192.0.1.2/24
set interfaces xe-0/0/47 unit 0 family address 192.0.1.3/24
set interfaces xe-0/0/0 unit 0 family inet filter input watch-employee
set interfaces xe-0/0/6 unit 0 family inet filter input watch-employee
```

Step-by-Step Procedure

To configure local port mirroring of employee-to-web traffic from the two ports connected to employee computers:

1. Configure a port-mirroring instance, including the output interface and the IP address of the device running the analyzer application as the next hop. (Configure only the output—the input comes from the filter.) You must also specify that the mirror is for IPv4 traffic (**family inet**).

```
[edit forwarding-options]
user@switch# set forwarding-options port-mirroring family inet output interface
xe-0/0/47.0 next-hop 192.0.2.100/28
```

2. Configure an IPv4 (**family inet**) firewall filter called **watch-employee** that includes a term to match traffic sent to the Web and send it to the port-mirroring instance. Traffic sent to and arriving from the corporate subnet (destination or source address of **192.0.2.16/24**) does not need to be copied, so first create another term to accept that traffic before it reaches the term that sends Web traffic to the instance:

```
[edit firewall family inet]
er@switch# set filter watch-employee term employee-to-corp from destination-address
192.0.2.16/24
user@switch# set filter watch-employee term employee-to-corp from source-address
192.0.2.16/24
user@switch# set filter watch-employee term employee-to-corp then accept
user@switch# set filter watch-employee term employee-to-web from destination-port 80
user@switch# set filter watch-employee term employee-to-web then port-mirror
```

3. Configure addresses for the IPv4 interfaces connected to the employee computers and the analyzer device:

```
[edit interfaces]
user@switch# set xe-0/0/0 unit 0 family inet address 192.0.1.1/24
user@switch# set xe-0/0/6 unit 0 family inet address 192.0.1.2/24
user@switch# set interfaces xe-0/0/47 unit 0 family address 192.0.1.3/24
```

4. Apply the firewall filter to the appropriate interfaces as an ingress filter:

```
[edit interfaces]
user@switch# set xe-0/0/0 unit 0 family inet filter input watch-employee
user@switch# set xe-0/0/6 unit 0 family inet filter input watch-employee
```

Results Check the results of the configuration:

```
[edit]
user@switch# show
forwarding-options {
  port-mirroring {
    employee-web-monitor {
      output {
        ip-address 192.0.2.100.0;
      }
    }
  }
}
...
firewall family inet {
  filter watch-employee {
    term employee-to-corp {
      from {
        destination-address 192.0.2.16/24;
        source-address 192.0.2.16/24;
      }
      then accept {
      }
    }
    term employee-to-web {
      from {
        destination-port 80;
      }
      then port-mirror;
    }
  }
}
...
interfaces {
  xe-0/0/0 {
    unit 0 {
      family inet {
        filter {
```



```

        input watch-employee;
    }
}
}
xe-0/0/6 {
    family inet {
        filter {
            input watch-employee;
        }
    }
}
}
}

```

Verification

Verifying That the Analyzer Has Been Correctly Created

Purpose Verify that the analyzer has been created on the switch with the appropriate input interfaces and appropriate output interface.

Action You can verify that the port mirror analyzer has been configured as expected using the **show forwarding-options port-mirroring** command.

```
user@switch> show forwarding-options port-mirroring
```

```

Instance Name: &global_instance
Instance Id: 1
Input parameters:
  Rate           : 1
  Run-length     : 0
  Maximum-packet-length : 0
Output parameters:
  Family      State      Destination      Next-hop
  inet        up         xe-0/0/47.0     192.0.2.100

```

Meaning This output shows that the port-mirroring instance has a ratio of 1 (mirroring every packet, the default setting) and the maximum size of the original packet that was mirrored (0 indicates the entire packet). If the state of the output interface is down or if the output interface is not configured, the value of state will be **down** and the instance will not be programmed for mirroring.

Related Documentation

- [Understanding Port Mirroring on page 821](#)
- [Configuring Port Mirroring](#)
- [Port Mirroring Constraints and Limitations on page 817](#)

Understanding Layer 2 Port Mirroring of PE Router Logical Interfaces

For an MX Series router or an EX Series switch configured as a provider edge (PE) router or PE switch on the customer-facing edge of a service provider network, you can apply a Layer 2 port-mirroring firewall filter at the following ingress and egress points to mirror the traffic between the MX Series router (or an EX Series switch) and customer edge (CE) devices, such as routers and Ethernet switches.

[Table 158 on page 956](#) describes the ways in which you can apply Layer 2 port-mirroring firewall filters to an MX Series router or an EX Series switch configured as a PE router or PE switch.

Table 158: Application of Layer 2 Port Mirroring Firewall Filters on PE Routers and PE Switches

Point of Application	Scope of Mirroring	Notes	Configuration Details
Ingress Customer-Facing Logical Interface	Packets originating within a service provider customer's network, sent first to a CE device, and sent next to an MX Series router or an EX Series switch acting as a PE router or PE switch.	<p>You can also configure aggregated Ethernet interfaces between CE devices and PE routers or PE switches for VPLS routing instances. Traffic is load-balanced across all of the links in the aggregated interface.</p> <p>Traffic received on an aggregated Ethernet interface is forwarded over a different interface based on a lookup of the destination MAC (DMAC) address:</p> <ul style="list-style-type: none"> • Packets destined for a local site are sent out of the load-balanced child interface. • Packets destined for the remote site are encapsulated and forwarded over a label-switched path (LSP). 	<p>See “Applying Layer 2 Port Mirroring to a Logical Interface” on page 964.</p> <p>For more information about VPLS routing instances, see <i>Configuring a VPLS Routing Instance</i> and <i>Configuring VLAN Identifiers for Bridge Domains and VPLS Routing Instances</i>.</p>
Egress Customer-Facing Logical Interface	<p>Unicast packets being forwarded by the MX Series router or the EX Series switch to another PE router or PE switch.</p> <p>NOTE: If you apply a port-mirroring filter to the output for a logical interface, only unicast packets are mirrored. To mirror multicast, unknown unicast, and broadcast packets, apply a filter to the input to the flood table of a bridge domain or VPLS routing instance.</p>		See “Applying Layer 2 Port Mirroring to a Logical Interface” on page 964 .

Table 158: Application of Layer 2 Port Mirroring Firewall Filters on PE Routers and PE Switches (continued)

Point of Application	Scope of Mirroring	Notes	Configuration Details
Input to a Bridge Domain Forwarding Table or Flood Table	Forwarding traffic or flood traffic sent to the bridge domain from a CE device.	Forwarding and flood traffic typically consists of broadcast packets, multicast packets, unicast packets with an unknown destination MAC address, or packets with a MAC entry in the DMAC routing table.	See “Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a Bridge Domain” on page 967 . For information about flooding behavior in VPLS, see the <i>Junos OS VPNs Library for Routing Devices</i> .
Input to a VPLS Routing Instance Forwarding Table or Flood Table	Forwarding traffic or flood traffic sent to the VPLS routing instance from a CE device.		See “Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VPLS Routing Instance” on page 969 . For information about flooding behavior in VPLS, see the <i>Junos OS VPNs Library for Routing Devices</i> .

- Related Documentation**
- [Understanding Layer 2 Port Mirroring on page 822](#)
 - [Layer 2 Port Mirroring Firewall Filters](#)
 - [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
 - [Example: Layer 2 Port Mirroring at a Logical Interface on page 979](#)

Understanding Layer 2 Port Mirroring of PE Router Aggregated Ethernet Interfaces

An aggregated Ethernet interface is a virtual aggregated link that consists of a set of physical interfaces of the same speed and operating in full-duplex link connection mode. You can configure aggregated Ethernet interfaces between CE devices and PE routers for VPLS routing instances. Traffic is load-balanced across all of the links in the aggregated interface. If one or more links in the aggregated interface fails, the traffic is switched to the remaining links.

You can apply a Layer 2 port-mirroring firewall filter to an aggregated Ethernet interface to configure port-mirroring at the parent interface. However, if any child interfaces are bound to different Layer 2 port-mirroring instances, packets received at the child interfaces will be mirrored to the destinations specified by their respective port-mirroring instances. Thus, multiple child interfaces can mirror packets to multiple destinations.

For example, suppose the parent aggregated Ethernet interface instance **ae0** has two child interfaces:

- **xe-2/0/0**
- **xe-3/1/2**

Suppose that these child interfaces on **ae0** are bound to two different Layer 2 port-mirroring instances:

- **pm_instance_A**—A named instance of Layer 2 port-mirroring, bound to child interface **xe-2/0/0**.
- **pm_instance_B**—A named instance of Layer 2 port-mirroring, bound to child interface **xe-3/1/2**.

Now suppose you apply a Layer 2 port-mirroring firewall filter to the Layer 2 traffic sent on **ae0.0** (logical unit **0** on the aggregated Ethernet interface instance **0**). This enables port mirroring on **ae0.0**, which has the following effect on the processing of traffic received on the child interfaces for which Layer 2 port-mirroring properties are specified:

- The packets received on **xe-2/0/0.0** are mirrored to the output interfaces configured in port-mirroring instance **pm_instance_A**.
- The packets received on **xe-3/1/2.0** are mirrored to the output interfaces configured in port-mirroring instance **pm_instance_B**.

Because **pm_instance_A** and **pm_instance_B** can specify different packet-selection properties or mirror destination properties, the packets received on **xe-2/0/0.0** and **xe-3/1/2.0** can mirror different packets to different destinations.

**Related
Documentation**

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Firewall Filters](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN on page 984](#)

Layer 2 Port Mirroring of PE Router or PE Switch Logical Interfaces

For a router or switch configured as a provider edge (PE) device on the customer-facing edge of a service provider network, you can apply a Layer 2 port-mirroring firewall filter at the following ingress and egress points to mirror the traffic between the router or switch and customer edge (CE) devices, which are typically also routers and Ethernet switches.

[Table 158 on page 956](#) describes the ways in which you can apply Layer 2 port-mirroring firewall filters to a router or switch configured as a PE device.

Table 159: Application of Layer 2 Port Mirroring Firewall Filters on PE Devices

Point of Application	Scope of Mirroring	Notes	Configuration Details
Ingress Customer-Facing Logical Interface	Packets originating within a service provider customer's network, sent first to a CE device, and sent next to the PE device.	<p>You can also configure aggregated Ethernet interfaces between CE devices and PE devices for VPLS routing instances. Traffic is load-balanced across all of the links in the aggregated interface.</p> <p>Traffic received on an aggregated Ethernet interface is forwarded over a different interface based on a lookup of the destination MAC (DMAC) address:</p>	<p>See “Applying Layer 2 Port Mirroring to a Logical Interface” on page 964.</p> <p>For more information about VPLS routing instances, see <i>Configuring a VPLS Routing Instance</i> and <i>Configuring VLAN Identifiers for Bridge Domains and VPLS Routing Instances</i>.</p>
Egress Customer-Facing Logical Interface	<p>Unicast packets being forwarded by the PE device to another PE device.</p> <p>NOTE: If you apply a port-mirroring filter to the output for a logical interface, only unicast packets are mirrored. To mirror multicast, unknown unicast, and broadcast packets, apply a filter to the input to the flood table of a VLAN or VPLS routing instance.</p>	<ul style="list-style-type: none"> • Packets destined for a local site are sent out of the load-balanced child interface. • Packets destined for the remote site are encapsulated and forwarded over a label-switched path (LSP). 	See “Applying Layer 2 Port Mirroring to a Logical Interface” on page 964.
Input to a VLAN Forwarding Table or Flood Table	Forwarding traffic or flood traffic sent to the VLAN from a CE device.	Forwarding and flood traffic typically consists of broadcast packets, multicast packets, unicast packets with an unknown destination MAC address, or packets with a MAC entry in the DMAC routing table.	See “Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a Bridge Domain” on page 967. For information about flooding behavior in VPLS, see the <i>Junos OS VPNs Library for Routing Devices</i> .
Input to a VPLS Routing Instance Forwarding Table or Flood Table	Forwarding traffic or flood traffic sent to the VPLS routing instance from a CE device.		See “Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VPLS Routing Instance” on page 969. For information about flooding behavior in VPLS, see the <i>Junos OS VPNs Library for Routing Devices</i> .

Related Documentation

- [Understanding Layer 2 Port Mirroring](#) on page 822
- [Layer 2 Port Mirroring Firewall Filters](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter](#) on page 944
- [Example: Layer 2 Port Mirroring at a Logical Interface](#) on page 979

Layer 2 Port Mirroring of PE Router or PE Switch Aggregated Ethernet Interfaces

An aggregated Ethernet interface is a virtual aggregated link that consists of a set of physical interfaces of the same speed and operating in full-duplex link connection mode. You can configure aggregated Ethernet interfaces between CE devices and PE devices for VPLS routing instances. Traffic is load-balanced across all of the links in the aggregated interface. If one or more links in the aggregated interface fails, the traffic is switched to the remaining links.

You can apply a Layer 2 port-mirroring firewall filter to an aggregated Ethernet interface to configure port mirroring at the parent interface. However, if any child interfaces are bound to different Layer 2 port-mirroring instances, packets received at the child interfaces will be mirrored to the destinations specified by their respective port-mirroring instances. Thus, multiple child interfaces can mirror packets to multiple destinations.

For example, suppose the parent aggregated Ethernet interface instance **ae0** has two child interfaces:

- **xe-2/0/0**
- **xe-3/1/2**

Suppose that these child interfaces on **ae0** are bound to two different Layer 2 port-mirroring instances:

- **pm_instance_A**—A named instance of Layer 2 port mirroring, bound to child interface **xe-2/0/0**.
- **pm_instance_B**—A named instance of Layer 2 port mirroring, bound to child interface **xe-3/1/2**.

Now suppose you apply a Layer 2 port-mirroring firewall filter to the Layer 2 traffic sent on **ae0.0** (logical unit **0** on the aggregated Ethernet interface instance **0**). This enables port mirroring on **ae0.0**, which has the following effect on the processing of traffic received on the child interfaces for which Layer 2 port-mirroring properties are specified:

- The packets received on **xe-2/0/0.0** are mirrored to the output interfaces configured in port-mirroring instance **pm_instance_A**.
- The packets received on **xe-3/1/2.0** are mirrored to the output interfaces configured in port-mirroring instance **pm_instance_B**.

Because **pm_instance_A** and **pm_instance_B** can specify different packet-selection properties or mirror destination properties, the packets received on **xe-2/0/0.0** and **xe-3/1/2.0** can mirror different packets to different destinations.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Firewall Filters](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN on page 984](#)

Applying Layer 2 Port Mirroring to a Logical Interface

You can apply a Layer 2 port-mirroring firewall filter to the input or to the output of a logical interface, including an aggregated Ethernet logical interface. Only packets of the address-type family specified by the filter action are mirrored.

Before you begin, complete the following task:

- Define a Layer 2 port-mirroring firewall filter to be applied to the input to a logical interface or output to a logical interface. For details, see [“Defining a Layer 2 Port-Mirroring Firewall Filter” on page 944](#).



NOTE: This configuration task shows two Layer 2 port-mirroring firewall filters: one filter applied to the logical interface ingress traffic, and one filter applied to the logical interface egress traffic.

To apply a Layer 2 port-mirroring firewall filter to an input or output logical interface:

1. Configure the underlying physical interface for the logical interface.
 - a. Enable configuration of the underlying physical interface:

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



NOTE: A port-mirroring firewall filter can also be applied to an aggregated-Ethernet logical interface.

- b. For Fast Ethernet and Gigabit Ethernet interfaces and aggregated Ethernet interfaces configured for VPLS, enable the reception and transmission of 802.1Q VLAN-tagged frames on the interface:

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

- c. For 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, set the logical link-layer encapsulation type:

```
[edit interfaces interface-name]
user@host# set encapsulation extended-vlan-ethernet-switching
```

2. Configure the logical interface to which you want to apply a Layer 2 port-mirroring firewall filter.

- a. Specify the logical unit number:

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

- b. For a Fast Ethernet, Gigabit Ethernet, or Aggregated Ethernet interface, bind an 802.1Q VLAN tag ID to the logical interface:

```
[edit interfaces interface-name unit logical-unit-number]
user@host# set vlan-id number
```

3. Enable specification of an input or output filter to be applied to Layer 2 packets that are part of bridging domain, Layer 2 switching cross-connects, or virtual private LAN service (VPLS).

- If the filter is to be evaluated when packets are received on the interface:

```
[edit interfaces interface-name unit logical-unit-number]
user@host# set family family filter input pm-filter-name-a
```

- If the filter is to be evaluated when packets are sent on the interface:

```
[edit interfaces interface-name unit logical-unit-number]
user@host# set family family filter output pm-filter-name-b
```

The value of the *family* option can be **ethernet-switching**, **ccc**, or **vpls**.



NOTE: If port-mirroring firewall filters are applied at both the input and output of a logical interface, two copies of each packet are mirrored. To prevent the router or switch from forwarding duplicate packets to the same destination, include the optional **mirror-once** statement at the [edit forwarding-options] hierarchy level.

4. Verify the minimum configuration for applying a named Layer 2 port mirroring firewall filter to a logical interface:

```
[edit interfaces interface-name unit logical-unit-number family family filter ... ]
user@host# top
[edit]
user@host# show interfaces

interfaces {
  interface-name {
    vlan-tagging;
    encapsulation extended-vlan-ethernet-switching;
    unit number { # Apply a filter to the input of this interface
      vlan-id number;
      family (ethernet-switching | ccc | vpls) {
```



```

        filter {
            input pm-filter-for-logical-interface-input;
        }
    }
}
unit number { # Apply a filter to the output of this interface
    vlan-id number;
    family (ethernet-switching | ccc | vpls) {
        filter {
            output pm-filter-for-logical-interface-output;
        }
    }
}
}
}

```

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Firewall Filters](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
- [Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a Bridge Domain on page 967](#)
- [Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VPLS Routing Instance on page 969](#)
- [Example: Layer 2 Port Mirroring at a Logical Interface on page 979](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN on page 984](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links on page 986](#)

Applying Layer 2 Port Mirroring to a Logical Interface

You can apply a Layer 2 port-mirroring firewall filter to the input or to the output of a logical interface, including an aggregated Ethernet logical interface. Only packets of the address-type family specified by the filter action are mirrored.

Before you begin, complete the following task:

- Define a Layer 2 port-mirroring firewall filter to be applied to the input to a logical interface or output to a logical interface. For details, see “[Defining a Layer 2 Port-Mirroring Firewall Filter](#)” on page 944.



NOTE: This configuration task shows two Layer 2 port-mirroring firewall filters: one filter applied to the logical interface ingress traffic, and one filter applied to the logical interface egress traffic.

To apply a Layer 2 port-mirroring firewall filter to an input or output logical interface:

1. Configure the underlying physical interface for the logical interface.
 - a. Enable configuration of the underlying physical interface:

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



NOTE: A port-mirroring firewall filter can also be applied to an aggregated-Ethernet logical interface.

- b. For Fast Ethernet and Gigabit Ethernet interfaces and aggregated Ethernet interfaces configured for VPLS, enable the reception and transmission of 802.1Q VLAN-tagged frames on the interface:

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

- c. For 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, set the logical link-layer encapsulation type:

```
[edit interfaces interface-name]
user@host# set encapsulation extended-vlan-bridge
```

2. Configure the logical interface to which you want to apply a Layer 2 port-mirroring firewall filter.

- a. Specify the logical unit number:

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

- b. For a Fast Ethernet, Gigabit Ethernet, or Aggregated Ethernet interface, bind an 802.1Q VLAN tag ID to the logical interface:

```
[edit interfaces interface-name unit logical-unit-number]
user@host# set vlan-id number
```

3. Enable specification of an input or output filter to be applied to Layer 2 packets that are part of bridging domain, Layer 2 switching cross-connects, or virtual private LAN service (VPLS).

- If the filter is to be evaluated when packets are received on the interface:

```
[edit interfaces interface-name unit logical-unit-number]
user@host# set family family filter input pm-filter-name-a
```

- If the filter is to be evaluated when packets are sent on the interface:

```
[edit interfaces interface-name unit logical-unit-number]
user@host# set family family filter output pm-filter-name-b
```

The value of the *family* option can be **bridge**, **ccc**, or **vpls**.



NOTE: If port-mirroring firewall filters are applied at both the input and output of a logical interface, two copies of each packet are mirrored. To prevent the router from forwarding duplicate packets to the same destination, include the optional *mirror-once* statement at the [edit forwarding-options] hierarchy level.

4. Verify the minimum configuration for applying a named Layer 2 port-mirroring firewall filter to a logical interface:

```
[edit interfaces interface-name unit logical-unit-number family family filter ... ]
user@host# top
[edit]
user@host# show interfaces

interfaces {
  interface-name {
    vlan-tagging;
    encapsulation extended-vlan-bridge;
    unit number { # Apply a filter to the input of this interface
      vlan-id number;
      family (bridge | ccc | vpls) {
```

```
filter {  
    input pm-filter-for-logical-interface-input;  
}  
}  
unit number { # Apply a filter to the output of this interface  
    vlan-id number;  
    family (bridge | ccc | vpls) {  
        filter {  
            output pm-filter-for-logical-interface-output;  
        }  
    }  
}  
}
```

**Related
Documentation**

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Firewall Filters](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
- [Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a Bridge Domain on page 967](#)
- [Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VPLS Routing Instance on page 969](#)
- [Example: Layer 2 Port Mirroring at a Logical Interface on page 979](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN on page 984](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links on page 986](#)

Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a Bridge Domain

You can apply a Layer 2 port-mirroring firewall filter to traffic being forwarded or flooded to a bridge domain. Only packets of the specified family type and forwarded or flooded to that bridge domain are mirrored.

Before you begin, complete the following task:

- Define a Layer 2 port-mirroring firewall filter to be applied to the traffic being forwarded to a bridge domain or flooded to a bridge domain. For details, see [“Defining a Layer 2 Port-Mirroring Firewall Filter” on page 944](#).



NOTE: This configuration task shows two Layer_2 port-mirroring firewall filters: one filter applied to the bridge domain forwarding table ingress traffic, and one filter applied to the bridge domain flood table ingress traffic.

To apply a Layer 2 port-mirroring firewall filter to the forwarding table or flood table of a bridge domain:

- Enable configuration of the bridge domain **bridge-domain-name** to which you want to apply a Layer 2 port-mirroring firewall filter for forwarded or flooded traffic:

- For a bridge domain:

```
[edit]
user@host# edit bridge-domains bridge-domain-name
```

- For a bridge domain under a routing instance:

```
[edit]
user@host# edit routing-instances routing-instance-name bridge-domains
bridge-domain-name
user@host# set instance-type virtual-switch
```

For more detailed configuration information, see *Configuring a VPLS Routing Instance*.

- Configure the bridge domain:

```
[edit]
user@host# set domain-type bridge
user@host# set interface interface-name
user@host# set routing-interface routing-interface-name
```

For more detailed configuration information, see *Configuring a Bridge Domain* and *Configuring VLAN Identifiers for Bridge Domains and VPLS Routing Instances*.

- Enable configuration of traffic forwarding on the bridge domain:

```
[edit ... bridge-domains bridge-domain-name]
```

```
user@host# edit forwarding-options
```

4. Apply a Layer 2 port-mirroring firewall filter to the bridge domain forwarding table or flood table.

- To mirror packets being forwarded to the bridge domain:

```
[edit ... bridge-domains bridge-domain-name forwarding-options]
user@host# set filter input pm-filter-for-bd-ingress-forwarded
```

- To mirror packets being flooded to the bridge domain:

```
[edit ... bridge-domains bridge-domain-name forwarding-options]
user@host# set flood input pm-filter-for-bd-ingress-flooded
```

5. Verify the minimum configuration for applying a Layer 2 port-mirroring firewall filter to the forwarding table or flood table of the bridge domain.

- a. Navigate to the hierarchy level at which the bridge domain is configured:

- **[edit]**
- **[edit routing-instances *routing-instance-name*]**

- b. Display the bridge domain configurations:

```
user@host# show bridge domains

bridge-domains {
  bridge-domain-name {
    instance-type virtual-switch; # For a bridge domain under a routing instance.
    domain-type bridge;
    interface interface-name;
    forwarding-options {
      filter { # Mirror ingress forwarded traffic
        input pm-filter-for-bd-ingress-forwarded;
      }
      flood { # Mirror ingress flooded traffic
        input pm-filter-for-bd-ingress-flooded;
      }
    }
  }
}
```

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Firewall Filters](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
- [Applying Layer 2 Port Mirroring to a Logical Interface on page 964](#)

- Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VPLS Routing Instance on page 969
- Example: Layer 2 Port Mirroring at a Logical Interface on page 979
- Example: Layer 2 Port Mirroring for a Layer 2 VPN on page 984
- Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links on page 986

Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VPLS Routing Instance

You can apply a Layer 2 port-mirroring firewall filter to traffic being forwarded or flooded to a VPLS routing instance. Only packets of the specified family type and forwarded or flooded to that VPLS routing instance are mirrored.

Before you begin, complete the following task:

- Define a Layer 2 port-mirroring firewall filter to be applied to the traffic being forwarded to a VPLS routing instance or flooded to a bridge domain. For details, see [“Defining a Layer 2 Port-Mirroring Firewall Filter” on page 944](#).



NOTE: This configuration task shows two Layer_2 port-mirroring firewall filters: one filter applied to the VPLS routing instance forwarding table ingress traffic, and one filter applied to the VPLS routing instance flood table ingress traffic.

To apply a Layer 2 port-mirroring firewall filter to the forwarding table or flood table of a VPLS routing instance:

1. Enable configuration of the VPLS routing instance to which you want to apply a Layer 2 port-mirroring firewall filter for forwarded or flooded traffic:

```
[edit]
user@host# edit routing-instances routing-instance-name
user@host# set instance-type vpls
user@host# set interface interface-name
user@host# set route-distinguisher (as-number:number | ip-address:number)
user@host# set vrf-import [policy-names]
user@host# set vrf-export [policy-names]
user@host# edit protocols vpls
user@host@ ... vpls-configuration ...
```

For more detailed configuration information, see *Configuring a VPLS Routing Instance*.

2. Enable configuration of traffic forwarding on the VPLS routing instance:

```
[edit routing-instances routing-instance-name protocols vpls]
user@host# up 2
[edit routing-instances routing-instance-name]
```

```
user@host# edit forwarding-options
```

3. Apply a Layer 2 port-mirroring firewall filter to the VPLS routing instance forwarding table or flood table.

- To mirror packets being forwarded to the VPLS routing instance:

```
[edit routing-instances routing-instance-name forwarding-options]
user@host# set filter input pm-filter-for-vpls-ri-forwarded
```

- To mirror packets being flooded to the VPLS routing instance:

```
[edit routing-instances routing-instance-name forwarding-options]
user@host# set flood input pm-filter-for-vpls-ri-flooded
```

4. Verify the minimum configuration for applying a Layer 2 port-mirroring firewall filter to the forwarding table or flood table of the VPLS routing instance:

```
[edit routing-instances routing-instance-name forwarding-options]
user@host# top
[edit]
user@host# show routing-instances

routing-instances {
  routing-instance-name {
    instance-type vpls;
    interface interface-name;
    route-distinguisher (as-number:number | ip-address:number);
    vrf-import [policy-names];
    vrf-export [policy-names];
    protocols {
      vpls {
        ...vpls-configuration...
      }
    }
    forwarding-options {
      family vpls {
        filter { # Mirror ingress forwarded traffic
          input pm-filter-for-vpls-ri-forwarded;
        }
        flood { # Mirror ingress flooded traffic
          input pm-filter-for-vpls-ri-flooded;
        }
      }
    }
  }
}
```

- Related Documentation**
- [Understanding Layer 2 Port Mirroring on page 822](#)
 - [Layer 2 Port Mirroring Firewall Filters](#)

- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
- [Applying Layer 2 Port Mirroring to a Logical Interface on page 964](#)
- [Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a Bridge Domain on page 967](#)
- [Example: Layer 2 Port Mirroring at a Logical Interface on page 979](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN on page 984](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links on page 986](#)

Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VPLS Routing Instance

You can apply a Layer 2 port-mirroring firewall filter to traffic being forwarded or flooded to a VPLS routing instance. Only packets of the specified family type and forwarded or flooded to that VPLS routing instance are mirrored.

Before you begin, complete the following task:

- Define a Layer 2 port-mirroring firewall filter to be applied to the traffic being forwarded to a VPLS routing instance or flooded to a VLAN. For details, see [“Defining a Layer 2 Port-Mirroring Firewall Filter” on page 944](#).



NOTE: This configuration task shows two Layer_2 port-mirroring firewall filters: one filter applied to the VPLS routing instance forwarding table ingress traffic, and one filter applied to the VPLS routing instance flood table ingress traffic.

To apply a Layer 2 port-mirroring firewall filter to the forwarding table or flood table of a VPLS routing instance:

1. Enable configuration of the VPLS routing instance to which you want to apply a Layer 2 port-mirroring firewall filter for forwarded or flooded traffic:

```
[edit]
user@host# edit routing-instances routing-instance-name
user@host# set instance-type vpls
user@host# set interface interface-name
user@host# set route-distinguisher (as-number:number | ip-address:number)
user@host# set vrf-import [policy-names]
user@host# set vrf-export [policy-names]
user@host# edit protocols vpls
user@host@ ... vpls-configuration ...
```

For more detailed configuration information, see [Configuring a VPLS Routing Instance](#).

2. Enable configuration of traffic forwarding on the VPLS routing instance:

```
[edit routing-instances routing-instance-name protocols vpls]
user@host# up 2
[edit routing-instances routing-instance-name]
user@host# edit forwarding-options
```

3. Apply a Layer 2 port-mirroring firewall filter to the VPLS routing instance forwarding table or flood table.

- To mirror packets being forwarded to the VPLS routing instance:

```
[edit routing-instances routing-instance-name forwarding-options]
user@host# set filter input pm-filter-for-vpls-ri-forwarded
```

- To mirror packets being flooded to the VPLS routing instance:

```
[edit routing-instances routing-instance-name forwarding-options]
user@host# set flood input pm-filter-for-vpls-ri-flooded
```

4. Verify the minimum configuration for applying a Layer 2 port-mirroring firewall filter to the forwarding table or flood table of the VPLS routing instance:

```
[edit routing-instances routing-instance-name forwarding-options]
user@host# top
[edit]
user@host# show routing-instances

routing-instances {
  routing-instance-name {
    instance-type vpls;
    interface interface-name;
    route-distinguisher (as-number:number | ip-address:number);
    vrf-import [policy-names];
    vrf-export [policy-names];
    protocols {
      vpls {
        ...vpls-configuration...
      }
    }
    forwarding-options {
      family vpls {
        filter { # Mirror ingress forwarded traffic
          input pm-filter-for-vpls-ri-forwarded;
        }
        flood { # Mirror ingress flooded traffic
          input pm-filter-for-vpls-ri-flooded;
        }
      }
    }
  }
}
```

**Related
Documentation**

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Firewall Filters](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
- [Applying Layer 2 Port Mirroring to a Logical Interface on page 964](#)
- [Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a Bridge Domain on page 967](#)
- [Example: Layer 2 Port Mirroring at a Logical Interface on page 979](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN on page 984](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links on page 986](#)

Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VLAN

You can apply a Layer 2 port-mirroring firewall filter to traffic being forwarded or flooded to a VLAN. Only packets of the specified family type and forwarded or flooded to that VLAN are mirrored.

Before you begin, complete the following task:

- Define a Layer 2 port-mirroring firewall filter to be applied to the traffic being forwarded to a VLAN or flooded to a VLAN. For details, see [“Defining a Layer 2 Port-Mirroring Firewall Filter” on page 944](#).



NOTE: This configuration task shows two Layer_2 port-mirroring firewall filters: one filter applied to the VLAN forwarding table ingress traffic, and one filter applied to the VLAN flood table ingress traffic.

To apply a Layer 2 port-mirroring firewall filter to the forwarding table or flood table of a VLAN:

1. Enable configuration of the VLAN **bridge-domain-name** to which you want to apply a Layer 2 port-mirroring firewall filter for forwarded or flooded traffic:

- For a VLAN:

```
[edit]
user@host# edit bridge-domains bridge-domain-name
```

- For a VLAN under a routing instance:

```
[edit]
user@host# edit routing-instances routing-instance-name bridge-domains
  bridge-domain-name
user@host# set instance-type virtual-switch
```

For more detailed configuration information, see *Configuring a VPLS Routing Instance*.

2. Configure the VLAN:

```
[edit]
user@host# set domain-type bridge
user@host# set interface interface-name
user@host# set routing-interface routing-interface-name
```

For more detailed configuration information, see *Configuring a Bridge Domain* and *Configuring VLAN Identifiers for Bridge Domains and VPLS Routing Instances*.

3. Enable configuration of traffic forwarding on the VLAN:

```
[edit ... bridge-domains bridge-domain-name]
```

```
user@host# edit forwarding-options
```

4. Apply a Layer 2 port-mirroring firewall filter to the VLAN forwarding table or flood table.

- To mirror packets being forwarded to the VLAN:

```
[edit ... bridge-domains bridge-domain-name forwarding-options]
user@host# set filter input pm-filter-for-bd-ingress-forwarded
```

- To mirror packets being flooded to the VLAN:

```
[edit ... bridge-domains bridge-domain-name forwarding-options]
user@host# set flood input pm-filter-for-bd-ingress-flooded
```

5. Verify the minimum configuration for applying a Layer 2 port-mirroring firewall filter to the forwarding table or flood table of the VLAN.

- a. Navigate to the hierarchy level at which the VLAN is configured:

- **[edit]**
- **[edit routing-instances *routing-instance-name*]**

- b. Display the VLAN configurations:

```
user@host# show vlans

vlans {
  vlan-name {
    instance-type virtual-switch; # For a bridge domain under a routing instance.
    domain-type bridge;
    interface interface-name;
    forwarding-options {
      filter { # Mirror ingress forwarded traffic
        input pm-filter-for-bd-ingress-forwarded;
      }
      flood { # Mirror ingress flooded traffic
        input pm-filter-for-bd-ingress-flooded;
      }
    }
  }
}
```

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Firewall Filters](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
- [Applying Layer 2 Port Mirroring to a Logical Interface on page 964](#)

- [Applying Layer 2 Port Mirroring to Traffic Forwarded or Flooded to a VPLS Routing Instance on page 969](#)
- [Example: Layer 2 Port Mirroring at a Logical Interface on page 979](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN on page 984](#)
- [Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links on page 986](#)

Example: Layer 2 Port Mirroring at a Logical Interface

The following steps describe an example in which the global port-mirroring instance and a port-mirroring firewall filter are used to configure Layer 2 port mirroring for the input to a logical interface.

1. Configure the VLAN **example-bd-with-analyzer**, which contains the external packet analyzer, and the VLAN **example-bd-with-traffic**, which contains the source and destination of the Layer 2 traffic being mirrored:

```
[edit]
bridge-domains {
  example-bd-with-analyzer { # Contains an external traffic analyzer
    vlan-id 1000;
    interface ge-2/0/0.0; # External analyzer
  }
  example-bd-with-traffic { # Contains traffic input and output interfaces
    vlan-id 1000;
    interface ge-2/0/6.0; # Traffic input port
    interface ge-3/0/1.2; # Traffic output port
  }
}
```

Assume that logical interface **ge-2/0/0.0** is associated with an external traffic analyzer that is to receive port-mirrored packets. Assume that logical interfaces **ge-2/0/6.0** and **ge-3/0/1.2** will be traffic input and output ports, respectively.

2. Configure Layer 2 port-mirroring for the global instance, with the port-mirroring destination being the VLAN interface associated with the external analyzer (logical interface **ge-2/0/0.0** on VLAN **example-bd-with-analyzer**). Be sure to enable the option that allows filters to be applied to this port-mirroring destination:

```
[edit]
forwarding-options {
  port-mirroring {
    input {
      rate 10;
      run-length 5;
    }
  }
  family ethernet-switching {
    output {
      interface ge-2/0/0.0; # Mirror packets to the external analyzer
      no-filter-check; # Allow filters on the mirror destination interface
    }
  }
}
```

```

    }
  }
}

```

The **input** statement at the **[edit forwarding-options port-mirroring]** hierarchy level specifies that sampling begins every tenth packet and that each of the first five packets selected are to be mirrored.

The **output** statement at the **[edit forwarding-options port-mirroring family ethernet-switching]** hierarchy level specifies the output mirror interface for Layer 2 packets in a bridging environment:

- Logical interface **ge-2/0/0.0**, which is associated with the external packet analyzer, is configured as the port-mirroring destination.
- The optional **no-filter-check** statement allows filters to be configured on this destination interface.

3. Configure the Layer 2 port-mirroring firewall filter **example-bridge-pm-filter**:

```

[edit]
firewall {
  family ethernet-switching {
    filter example-bridge-pm-filter {
      term example-filter-terms {
        then {
          accept;
          port-mirror;
        }
      }
    }
  }
}

```

When this firewall filter is applied to the input or output of a logical interface for traffic in a bridging environment, Layer 2 port mirroring is performed according to the input packet-sampling properties and mirror destination properties configured for the Layer 2 port mirroring global instance. Because this firewall filter is configured with the single, default filter action **accept**, all packets selected by the **input** properties (**rate = 10** and **run-length = 5**) match this filter.

4. Configure the logical interfaces:

```

[edit]
interfaces {
  ge-2/0/0 { # Define the interface to the external analyzer
    encapsulation ethernet-bridge;
    unit 0 {
      family ethernet-switching;
    }
  }
  ge-2/0/6 { # Define the traffic input port

```

```

flexible-vlan-tagging;
encapsulation extended-vlan-bridge;
unit 0 {
    vlan-id 100;
    family ethernet-switching {
        filter {
            input example-bridge-pm-filter; # Apply the port-mirroring firewall filter
        }
    }
}
ge-3/0/1 { # Define the traffic output port
    flexible-vlan-tagging;
    encapsulation extended-vlan-bridge;
    unit 2 {
        vlan-tags outer 10 inner 20;
        family ethernet-switching;
    }
}
}

```

Packets received at logical interface **ge-2/0/6.0** on VLAN **example-bd-with-traffic** are evaluated by the port-mirroring firewall filter **example-bridge-pm-filter**. The firewall filter acts on the input traffic according to the filter actions configured in the firewall filter itself plus the input packet-sampling properties and mirror destination properties configured in the global port-mirroring instance:

- All packets received at **ge-2/0/6.0** are forwarded to their (assumed) normal destination at logical interface **ge-3/0/1.2**.
- For every ten input packets, copies of the first five packets in that selection are forwarded to the external analyzer at logical interface **ge-0/0/0.0** in the other VLAN, **example-bd-with-analyzer**.

If you configure the port-mirroring firewall filter **example-bridge-pm-filter** to take the **discard** action instead of the **accept** action, all original packets are discarded while copies of the packets selected using the global port-mirroring **input** properties are sent to the external analyzer.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Firewall Filters](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)

Example: Layer 2 Port Mirroring at a Logical Interface

The following steps describe an example in which the global port-mirroring instance and a port-mirroring firewall filter are used to configure Layer 2 port mirroring for the input to a logical interface.

1. Configure the bridge domain **example-bd-with-analyzer**, which contains the external packet analyzer, and the bridge domain **example-bd-with-traffic**, which contains the source and destination of the Layer 2 traffic being mirrored:

```
[edit]
bridge-domains {
  example-bd-with-analyzer { # Contains an external traffic analyzer
    vlan-id 1000;
    interface ge-2/0/0.0; # External analyzer
  }
  example-bd-with-traffic { # Contains traffic input and output interfaces
    vlan-id 1000;
    interface ge-2/0/6.0; # Traffic input port
    interface ge-3/0/1.2; # Traffic output port
  }
}
```

Assume that logical interface **ge-2/0/0.0** is associated with an external traffic analyzer that is to receive port-mirrored packets. Assume that logical interfaces **ge-2/0/6.0** and **ge-3/0/1.2** will be traffic input and output ports, respectively.

2. Configure Layer 2 port mirroring for the global instance, with the port-mirroring destination being the bridge domain interface associated with the external analyzer (logical interface **ge-2/0/0.0** on bridge domain **example-bd-with-analyzer**). Be sure to enable the option that allows filters to be applied to this port-mirroring destination:

```
[edit]
forwarding-options {
  port-mirroring {
    input {
      rate 10;
      run-length 5;
    }
    family bridge {
      output {
        interface ge-2/0/0.0; # Mirror packets to the external analyzer
        no-filter-check; # Allow filters on the mirror destination interface
      }
    }
  }
}
```

The **input** statement at the **[edit forwarding-options port-mirroring]** hierarchy level specifies that sampling begins every tenth packet and that each of the first five packets selected are to be mirrored.

The **output** statement at the **[edit forwarding-options port-mirroring family bridge]** hierarchy level specifies the output mirror interface for Layer 2 packets in a bridging environment:

- Logical interface **ge-2/0/0.0**, which is associated with the external packet analyzer, is configured as the port-mirroring destination.
- The optional **no-filter-check** statement allows filters to be configured on this destination interface.

3. Configure the Layer 2 port-mirroring firewall filter **example-bridge-pm-filter**:

```
[edit]
firewall {
  family bridge {
    filter example-bridge-pm-filter {
      term example-filter-terms {
        then {
          accept;
          port-mirror;
        }
      }
    }
  }
}
```

When this firewall filter is applied to the input or output of a logical interface for traffic in a bridging environment, Layer 2 port mirroring is performed according to the input packet-sampling properties and mirror destination properties configured for the Layer 2 port mirroring global instance. Because this firewall filter is configured with the single, default filter action **accept**, all packets selected by the **input** properties (**rate = 10** and **run-length = 5**) match this filter.

4. Configure the logical interfaces:

```
[edit]
interfaces {
  ge-2/0/0 { # Define the interface to the external analyzer
    encapsulation ethernet-bridge;
    unit 0 {
      family bridge;
    }
  }
  ge-2/0/6 { # Define the traffic input port
    flexible-vlan-tagging;
    encapsulation extended-vlan-bridge;
    unit 0 {
      vlan-id 100;
      family bridge {
        filter {
          input example-bridge-pm-filter; # Apply the port-mirroring firewall filter
        }
      }
    }
  }
}
```

```

    }
  }
  ge-3/0/1 { # Define the traffic output port
    flexible-vlan-tagging;
    encapsulation extended-vlan-bridge;
    unit 2 {
      vlan-tags outer 10 inner 20;
      family bridge;
    }
  }
}

```

Packets received at logical interface **ge-2/0/6.0** on bridge domain **example-bd-with-traffic** are evaluated by the port-mirroring firewall filter **example-bridge-pm-filter**. The firewall filter acts on the input traffic according to the filter actions configured in the firewall filter itself plus the input packet-sampling properties and mirror destination properties configured in the global port-mirroring instance:

- All packets received at **ge-2/0/6.0** are forwarded to their (assumed) normal destination at logical interface **ge-3/0/1.2**.
- For every ten input packets, copies of the first five packets in that selection are forwarded to the external analyzer at logical interface **ge-0/0/0.0** in the other bridge domain, **example-bd-with-analyzer**.

If you configure the port-mirroring firewall filter **example-bridge-pm-filter** to take the **discard** action instead of the **accept** action, all original packets are discarded while copies of the packets selected using the global port-mirroring **input** properties are sent to the external analyzer.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Firewall Filters](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)

Example: Layer 2 Port Mirroring for a Layer 2 VPN

The following example is not a complete configuration, but shows all the steps needed to configure port mirroring on an L2VPN using **family ccc**.

1. Configure the VLAN **port-mirror-bd**, which contains the external packet analyzer:

```

[edit]
vllns {
  port-mirror-vlan { # Contains an external traffic analyzer
    interface ge-2/2/9.0; # External analyzer
  }
}

```

2. Configure the Layer 2 VPN CCC to connect logical interface **ge-2/0/1.0** and logical interface **ge-2/0/1.1**:

```
[edit]
protocols {
  mpls {
    interface all;
  }
  connections {
    interface-switch if_switch {
      interface ge-2/0/1.0;
      interface ge-2/0/1.1;
    }
  }
}
```

3. Configure Layer 2 port mirroring for the global instance, with the port-mirroring destination being the VLAN interface associated with the external analyzer (logical interface **ge-2/2/9.0** on VLAN **example-bd-with-analyzer**):

```
[edit]
forwarding-options {
  port-mirroring {
    input {
      rate 1;
      maximum-packet-length 200;
    }
    family ccc {
      output {
        interface ge-2/2/9.0; # Mirror packets to the external analyzer
      }
    }
  }
  instance {
    inst1 {
      input {
        rate 1;
        maximum-packet-length 300;
      }
      family ccc {
        output {
          interface ge-2/2/9.0;
        }
      }
    }
  }
}
```

4. Define the Layer 2 port-mirroring firewall filter **pm_filter_ccc** for **family ccc**:

```
[edit]
firewall {
```

```

family ccc {
  filter pm_filter_ccc {
    term pm {
      then port-mirror;
    }
  }
}

```

5. Apply the port mirror instance to the chassis:

```

[edit]
chassis {
  fpc 2 {
    port-mirror-instance inst1;
  }
}

```

6. Configure interface **ge-2/2/9** for the VLANs, and configure interface **ge-2/0/1** for port mirroring with the **pm_filter_ccc** firewall filter:

```

[edit]
interfaces {
  ge-2/2/9 {
    encapsulation ethernet-bridge;
    unit 0 {
      family ethernet-switching;
    }
  }
  ge-2/0/1 {
    vlan-tagging;
    encapsulation extended-vlan-ccc;
    unit 0 {
      vlan-id 10;
      family ccc {
        filter {
          input pm_filter_ccc;
        }
      }
    }
    unit 1 {
      vlan-id 20;
      family ccc {
        filter {
          output pm_filter_ccc;
        }
      }
    }
  }
}

```

- Related Documentation**
- [Understanding Layer 2 Port Mirroring on page 822](#)
 - [Layer 2 Port Mirroring Firewall Filters](#)
 - [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)

Example: Layer 2 Port Mirroring for a Layer 2 VPN

The following example is not a complete configuration, but shows all the steps needed to configure port mirroring on an L2VPN using **family ccc**.

1. Configure the bridge domain **port-mirror-bd**, which contains the external packet analyzer:

```
[edit]
bridge-domains {
  port-mirror-bd { # Contains an external traffic analyzer
    interface ge-2/2/9.0; # External analyzer
  }
}
```

2. Configure the Layer 2 VPN CCC to connect logical interface **ge-2/0/1.0** and logical interface **ge-2/0/1.1**:

```
[edit]
protocols {
  mpls {
    interface all;
  }
}
connections {
  interface-switch if_switch {
    interface ge-2/0/1.0;
    interface ge-2/0/1.1;
  }
}
}
```

3. Configure Layer 2 port mirroring for the global instance, with the port-mirroring destination being the bridge domain interface associated with the external analyzer (logical interface **ge-2/2/9.0** on bridge domain **example-bd-with-analyzer**):

```
[edit]
forwarding-options {
  port-mirroring {
    input {
      rate 1;
      maximum-packet-length 200;
    }
  }
  family ccc {
    output {
      interface ge-2/2/9.0; # Mirror packets to the external analyzer
    }
  }
}
```

```

    }
  }
  instance {
    inst1 {
      input {
        rate 1;
        maximum-packet-length 300;
      }
      family ccc {
        output {
          interface ge-2/2/9.0;
        }
      }
    }
  }
}

```

4. Define the Layer 2 port-mirroring firewall filter **pm_filter_ccc** for **family ccc**:

```

[edit]
firewall {
  family ccc {
    filter pm_filter_ccc {
      term pm {
        then port-mirror;
      }
    }
  }
}

```

5. Apply the port mirror instance to the chassis:

```

[edit]
chassis {
  fpc 2 {
    port-mirror-instance inst1;
  }
}

```

6. Configure interface **ge-2/2/9** for the VLANs, and configure interface **ge-2/0/1** for port mirroring with the **pm_filter_ccc** firewall filter:

```

[edit]
interfaces {
  ge-2/2/9 {
    encapsulation ethernet-bridge;
    unit 0 {
      family bridge;
    }
  }
}

```

```

ge-2/0/1 {
  vlan-tagging;
  encapsulation extended-vlan-ccc;
  unit 0 {
    vlan-id 10;
    family ccc {
      filter {
        input pm_filter_ccc;
      }
    }
  }
  unit 1 {
    vlan-id 20;
    family ccc {
      filter {
        output pm_filter_ccc;
      }
    }
  }
}

```

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Firewall Filters](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)

Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links

The following example is not a complete configuration, but shows all the steps needed to configure port mirroring on an L2VPN using **family ccc** and aggregated Ethernet links.

1. Configure the bridge domain **port_mirror_bd**, which contains the external packet analyzer:

```

[edit]
bridge-domains {
  port_mirror_bd { # Contains an external traffic analyzer
    interface ge-2/2/8.0; # External analyzer
  }
}

```

2. Configure the Layer 2 VPN CCC to connect interface **ae0.0** and interface **ae0.1**:

```

[edit]
protocols {
  mpls {
    interface all;
  }
  connections {

```



```

interface-switch if_switch {
  interface ae0.0;
  interface ae0.1;
}
}
}

```

3. Configure Layer 2 port mirroring for the global instance, with the port-mirroring destination being the bridge domain interface associated with the external analyzer (logical interface **ge-2/2/9.0** on bridge domain **example_bd_with_analyzer**):

```

[edit]
forwarding-options {
  port-mirroring {
    input {
      rate 1;
      maximum-packet-length 200;
    }
    family ccc {
      output {
        interface ge-2/2/8.0; # Mirror packets to the external analyzer
      }
    }
  }
  instance {
    pm_instance_1 {
      input {
        rate 1;
        maximum-packet-length 300;
      }
      family ccc {
        output {
          interface ge-2/2/8.0;
        }
      }
    }
  }
}
}
}

```

4. Configure the firewall filter **pm_ccc** for family **ccc**:

```

[edit]
firewall {
  family ccc {
    filter pm_ccc {
      term pm {
        then port-mirror;
      }
    }
  }
}
}

```

5. Apply the aggregated Ethernet interfaces and port mirror instance to the chassis:

```
[edit]
chassis {
  aggregated-devices {
    ethernet {
      device-count 10;
    }
  }
  fpc 2 {
    port-mirror-instance pm_instance_1;
  }
}
```

6. Configure interfaces **ae0** and **ge-2/0/2** (for aggregated Ethernet) and **ge-2/2/8** (for port mirroring) with the **pm_ccc** filter:

```
[edit]
interfaces {
  ae0 {
    vlan-tagging;
    encapsulation extended-vlan-ccc;
    unit 0 {
      vlan-id 10;
      family ccc {
        filter {
          input pm_ccc;
        }
      }
    }
    unit 1 {
      vlan-id 20;
      family ccc {
        filter {
          output pm_ccc;
        }
      }
    }
  }
  ge-2/0/2 {
    gigether-options {
      802.3ad ae0;
    }
  }
  ge-2/2/8 {
    encapsulation ethernet-bridge;
    unit 0 {
      family bridge;
    }
  }
}
```

- Related Documentation**
- [Understanding Layer 2 Port Mirroring on page 822](#)
 - [Layer 2 Port Mirroring Firewall Filters](#)
 - [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)

Example: Layer 2 Port Mirroring for a Layer 2 VPN with LAG Links

The following example is not a complete configuration, but shows all the steps needed to configure port mirroring on an L2VPN using **family ccc** and aggregated Ethernet links.

1. Configure the VLAN **port_mirror_bd**, which contains the external packet analyzer:

```
[edit]
vpls {
  port_mirror_vlan { # Contains an external traffic analyzer
    interface ge-2/2/8.0; # External analyzer
  }
}
```

2. Configure the Layer 2 VPN CCC to connect interface **ae0.0** and interface **ae0.1**:

```
[edit]
protocols {
  mpls {
    interface all;
  }
  connections {
    interface-switch if_switch {
      interface ae0.0;
      interface ae0.1;
    }
  }
}
```

3. Configure Layer 2 port mirroring for the global instance, with the port-mirroring destination being the VLAN interface associated with the external analyzer (logical interface **ge-2/2/9.0** on VLAN **example_bd_with_analyzer**):

```
[edit]
forwarding-options {
  port-mirroring {
    input {
      rate 1;
      maximum-packet-length 200;
    }
    family ccc {
      output {
        interface ge-2/2/8.0; # Mirror packets to the external analyzer
      }
    }
  }
}
```

```

instance {
  pm_instance_1 {
    input {
      rate 1;
      maximum-packet-length 300;
    }
    family ccc {
      output {
        interface ge-2/2/8.0;
      }
    }
  }
}

```

4. Configure the firewall filter **pm_ccc** for **family ccc**:

```

[edit]
firewall {
  family ccc {
    filter pm_ccc {
      term pm {
        then port-mirror;
      }
    }
  }
}

```

5. Apply the aggregated Ethernet interfaces and port mirror instance to the chassis:

```

[edit]
chassis {
  aggregated-devices {
    ethernet {
      device-count 10;
    }
  }
  fpc 2 {
    port-mirror-instance pm_instance_1;
  }
}

```

6. Configure interfaces **ae0** and **ge-2/0/2** (for aggregated Ethernet) and **ge-2/2/8** (for port mirroring) with the **pm_ccc** filter:

```

[edit]
interfaces {
  ae0 {
    vlan-tagging;
    encapsulation extended-vlan-ccc;
  }
}

```

```
unit 0 {
  vlan-id 10;
  family ccc {
    filter {
      input pm_ccc;
    }
  }
}
unit 1 {
  vlan-id 20;
  family ccc {
    filter {
      output pm_ccc;
    }
  }
}
}
ge-2/0/2 {
  gigether-options {
    802.3ad ae0;
  }
}
ge-2/2/8 {
  encapsulation ethernet-bridge;
  unit 0 {
    family ethernet-switching;
  }
}
}
```

**Related
Documentation**

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Firewall Filters](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)

Configuring Port Mirroring for Multiple Destinations

- [Understanding Layer 2 Port Mirroring to Multiple Destinations Using Next-Hop Groups on page 993](#)
- [Defining a Next-Hop Group for Layer 2 Port Mirroring on page 994](#)
- [Defining a Next-Hop Group on MX Series Routers for Port Mirroring on page 995](#)
- [Example: Configuring Multiple Port Mirroring with Next-Hop Groups on M, MX and T Series Routers on page 998](#)
- [Example: Layer 2 Port Mirroring to Multiple Destinations on page 1001](#)

Understanding Layer 2 Port Mirroring to Multiple Destinations Using Next-Hop Groups

On an MX Series router and on an EX Series switch, you can mirror traffic to multiple destinations by configuring next-hop groups in Layer 2 port-mirroring firewall filters applied to tunnel interfaces. The mirroring of packets to multiple destinations is also known as *multipacket port mirroring*.



NOTE: Junos OS Release 9.5 introduced support for Layer 2 port mirroring using next-hop groups on MX Series routers, but required installation of a Tunnel PIC. Beginning in Junos OS Release 9.6, Layer 2 port mirroring using next-hop groups on MX Series routers does not require Tunnel PICs.

On MX Series routers and on EX Series switches, you can define a firewall filter for mirroring packets to a next-hop group. The next-hop group can contain Layer 2 members, Layer 3 members, and subgroups that are either unit list (mirroring packets to each interface) or load-balanced (mirroring packets to one of several interfaces). The MX Series router and the EX Series switch supports up to 30 next-hop groups. Each next-hop group supports up to 16 next-hop addresses. Each next-hop group must specify at least two addresses.

To enable port mirroring to the members of a next-hop group, you specify the next-hop group as the filter action of a firewall filter, and then you apply the firewall filter to logical tunnel interfaces (**lt-**) or virtual tunnel interfaces (**vt-**) on the MX Series router or on the EX Series switch.



NOTE: The use of subgroups for load-balancing mirrored traffic is not supported.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
- [Defining a Next-Hop Group for Layer 2 Port Mirroring on page 994](#)
- [Example: Layer 2 Port Mirroring to Multiple Destinations on page 1001](#)

Defining a Next-Hop Group for Layer 2 Port Mirroring

On MX Series routers and EX Series switches, you can mirror tunnel interface input traffic to multiple destinations. To this form of *multipacket port mirroring*, you specify two or more additional destinations in a next-hop group, define a firewall filter that references the next-hop group as the filter action, and then apply the filter to a logical tunnel interface (**lt-**) or virtual tunnel interface (**vt-**) on the MX Series router and on an EX Series switch.



NOTE: This topic describes how to define a next-hop group for Layer 2 port mirroring to multiple destinations. For detailed information about defining a firewall filter for Layer 2 port mirroring to multiple destinations, see [“Defining a Layer 2 Port-Mirroring Firewall Filter” on page 944](#).

To define a next-hop group for a Layer 2 port-mirroring firewall filter action:

1. Enable configuration of Layer 2 forwarding options.
 - To enable Layer 2 forwarding options at the top level:

```
[edit]
user@host edit forwarding-options port-mirroring family (ccc | vpls) output
```

- To enable Layer 2 forwarding options for a routing instance:

```
[edit]
user@host edit forwarding-options port-mirroring instance instance-name
family (ccc | vpls) output
```

2. Enable configuration of a next-hop-group for Layer 2 port mirroring:

```
[edit forwarding-options port-mirroring ... family (ccc | vpls) output]
user@host# edit next-hop-group pm-next-hop-group-name
```


- Specify the type of addresses to be used in the next-hop group configuration. By default, the next-hop group is specified using Layer 3 addresses (**group-type inet**). To specify the next-hop group using Layer 2 addresses instead, you must include the **group-type layer-2** statement:

```
[edit forwarding-options port-mirroring ... family (ccc | vpls) output next-hop-group
  pm-next-hop-group-name]
user@host# set group-type layer-2
```

- Specify the logical interfaces of the next-hop route (or switch):

```
[edit forwarding-options port-mirroring ... family (ccc | vpls) output next-hop-group
  pm-next-hop-group-name]
user@host# set interface logical-interface-name-1
user@host# set interface logical-interface-name-2
```

The MX Series router and the EX Series switch supports up to 30 next-hop groups. Each next-hop group supports up to 16 next-hop addresses. Each next-hop group must specify at least two addresses.

- Verify the configuration of the next-hop group:

```
[edit forwarding-options port-mirroring ... family (ccc | vpls) output next-hop-group
  pm-next-hop-group-name]
user@host# top
[edit]
user@host# show forwarding-options

...
next-hop-group pm-next-hop-group-name { # Next-hop group on a bridge domain.
  group-type layer-2;
  interface logical-interface-name-1;
  interface logical-interface-name-2;
}
...
```

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Understanding Layer 2 Port Mirroring to Multiple Destinations Using Next-Hop Groups on page 993](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
- [Displaying Next-Hop Group Settings and Status on page 1037](#)
- [Example: Layer 2 Port Mirroring to Multiple Destinations on page 1001](#)

Defining a Next-Hop Group on MX Series Routers for Port Mirroring

Starting with release 14.2, on routers containing an Internet Processor II application-specific integrated circuit (ASIC) or T Series Internet Processor, you can send

a copy of an IP version 4 (IPv4) or IP version 6 (IPv6) packet from the router to an external host address or a packet analyzer for analysis. This is known as *port mirroring*.

Port mirroring is different from traffic sampling. In traffic sampling, a sampling key based on the IPv4 header is sent to the Routing Engine. There, the key can be placed in a file, or cflowd packets based on the key can be sent to a cflowd server. In port mirroring, the entire packet is copied and sent out through a next-hop interface.

You can configure simultaneous use of sampling and port mirroring, and set an independent sampling rate and run-length for port-mirrored packets. However, if a packet is selected for both sampling and port mirroring, only one action can be performed, and port mirroring takes precedence. For example, if you configure an interface to sample every packet input to the interface and a filter also selects the packet to be port mirrored to another interface, only the port mirroring takes effect. All other packets not matching the explicit filter port-mirroring criteria continue to be sampled when forwarded to their final destination.

Next-hop groups allow you to include port mirroring multiple interfaces used to forward duplicate packets used in port mirroring.

On MX Series routers, you can mirror tunnel interface input traffic to multiple destinations. To this form of multipacket port mirroring, you specify two or more additional destinations in a next-hop group, define a firewall filter that references the next-hop group as the filter action, and then apply the filter to a logical tunnel interface (lt-) or virtual tunnel interface (vt-) on the MX Series router.

To define a next-hop group for a Layer 2 port-mirroring firewall filter action:

1. Enable the configuration of forwarding options.

```
[edit]
user@host set forwarding-options port-mirroring family (inet | inet6) output
```

2. Enable configuration of a next-hop-group for Layer 2 port mirroring.

```
[edit forwarding-options port-mirroring ... family (inet | inet6) output]
user@host# set next-hop-group next-hop-group-name
```

3. Specify the type of addresses to be used in the next-hop group configuration.

```
[edit forwarding-options port-mirroring ... family (inet | inet6) output next-hop-group
next-hop-group-name]
user@host# set group-type inet6
```

4. Specify the interfaces of the next-hop route.

```
[edit forwarding-options port-mirroring ... family (inet | inet6) output next-hop-group
next-hop-group-name]
user@host# set interface logical-interface-name-1
user@host# set interface logical-interface-name-2
```

or

```
[edit forwarding-options port-mirroring ... family (inet | inet6) output next-hop-group
next-hop-group-name]
user@host# set interface interface-name next-hop next-hop-address
```

The MX Series router supports up to 30 next-hop groups. Each next-hop group supports up to 16 next-hop addresses. Each next-hop group must specify at least two addresses. The *next-hop-address* can be an IPv4 or IPv6 address.

- 5. (Optional) Specify the next-hop subgroup.

```
[edit forwarding-options port-mirroring ... family (inet | inet6) output next-hop-group
next-hop-group-name]
user@host# set next-hop-subgroup subgroup-name interface interface-name next-hop
next-hop-address
```

- 6. Verify the configuration of the next-hop group.

```
[edit forwarding-options port-mirroring ... family (inet | inet6) output next-hop-group
next-hop-group-name]
user@host# top
[edit]
user@host# show forwarding-options

...
next-hop-group next-hop-group-name {
  group-type inet6;
  interface logical-interface-name-1;
  interface interface-name {
    next-hop next-hop-address;
  }
  next-hop-subgroup subgroup-name {
    interface interface-name {
      next-hop next-hop-address;
    }
  }
}
...
```

Release History Table

Release	Description
14.2	Starting with release 14.2, on routers containing an Internet Processor II application-specific integrated circuit (ASIC) or T Series Internet Processor, you can send a copy of an IP version 4 (IPv4) or IP version 6 (IPv6) packet from the router to an external host address or a packet analyzer for analysis.

Related Documentation

- *Configuring Port Mirroring on M, T MX, and PTX Series Routers*

- Example: Configuring Multiple Port Mirroring with Next-Hop Groups on M, MX and T Series Routers on page 998

Example: Configuring Multiple Port Mirroring with Next-Hop Groups on M, MX and T Series Routers

When you need to analyze traffic containing more than one packet type, or you wish to perform multiple types of analysis on a single type of traffic, you can implement multiple port mirroring and next-hop groups. You can make up to 16 copies of traffic per group and send the traffic to next-hop group members. A maximum of 30 groups can be configured on a router at any given time. The port-mirrored traffic can be sent to any interface, except aggregated SONET/SDH, aggregated Ethernet, loopback (lo0), or administrative (**fxp0**) interfaces. To send port-mirrored traffic to multiple flow servers or packet analyzers, you can use the **next-hop-group** statement at the **[edit forwarding-options]** hierarchy level.

Figure 30: Active Flow Monitoring—Multiple Port Mirroring with Next-Hop Groups Topology Diagram

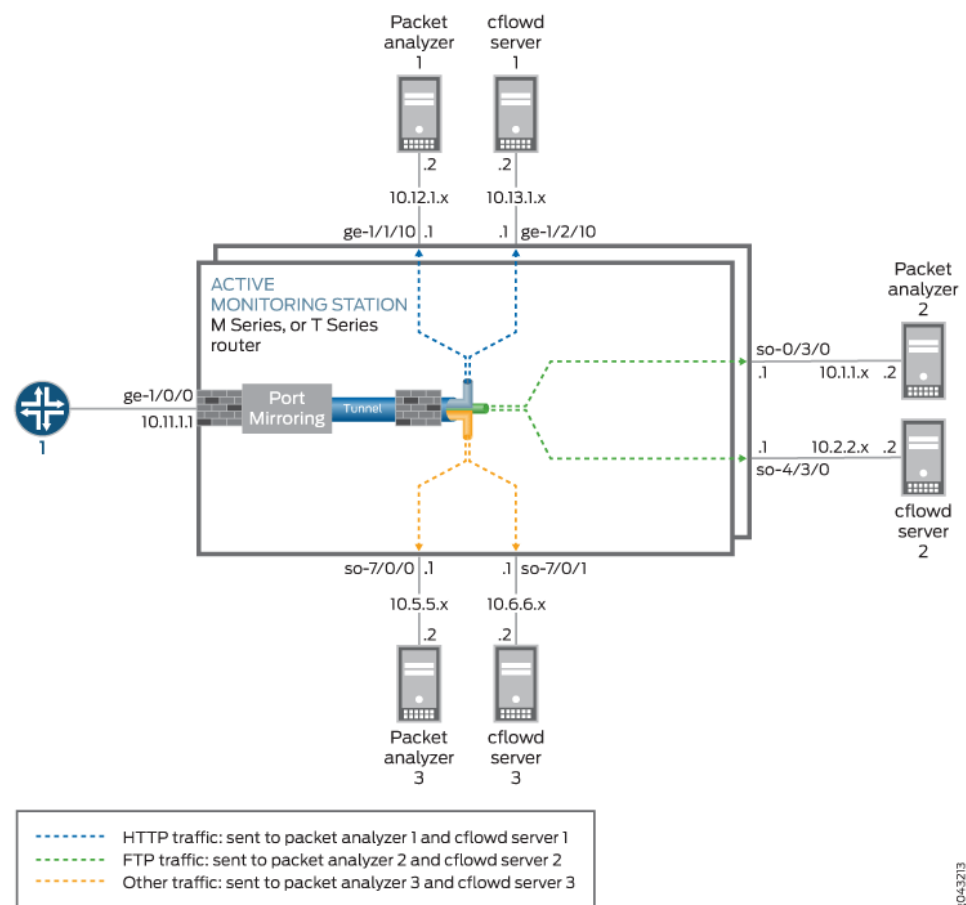


Figure 30 on page 998 shows an example of how to configure multiple port mirroring with next-hop groups. All traffic enters the monitoring router at interface ge-1/0/0. A firewall filter counts and port-mirrors all incoming packets to a Tunnel Services PIC. A second filter is applied to the tunnel interface and splits the traffic into three categories: HTTP traffic, FTP traffic, and all other traffic. The three types of traffic are assigned to three separate next-hop groups. Each next-hop group contains a unique pair of exit interfaces that lead to different groups of packet analyzers and flow servers.



NOTE: Instances enabled to mirror packets to different destinations from the same PFE, also use different sampling parameters for each instance. When we configure Layer2 Port-mirroring with both global port-mirroring and instance based port-mirroring, PIC level instances will override FPC level and the FPC level will override the Global instance.

```
[edit]
interfaces {
  ge-1/0/0 { # This is the input interface where packets enter the router.
    unit 0 {
      family inet {
        filter {
          input mirror_pkts; # Here is where you apply the first filter.
        }
        address 10.11.1.1/24;
      }
    }
  }
  ge-1/1/0 { # This is an exit interface for HTTP packets.
    unit 0 {
      family inet {
        address 10.12.1.1/24;
      }
    }
  }
  ge-1/2/0 { # This is an exit interface for HTTP packets.
    unit 0 {
      family inet {
        address 10.13.1.1/24;
      }
    }
  }
  so-0/3/0 { # This is an exit interface for FTP packets.
    unit 0 {
      family inet {
        address 10.1.1.1/30;
      }
    }
  }
  so-4/3/0 { # This is an exit interface for FTP packets.
    unit 0 {
      family inet {
        address 10.2.2.1/30;
      }
    }
  }
}
```

```

    }
  }
}
so-7/0/0 { # This is an exit interface for all remaining packets.
  unit 0 {
    family inet {
      address 10.5.5.1/30;
    }
  }
}
so-7/0/1 { # This is an exit interface for all remaining packets.
  unit 0 {
    family inet {
      address 10.6.6.1/30;
    }
  }
}
vt-3/3/0 { # The tunnel interface is where you send the port-mirrored traffic.
  unit 0 {
    family inet;
  }
  unit 1 {
    family inet {
      filter {
        input collect_pkts; # This is where you apply the second firewall filter.
      }
    }
  }
}
}
forwarding-options {
  port-mirroring { # This is required when you configure next-hop groups.
    family inet {
      input {
        rate 1; # This port-mirrors all packets (one copy for every packet received).
      }
      output { # Sends traffic to a tunnel interface to enable multiport mirroring.
        interface vt-3/3/0.1;
        no-filter-check;
      }
    }
  }
}
next-hop-group ftp-traffic { # Point-to-point interfaces require you to specify the
  interface so-4/3/0.0; # interface name.
  interface so-0/3/0.0;
}
next-hop-group http-traffic { # Configure a next hop for all multipoint interfaces.
  interface ge-1/1/0.0 {
    next-hop 10.12.1.2;
  }
  interface ge-1/2/0.0 {
    next-hop 10.13.1.2;
  }
}
next-hop-group default-collect {

```

```

interface so-7/0/0.0;
interface so-7/0/1.0;
}
}
firewall {
  family inet {
    filter mirror_pkts { # Apply this filter to the input interface.
      term catch_all {
        then {
          count input_mirror_pkts;
          port-mirror; # This action sends traffic to be copied and port-mirrored.
        }
      }
    }
    filter collect_pkts { # Apply this filter to the tunnel interface.
      term ftp-term { # This term sends FTP traffic to an FTP next-hop group.
        from {
          protocol ftp;
        }
        then next-hop-group ftp-traffic;
      }
      term http-term { # This term sends HTTP traffic to an HTTP next-hop group.
        from {
          protocol http;
        }
        then next-hop-group http-traffic;
      }
      term default { # This sends all remaining traffic to a final next-hop group.
        then next-hop-group default-collectors;
      }
    }
  }
}
}

```

Related Documentation

- [Understanding Port Mirroring on Routers with an Internet Processor II ASIC or T Series Internet Processor on page 814](#)
- [Configuring Port Mirroring on M, T MX, and PTX Series Routers](#)

Example: Layer 2 Port Mirroring to Multiple Destinations

On MX Series routers, you can mirror traffic to multiple destinations by configuring next-hop groups in Layer 2 port-mirroring firewall filters applied to tunnel interfaces.

1. Configure the chassis to support tunnel services at PIC 0 on FPC 2. This configuration includes two logical tunnel interfaces on FPC 2, PIC 0, port 10.

```

[edit]
chassis {
  fpc 2 {
    pic 0 {
      tunnel-services {

```

```

        bandwidth 1g;
    }
}
}
}

```

2. Configure the physical and logical interfaces for three bridge domains and one Layer 2 VPN CCC:

- Bridge domain **bd** will span logical interfaces **ge-2/0/1.0** and **ge-2/0/1.1**.
- Bridge domain **bd_next_hop_group** will span logical interfaces **ge-2/2/9.0** and **ge-2/0/2.0**.
- Bridge domain **bd_port_mirror** will use the logical tunnel interface **lt-2/0/10.2**.
- Layer 2 VPN CCC **if_switch** will connect logical interfaces **ge-2/0/1.2** and **lt-2/0/10.1**.

```

[edit]
interfaces {
  ge-2/0/1 {
    flexible-vlan-tagging;
    encapsulation flexible-ethernet-services;
    unit 0 { # An interface on bridge domain 'bd'.
      encapsulation vlan-bridge;
      vlan-id 200;
      family bridge {
        filter {
          input pm_bridge;
        }
      }
    }
    unit 1 { # An interface on bridge domain 'bd'.
      encapsulation vlan-bridge;
      vlan-id 201;
      family bridge {
        filter {
          input pm_bridge;
        }
      }
    }
    unit 2 {
      encapsulation vlan-ccc;
      vlan-id 1000;
    }
  }
  ge-2/0/2 { # For 'bd_next_hop_group'
    encapsulation ethernet-bridge;
    unit 0 {
      family bridge;
    }
  }
  lt-2/0/10 {
    unit 1 {
      encapsulation ethernet-ccc;
    }
  }
}

```



```

    peer-unit 2;
  }
  unit 2 {
    encapsulation ethernet-bridge;
    peer-unit 1;
    family bridge {
      filter {
        output redirect_to_nhg;
      }
    }
  }
}
ge-2/2/9 {
  encapsulation ethernet-bridge;
  unit 0 { # For 'bd_next_hop_group'
    family bridge;
  }
}
}
}

```

3. Configure the three bridge domains and the Layer 2 VPN switching CCC:

- Bridge domain **bd** spans logical interfaces **ge-2/0/1.0** and **ge-2/0/1.1**.
- Bridge domain **bd_next_hop_group** spans logical interfaces **ge-2/2/9.0** and **ge-2/0/2.0**.
- Bridge domain **bd_port_mirror** uses the logical tunnel interface **lt-2/0/10.2**.
- Layer 2 VPN CCC **if_switch** connects interfaces **ge-2/0/1.2** and **lt-2/0/10.1**.

```

[edit]
bridge-domains {
  bd {
    interface ge-2/0/1.0;
    interface ge-2/0/1.1;
  }
  bd_next_hop_group {
    interface ge-2/2/9.0;
    interface ge-2/0/2.0;
  }
  bd_port_mirror {
    interface lt-2/0/10.2;
  }
}
protocols {
  mpls {
    interface all;
  }
  connections {
    interface-switch if_switch {
      interface ge-2/0/1.2;
      interface lt-2/0/10.1;
    }
  }
}

```

```
}
```

For detailed information about configuring the CCC connection for Layer 2 switching cross-connects, see the *MPLS Applications Feature Guide*.

4. Configure forwarding options:

- Configure global port-mirroring properties to mirror **family vpls** traffic to an interface on the bridge domain **bd_port_mirror**.
- Configure the next-hop group **nhg_mirror_to_bd** to forward Layer 2 traffic to the bridge domain **bd_next_hop_group**.

Both of these forwarding options will be referenced by the port-mirroring firewall filter:

```
[edit]
forwarding-options {
  port-mirroring { # Global port mirroring properties.
    input {
      rate 1;
    }
    family vpls {
      output {
        interface lt-2/0/10.2; # Interface on 'bd_port_mirror' bridge domain.
        no-filter-check;
      }
    }
  }
  next-hop-group nhg_mirror_to_bd { # Configure a next-hop group.
    group-type layer-2; # Specify 'layer-2' for Layer 2; default 'inet' is for Layer 3.
    interface ge-2/0/2.0; # Interface on 'bd_next_hop_group' bridge domain.
    interface ge-2/2/9.0; # Interface on 'bd_next_hop_group' bridge domain.
  }
}
```

5. Configure two Layer 2 port-mirroring firewall filters for **family bridge** traffic:

- **filter_pm_bridge**—Sends all **family bridge** traffic to the global port mirroring destination.
- **filter_redirect_to_nhg**—Sends all **family bridge** traffic to the final next-hop group **nhg_mirror_to_bd**.

Layer 2 port-mirroring firewall filters for **family bridge** traffic applies to traffic on a physical interface configured with encapsulation **ethernet-bridge**.

```
[edit]
firewall {
  family bridge {
    filter filter_pm_bridge {
      term term_port_mirror {
        then port-mirror;
      }
    }
  }
}
```

```
filter filter_redirect_to_nhg {  
  term term_nhg {  
    then next-hop-group nhg_mirror_to_bd;  
  }  
}  
}
```

- Related Documentation**
- [Understanding Layer 2 Port Mirroring on page 822](#)
 - [Understanding Layer 2 Port Mirroring to Multiple Destinations Using Next-Hop Groups on page 993](#)
 - [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)
 - [Defining a Next-Hop Group for Layer 2 Port Mirroring on page 994](#)
 - [Displaying Next-Hop Group Settings and Status on page 1037](#)

Configuring Port Mirroring for Remote Destinations

- [Layer 2 Port Mirroring to Remote Destination by Using Destination as VLAN on page 1007](#)
- [Configuration Layer 2 Port Mirroring to a Remote VLAN on page 1007](#)
- [Example: Configuring Layer 2 Port Mirroring to Remote VLAN on page 1010](#)

Layer 2 Port Mirroring to Remote Destination by Using Destination as VLAN

You configure port mirroring on an EX9200 switch to send copies of traffic to an output destination, such as an interface, a routing-instance, or a VLAN; and for the input traffic, you can configure a firewall filter term with various match conditions and actions.

When you configure VLAN as the output destination in a port-mirroring configuration, the traffic for each port-mirroring session is carried over a user-specified VLAN that is dedicated for that mirroring session in all participating switches. The mirrored traffic is copied onto that VLAN (also called as mirror VLAN) and forwarded to interfaces, which are members of the mirror VLAN. The destination interfaces, which are members of the mirror VLAN, can span across multiple switches in the network provided that the same remote mirroring VLAN is used for a mirroring session in all the switches.

You can use the **port-mirror** or **port-mirror-instance** action in the firewall filter configuration when you mirror traffic to remote destinations by configuring a VLAN as a port-mirroring output destination.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Configuration Layer 2 Port Mirroring to a Remote VLAN on page 1007](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)

Configuration Layer 2 Port Mirroring to a Remote VLAN

EX9200 switches enable you to configure mirroring to send copies of packets to either a local interface for local monitoring or to a VLAN for remote monitoring. You can use mirroring to copy the following packets:

- Packets entering or exiting a port

- Packets entering or exiting a VLAN



BEST PRACTICE: Mirror only necessary packets to reduce potential performance impact. We recommend that you:

- Disable port mirroring that you have configured when you are not using them.
- Specify individual interfaces as input rather than specifying all interfaces as input in a port mirroring configuration.
- Limit the amount of mirrored traffic by:
 - Using statistical sampling.
 - Setting ratios to select statistical samples.
 - Using firewall filters.

-
- [Configuring Port Mirroring to a Remote VLAN on page 1008](#)

Configuring Port Mirroring to a Remote VLAN

To filter packets to be mirrored to a port-mirroring instance, create the instance and then use it as the action in the firewall filter. You can use firewall filters in both local and remote mirroring configurations.

If the same port-mirroring instance is used in multiple filters or terms, the packets are copied to the port-mirroring output port or port-mirroring VLAN only once.

To filter mirrored traffic, create a port-mirroring instance under the **[edit forwarding-options]** hierarchy level, and then create a firewall filter. The filter can use any of the available match conditions and must have **port-mirror-instance *instance-name*** as an action. This action in the firewall filter configuration provides the input to the port-mirroring instance.

To configure a port-mirroring instance with firewall filters:

1. Configure the port-mirroring instance name and set the output destination to a VLAN:

```
[edit forwarding-options]
user@switch# set port-mirroring instance instance-name output vlan (vlan-ID | vlan-name)
```

For example, configure a port-mirroring instance **employee-monitor** and set the output destination to a VLAN ID **999**:

```
[edit forwarding-options]
user@switch# set port-mirroring instance employee-monitor output vlan 999
```

2. Create a firewall filter by using any of the available match conditions and assign the port-mirroring instance name as an action in the firewall filter configuration.

```
[edit firewall family ethernet-switching]
```

```

user@switch set filter filter-name term term-name from match-condition
user@switch set filter filter-name term term-name then match-condition
user@switch# set filter filter-name term term-name then port-mirror-instance instance-name

```

For example, create a firewall filter called **example-filter** with two terms **no-analyzer** and **to-analyzer**, and assign the **to-analyzer** term to the **employee-monitor** port-mirroring instance:

- a. Create the first term to define the traffic that should not pass through to the port-mirroring instance **employee-monitor**:

```

[edit firewall family ethernet-switching]
user@switch# set filter (Firewall Filters) example-filter term no-analyzer from
source-address 192.0.2.14
[edit firewall family ethernet-switching]
user@switch# set filter example-filter term no-analyzer from protocol tcp
[edit firewall family ethernet-switching]
user@switch# set filter example-filter term no-analyzer then accept

```

- b. Create the second term to define the traffic that should pass through to the port-mirroring instance **employee-monitor**:

```

[edit firewall family ethernet-switching]
user@switch# set filter example-filter term to-analyzer from destination-port 80
[edit firewall family ethernet-switching]
user@switch# set filter example-filter term to-analyzer then port-mirror-instance
employee-monitor
[edit firewall family ethernet-switching]
user@switch# set filter example-filter term to-analyzer then accept

```

3. Apply the firewall filter to an interface or VLAN that provides input to the port-mirroring instance.

To apply a firewall filter to an interface:

```

[edit]
user@switch# set interfaces interface-name unit 0 family ethernet-switching filter (input |
output) filter-name

```

To apply a firewall filter to a VLAN:

```

[edit]
user@switch# set vlan (vlan-ID or vlan-name) filter (input | output) filter-name

```

For example, to apply the **example-filter** firewall filter to the ge-0/0/1 interface:

```

[edit]
user@switch# set interfaces ge-0/0/1 unit 0 family ethernet-switching filter input
example-filter

```

For example, to apply the **example-filter** filter to the **source-vlan** VLAN:

```

[edit]
user@switch# set vlan source-vlan filter input example-filter

```

- Related Documentation**
- [Example: Configuring Layer 2 Port Mirroring to Remote VLAN on page 1010](#)
 - [Layer 2 Port Mirroring to Remote Destination by Using Destination as VLAN on page 1007](#)

Example: Configuring Layer 2 Port Mirroring to Remote VLAN

EX9200 switches enable you to configure mirroring to send copies of packets to either a local interface for local monitoring or to a VLAN for remote monitoring. You can use mirroring to copy these packets:

- Packets entering or exiting a port
- Packets entering or exiting a VLAN

You can analyze the mirrored traffic by using a protocol analyzer application running on a remote monitoring station if you are sending mirrored traffic to an analyzer VLAN.

This topic includes two related examples that describe how to mirror traffic entering ports on the switch to the **remote-analyzer** VLAN so that you can perform analysis from a remote monitoring station. The first example shows how to mirror all traffic entering the ports connected to employee computers. The second example shows the same scenario but includes a filter to mirror only the employee traffic going to the Web.



BEST PRACTICE: Mirror only necessary packets to reduce potential performance impact. We recommend that you:

- Disable your configured mirroring sessions when you are not using them.
- Specify individual interfaces as input to analyzers rather than specifying all interfaces as input.
- Limit the amount of mirrored traffic by using firewall filters.

This example describes how to configure remote mirroring:

- [Requirements on page 1010](#)
- [Overview and Topology on page 1011](#)
- [Mirroring Employee-to-Web Traffic for Remote Analysis on page 1011](#)
- [Verification on page 1015](#)

Requirements

This example uses the following hardware and software components:

- An EX9200 switch connected to another EX9200 switch
- Junos OS Release 13.2X50-D10 or later for EX Series switches

Before you configure remote mirroring, be sure that:

- You have an understanding of mirroring concepts.

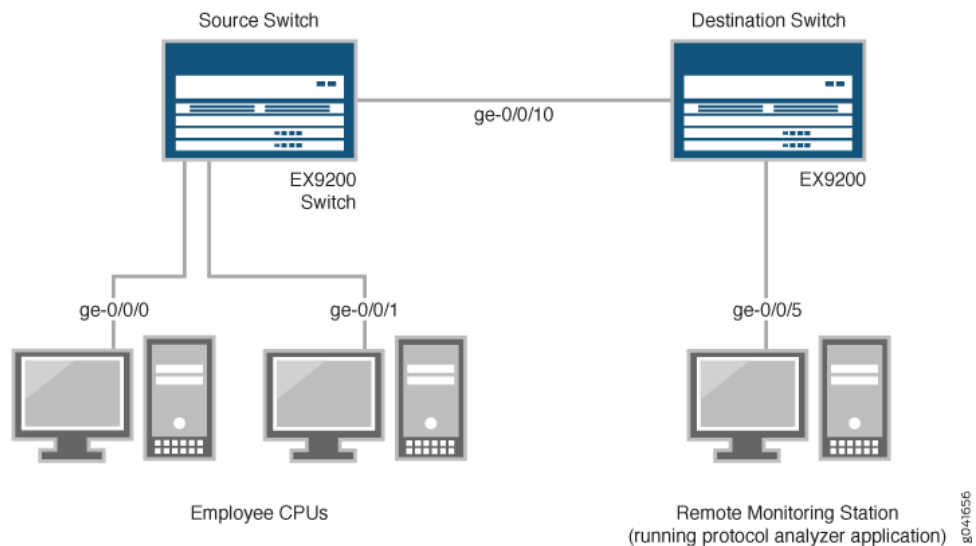
- The interfaces that port-mirroring will use as output interfaces have been configured on the switch.

Overview and Topology

This topic includes two related examples that describe how to configure mirroring to the **remote-analyzer** VLAN so that analysis can be performed from a remote monitoring station. The first example shows how to configure a switch to mirror all traffic from employee computers. The second example shows the same scenario, but the setup includes a filter to mirror only the employee traffic going to the Web.

Figure 22 on page 861 shows the network topology for both these example scenarios.

Figure 31: Remote Mirroring Network Topology Example



In this example:

- Interface ge-0/0/0 is a Layer 2 interface, and interface ge-0/0/1 is a Layer 2 interface (both interfaces on the source switch) that serve as connections for employee computers.
- Interface ge-0/0/10 is a Layer 2 interface that connects the source switch to the destination switch.
- Interface ge-0/0/5 is a Layer 2 interface that connects the destination switch to the remote monitoring station.
- VLAN **remote-analyzer** is configured on all switches in the topology to carry the mirrored traffic.

Mirroring Employee-to-Web Traffic for Remote Analysis

To configure port mirroring for remote traffic analysis of employee-to-Web traffic, perform these tasks:

CLI Quick Configuration To quickly configure port-mirroring to mirror employee traffic to the external Web, copy the following commands and paste them into the switch terminal window:

- Copy and paste the following commands in the source switch terminal window:

```
[edit]
set forwarding-options port-mirroring instance employee-web-monitor output vlan 999
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/10 unit 0 family ethernet-switching interface-mode access
set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan members 999
set firewall family ethernet-switching filter watch-employee term employee-to-corp from
destination-address 192.0.2.16/28
set firewall family ethernet-switching filter watch-employee term employee-to-corp from
source-address 192.0.2.16/28
set firewall family ethernet-switching filter watch-employee term employee-to-corp then
accept
set firewall family ethernet-switching filter watch-employee term employee-to-web from
destination-port 80
set firewall family ethernet-switching filter watch-employee term employee-to-web then
port-mirror-instance employee-web-monitor
set interfaces ge-0/0/0 unit 0 family ethernet-switching filter input watch-employee
set interfaces ge-0/0/1 unit 0 family ethernet-switching filter input watch-employee
```

- Copy and paste the following commands in the destination switch terminal window:

```
[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/10 unit 0 family ethernet-switching interface-mode access
set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan members 999
set interfaces ge-0/0/5 unit 0 family ethernet-switching interface-mode access
set interfaces ge-0/0/5 unit 0 family ethernet-switching vlan members 999
```

Step-by-Step Procedure To configure port mirroring of all traffic from the two ports connected to employee computers to the **remote-analyzer** VLAN for use from a remote monitoring station:

1. On the source switch:
 - a. Configure the **employee-web-monitor** port-mirroring instance:

```
[edit ]
user@switch# set interfaces ge-0/0/10 unit 0 family ethernet-switching port mode
access
user@switch# set forwarding-options port-mirroring instance employee-web-monitor
output vlan 999
```

- b. Configure the VLAN ID for the **remote-analyzer** VLAN:

```
[edit vlans]
user@switch# set remote-analyzer vlan-id 999
```

- c. Configure the interface to associate it with the **remote-analyzer** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/10 unit 0 family ethernet-switching vlan members 999
```

- d. Configure the firewall filter called **watch-employee**:

```
[edit firewall family ethernet-switching]
user@switch# set filter watch-employee term employee-to-corp from
destination-address 192.0.2.16/28
user@switch# set filter watch-employee term employee-to-corp from source-address
192.0.2.16/28
user@switch# set filter watch-employee term employee-to-corp then accept
user@switch# set filter watch-employee term employee-to-web from destination-port
80
user@switch# set filter watch-employee term employee-to-web then
port-mirror-instance employee-web-monitor
```

In this configuration, the **employee-to-corp** term defines that traffic from destination-address **192.0.2.16/28** and source address **192.0.2.16/28** can be accepted to pass through the switch, and the **employee-to-web** term defines that traffic from port **80** must be sent to the port-mirroring instance **employee-web-monitor**.

- e. Apply the firewall filter to the employee interfaces:

```
[edit interfaces]
user@switch# set ge-0/0/0 unit 0 family ethernet-switching filter input watch-employee
user@switch# set ge-0/0/1 unit 0 family ethernet-switching filter input watch-employee
```

2. On the destination switch:

- Configure the VLAN ID for the **remote-analyzer** VLAN:

```
[edit vlans]
user@switch# set remote-analyzer vlan-id 999
```

- Configure the interface on the destination switch for access mode and associate it with the **remote-analyzer** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/10 unit 0 family ethernet-switching interface-mode access
user@switch# set ge-0/0/10 unit 0 family ethernet-switching vlan members 999
```

- Configure the interface connected to the destination switch for access mode and associate it with the **remote-analyzer** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/5 unit 0 family ethernet-switching interface-mode access
user@switch# set ge-0/0/5 unit 0 family ethernet-switching vlan members 999
```

Results Check the results of the configuration on the source switch:

```
[edit]
user@switch> show
interfaces {
  ge-0/0/10 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
        vlan {
```

```
        members remote-analyzer;
    }
}
}
ge-0/0/0 {
    unit 0 {
        family ethernet-switching {
            filter {
                input watch-employee;
            }
        }
    }
}
ge-0/0/1 {
    unit 0 {
        family ethernet-switching {
            filter {
                input watch-employee;
            }
        }
    }
}
}
firewall {
    family ethernet-switching {
        filter watch-employee {
            term employee-to-corp {
                from {
                    source-address {
                        192.0.2.16/28;
                    }
                    destination-address {
                        192.0.2.16/28;
                    }
                }
                then accept;
            }
            term employee-to-web {
                from {
                    destination-port 80;
                }
                then port-mirror-instance employee-web-monitor;
            }
        }
    }
}
forwarding-options {
    analyzer employee-web-monitor {
        output {
            vlan {
                999;
            }
        }
    }
}
```

```
vlan {
  remote-analyzer {
    vlan-id 999;
  }
}
```

Check the results of the configuration on the destination switch:

```
[edit]
user@switch> show
vlan {
  remote-analyzer {
    vlan-id 999;
  }
}
interfaces {
  ge-0/0/10 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
        vlan {
          members remote-analyzer;
        }
      }
    }
  }
  ge-0/0/5 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
        vlan {
          members remote-analyzer;
        }
      }
    }
  }
}
```

Verification

To confirm that the configuration is working properly, perform these tasks:

- [Verifying That the Port-Mirroring Instance Has Been Correctly Created on page 1015](#)

Verifying That the Port-Mirroring Instance Has Been Correctly Created

Purpose Verify that the port-mirror instance **employee-web-monitor** has been created on the switch with the appropriate output VLAN.

Action You can verify that the port-mirror is configured as expected by using the **show forwarding-options port-mirror** command. To view previously created analyzers that are disabled, go to the J-Web interface.

To verify that the port-mirror is configured as expected while monitoring employee traffic on the source switch, run the **show forwarding-options port-mirror** command on the source switch. The following output is displayed for this configuration example:

```
user@switch> show forwarding-options port-mirror
```

```
Instance Name: employee-web-monitor
Instance Id: 3
Input parameters:
  Rate           : 1
  Run-length     : 0
  Maximum-packet-length : 0
Output parameters:
  Family      State      Destination      Next-hop
ethernet-switching  up      default-switch/remote-analyzer
```

Meaning This output shows that the **employee-web-monitor** instance has a ratio of 1 (mirroring every packet, which is the default), the maximum size of the original packet that was mirrored (0 indicates the entire packet), the state of the configuration is up (which indicates the proper state and that the analyzer is programmed, is mirroring the traffic entering ge-0/0/0 and ge-0/0/1, and is sending the mirrored traffic to the VLAN called **remote-analyzer**).

Related Documentation

- [Layer 2 Port Mirroring to Remote Destination by Using Destination as VLAN on page 1007](#)

Configuring Port Mirroring Local and Remote Analysis

- [Configuring Port Mirroring on page 1017](#)
- [Examples: Configuring Port Mirroring for Local Analysis on page 1020](#)
- [Example: Configuring Port Mirroring for Local Analysis on page 1026](#)
- [Example: Configuring Port Mirroring for Remote Analysis on page 1032](#)

Configuring Port Mirroring

You use port mirroring to copy packets and send the copies to a device running an application such as a network analyzer or intrusion detection application so that you can analyze traffic without delaying it. You can mirror traffic entering or exiting a port or entering a VLAN, and you can send the copies to a local access interface or to a VLAN through a trunk interface.

We recommend that you disable port mirroring when you are not using it. To avoid creating a performance issue. If you do enable port mirroring, we recommend that you select specific input interfaces instead of using the **all** keyword. You can also limit the amount of mirrored traffic by using a firewall filter.



NOTE: This task uses the Enhanced Layer 2 Software (ELS) configuration style. If your switch runs software that does not support ELS, see *Configuring Port Mirroring*. For ELS details, see *Using the Enhanced Layer 2 Software CLI*.



NOTE: If you want to create additional analyzers without deleting an existing analyzer, first disable the existing analyzer using the **disable analyzer analyzer-name** command.



NOTE: You must configure port mirroring output interfaces as family `ethernet-switching`.

- [Configuring Port Mirroring for Local Analysis on page 1018](#)
- [Configuring Port Mirroring for Remote Analysis on page 1019](#)
- [Filtering the Traffic Entering an Analyzer on page 1019](#)

Configuring Port Mirroring for Local Analysis

To mirror interface traffic to a local interface on the switch:

1. If you want to mirror traffic that is ingressing or egressing specific interfaces, choose a name for the port-mirroring configuration and configure what traffic should be mirrored by specifying the interfaces and direction of traffic:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name input (ingress | egress) interface interface-name
```



NOTE: If you configure Junos OS to mirror egress packets, do not configure more than 2000 VLANs. If you do so, some VLAN packets might contain incorrect VLAN IDs.



NOTE: If you configure mirroring for packets that egress an access interface, the original packets lose any VLAN tags when they exit the access interface, but the mirrored (copied) packets retain the VLAN tags when they are sent to the analyzer system.

2. If you want to specify that all traffic entering a VLAN should be mirrored, choose a name for the port-mirroring configuration and specify the VLAN:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name input ingress vlan vlan-name
```



NOTE: You cannot configure port mirroring to copy traffic that egresses a VLAN.

3. Configure the destination interface for the mirrored packets:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name output interface interface-name
```


Configuring Port Mirroring for Remote Analysis

To mirror traffic to a VLAN for analysis at a remote location:

1. Configure a VLAN to carry the mirrored traffic:

```
[edit]
user@switch# set vlans vlan-name vlan-id number
```

2. Configure the interface that connects to another switch (the uplink interface) to trunk mode and associate it with the appropriate VLAN:

```
[edit]
user@switch# set interfaces interface-name unit 0 family ethernet-switching port-mode
trunk vlan members (vlan-name | vlan-id)
```

3. Configure the analyzer:

- a. Choose a name for the analyzer:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name
```

- b. Specify the interface to be mirrored and whether the traffic should be mirrored on ingress or egress:

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name input (ingress | egress) interface interface-name
```

- c. Specify the appropriate IP address or VLAN as the output (a VLAN is specified in this example):

```
[edit forwarding-options]
user@switch# set analyzer analyzer-name output vlan (vlan-name | vlan-id)
```

If you specify an IP address as the output, note the following constraints:

- The address cannot be in the same subnet as any of the switch's management interfaces.
- If you create virtual routing instances and also create an analyzer configuration that includes an output IP address, the output address belongs to the default virtual routing instance (**inet.0** routing table).
- The analyzer device must be able to de-encapsulate GRE-encapsulated packets, or the GRE-encapsulated packets must be de-encapsulated before reaching the analyzer device. (You can use a network sniffer to de-encapsulate the packets.)

Filtering the Traffic Entering an Analyzer



NOTE: This functionality is not supported on NFX150 devices.

In addition to specifying which traffic to mirror by configuring an analyzer, you can also use a firewall filter to exercise more control over which packets are copied. For example, you might use a filter to specify that only traffic from certain applications be mirrored. The filter can use any of the available match conditions and must have an action of modifier of **port-mirror-instance** *instance-name*. If you use the same analyzer in multiple filters or terms, the output packets are copied only once.

When you use a firewall filter as the input to a port-mirroring instance, you send the copied traffic to a local interface or a VLAN just as you do when a firewall is not involved.

To configure port mirroring with filters:

1. Configure a port-mirroring instance for local or remote analysis. Configure only the output. For example, for local analysis enter:

```
[edit forwarding-options]
user@switch# set port-mirroring-instance instance-name output interface interface-name
```



NOTE: You cannot configure input to this instance.

2. Create a firewall filter using any of the available match conditions. In a **then** term, specify include the action modifier **port-mirror-instance** *instance-name*.
3. Apply the firewall filter to the interfaces or VLAN that should provide the input to the analyzer:

```
[edit]
user@switch# set interfaces interface-name unit 0 family ethernet-switching filter input
filter-name
[edit]
user@switch# set vlan (vlan-name | vlan-id) filter input filter-name
```

Related Documentation

- [Understanding Port Mirroring on page 814](#)
- [Examples: Configuring Port Mirroring for Local Analysis on page 1020](#)
- [Example: Configuring Port Mirroring for Remote Analysis on page 1032](#)
- [Overview of Firewall Filters](#)

Examples: Configuring Port Mirroring for Local Analysis

Use port mirroring to send traffic to applications that analyze traffic for purposes such as monitoring compliance, enforcing policies, detecting intrusions, monitoring and predicting traffic patterns, correlating events, and so on. Port mirroring copies packets entering or exiting an interface or entering a VLAN and sends the copies to a local interface for local monitoring.



NOTE: This example uses the Enhanced Layer 2 Software (ELS) configuration style. For ELS details, see *Using the Enhanced Layer 2 Software CLI*.

This example describes how to configure port mirroring to copy traffic sent by employee computers to a switch to an access interface on the same switch.

- [Requirements on page 1021](#)
- [Overview and Topology on page 1021](#)
- [Example: Mirroring All Employee Traffic for Local Analysis on page 1022](#)
- [Example: Mirroring Employee Web Traffic with a Firewall Filter on page 1023](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 13.2
- A switch

Overview and Topology

This topic includes two related examples that describe how to mirror traffic entering interfaces on the switch to an access interface on the same switch. The first example shows how to mirror all traffic sent by employee computers to the switch. The second example includes a filter to mirror only the employee traffic going to the Web.

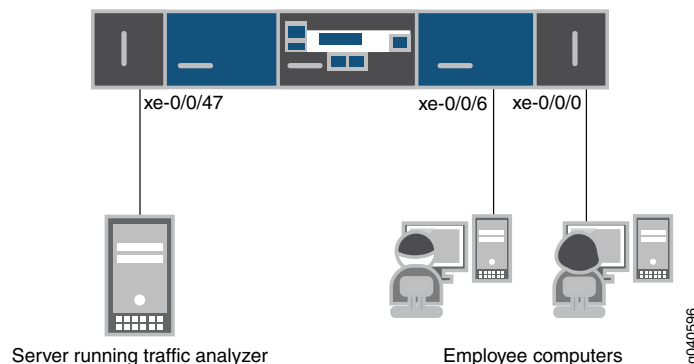
In this example, **xe-0/0/0** and **xe-0/0/6** serve as connections for employee computers. Interface **xe-0/0/47** is connected to a device running an analyzer application.



NOTE: Multiple ports mirrored to one interface can cause buffer overflow and dropped packets.

[Figure 29 on page 952](#) shows the network topology for this example.

Figure 32: Network Topology for Local Port Mirroring Example



Example: Mirroring All Employee Traffic for Local Analysis

To configure port mirroring for all traffic sent by employee computers for local analysis, perform the tasks explained in this section.

CLI Quick Configuration To quickly configure local port mirroring for ingress traffic to the two ports connected to employee computers, copy the following commands and paste them into a switch terminal window:

```
[edit]
set interfaces xe-0/0/0 unit 0 family ethernet-switching
set interfaces xe-0/0/6 unit 0 family ethernet-switching
set interfaces xe-0/0/47 unit 0 family ethernet-switching
set forwarding-options analyzer employee-monitor input ingress interface xe-0/0/0.0
set forwarding-options analyzer employee-monitor input ingress interface xe-0/0/6.0
set forwarding-options analyzer employee-monitor output interface xe-0/0/47.0
```

Step-by-Step Procedure To configure an analyzer called **employee-monitor** and specify the input (source) interfaces and the output interface:

1. Configure the interfaces connected to employee computers as input interfaces for the port-mirror analyzer **employee-monitor**:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor input ingress interface xe-0/0/0.0
user@switch# set analyzer employee-monitor input ingress interface xe-0/0/6.0
```

2. Configure the output analyzer interface for the **employee-monitor** analyzer. This will be the destination interface for the mirrored packets:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor output interface xe-0/0/47.0
```

Results Check the results of the configuration:

```
[edit]
user@switch# show forwarding-options analyzer
employee-monitor {
  input {
    ingress {
      interface xe-0/0/0.0;
      interface xe-0/0/6.0;
    }
  }
  output {
    interface {
      xe-0/0/47.0;
    }
  }
}
```

```
}
```

Example: Mirroring Employee Web Traffic with a Firewall Filter

- [Requirements on page 1023](#)
- [Overview on page 1023](#)
- [Configuring on page 1023](#)
- [Verification on page 1025](#)

Requirements

This example uses the following hardware and software components:

- One QFX5100 switch
- Junos OS Release 14.1X53-D30

Overview

Rather than mirror all traffic, it is usually desirable to mirror only certain traffic. This is a more efficient use of your bandwidth and hardware and might be necessary due to constraints on these assets. To select specific traffic for mirroring, you use a firewall filter to match the desired traffic and direct it to a port-mirroring instance. The port-mirroring instance then copies the packets and sends them to the output VLAN, interface, or IP address.

Configuring

To specify that the only traffic that will be mirrored is traffic sent by employees to the Web, perform the tasks explained in this section. To select this traffic for mirroring, you use a firewall filter to specify this traffic and direct it to a port-mirroring instance.

CLI Quick Configuration

To quickly configure local port mirroring of traffic from employee computers that is destined for the Web, copy the following commands and paste them into a switch terminal window:

```
[edit]
set interface xe-0/0/47 unit 0 family ethernet-switching
set forwarding-options port-mirroring instance employee-web-monitor family ethernet-switching
output interface xe-0/0/47.0
set firewall family ethernet-switching filter watch-employee term employee-to-corp from
ip-destination-address 192.0.2.16/28
set firewall family ethernet-switching filter watch-employee term employee-to-corp from
ip-source-address 192.0.2.16/28
set firewall family ethernet-switching filter watch-employee term employee-to-corp then accept
set firewall family ethernet-switching filter watch-employee term employee-to-web from
destination-port 80
set firewall family ethernet-switching filter watch-employee term employee-to-web then
port-mirror-instance employee-web-monitor
set interfaces xe-0/0/0 unit 0 family ethernet-switching filter input watch-employee
set interfaces xe-0/0/6 unit 0 family ethernet-switching filter input watch-employee
```

Step-by-Step Procedure To configure local port mirroring of employee-to-web traffic from the two ports connected to employee computers:

1. Configure the output interface:

```
[edit interfaces]
user@switch# set xe-0/0/47 unit 0 family ethernet-switching
```

2. Configure the **employee-web-monitor** output interface. (Configure only the output—the input comes from the filter.)

```
[edit forwarding-options]
user@switch# set port-mirroring instance employee-web-monitor family
ethernet-switching output interface xe-0/0/47.0
```

3. Configure a firewall filter called **watch-employee** that includes a term to match traffic sent to the Web and send it to the port-mirroring instance **employee-web-monitor**. Traffic to and from the corporate subnet (destination or source address of **192.0.2.16/28**) does not need to be copied, so create another term to accept that traffic before it reaches the term that sends Web traffic to the instance:

```
[edit firewall family ethernet-switching]
user@switch# set filter watch-employee term employee-to-corp from
ip-destination-address 192.0.2.16/28
user@switch# set filter watch-employee term employee-to-corp from ip-source-address
192.0.2.16/28
user@switch# set filter watch-employee term employee-to-corp then accept
user@switch# set filter watch-employee term employee-to-web from destination-port 80
user@switch# set filter watch-employee term employee-to-web then port-mirror-instance
employee-web-monitor
```

4. Apply the firewall filter to the appropriate interfaces as an ingress filter (egress filters do not allow analyzers):

```
[edit interfaces]
user@switch# set xe-0/0/0 unit 0 family ethernet-switching filter input watch-employee
user@switch# set xe-0/0/6 unit 0 family ethernet-switching filter input watch-employee
```

Results Check the results of the configuration:

```
[edit]
user@switch# show
forwarding-options {
  port-mirroring {
    instance {
      employee-web-monitor {
        family ethernet-switching {
          output {
            interface xe-0/0/47.0;
          }
        }
      }
    }
  }
}
```

```

    }
  }
}
...
firewall {
  family ethernet-switching {
    filter watch-employee {
      term employee-to-corp {
        from {
          ip-source-address 192.0.2.16/28;
          ip-destination-address 192.0.2.16/28;
        }
        then accept;
      }
      term employee-to-web {
        from {
          destination-port 80;
        }
        then port-mirror-instance employee-web-monitor;
      }
    }
  }
}
...
interfaces {
  xe-0/0/0 {
    unit 0 {
      family ethernet-switching {
        filter {
          input watch-employee;
        }
      }
    }
  }
  xe-0/0/6 {
    family ethernet-switching {
      filter {
        input watch-employee;
      }
    }
  }
  xe-0/0/47 {
    family ethernet-switching;
  }
}

```

Verification

Verifying That the Analyzer Has Been Correctly Created

Purpose Verify that the port-mirroring instance named **employee-web-monitor** has been created on the switch with the appropriate input interfaces and appropriate output interface.

Action You can verify that the port mirror port-mirroring instance has been configured as expected using the **show forwarding-options port-mirroring** command.

```
user@switch> show forwarding-options port-mirroring
```

```
Instance name           : employee-web-monitor
Instance Id: 2
Input parameters:
  Rate                  :1
  Run-length            :0
  Maximum packet length :0
Output parameters:
  Family                State      Destination  Next-hop
  ethernet-switching    up        xe-0/0/47.0
```

Meaning This output shows the following information about the port-mirroring instance **employee-web-monitor**:

- Has a rate of 1 (mirroring every packet, the default setting)
- The number of consecutive packets sampled (run-length) is 0
- The maximum size of the original packet that was mirrored is 0 (0 indicates the entire packet)
- The state of the output parameters: **up** indicates that the instance is mirroring the traffic entering the xe-0/0/0 and xe-0/0/6 interfaces, and is sending the mirrored traffic to the xe-0/0/47 interface

If the state of the output interface is **down** or if the output interface is not configured, the **state** value will be **down** and the instance will not be programmed for mirroring.

Related Documentation

- [Understanding Port Mirroring on page 814](#)

Related Documentation

- [Understanding Port Mirroring on page 814](#)
- [Configuring Port Mirroring on page 1017](#)
- [Example: Configuring Port Mirroring for Remote Analysis on page 1032](#)

Example: Configuring Port Mirroring for Local Analysis

Use port mirroring to send traffic to applications that analyze traffic for purposes such as monitoring compliance, enforcing policies, detecting intrusions, monitoring and predicting traffic patterns, correlating events, and so on. Port mirroring copies packets entering or exiting an interface or entering a VLAN and sends the copies to a local interface for local monitoring.



NOTE: This example uses a release of Junos OS that does not support the Enhanced Layer 2 Software (ELS) configuration style. If your switch runs software that supports ELS, see [“Examples: Configuring Port Mirroring for Local Analysis” on page 1020](#). For ELS details, see *Using the Enhanced Layer 2 Software CLI*.

This example describes how to configure port mirroring to copy traffic sent by employee computers to a switch to an access interface on the same switch.

- [Requirements on page 1027](#)
- [Overview and Topology on page 1027](#)
- [Mirroring All Employee Traffic for Local Analysis on page 1028](#)
- [Mirroring Employee-to-Web Traffic for Local Analysis on page 1029](#)
- [Verification on page 1031](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 11.1
- A switch

Overview and Topology

This topic includes two related examples that describe how to mirror traffic entering interfaces on the switch to an access interface on the same switch. The first example shows how to mirror all traffic sent by employee computers to the switch. The second example includes a filter to mirror only the employee traffic going to the Web.

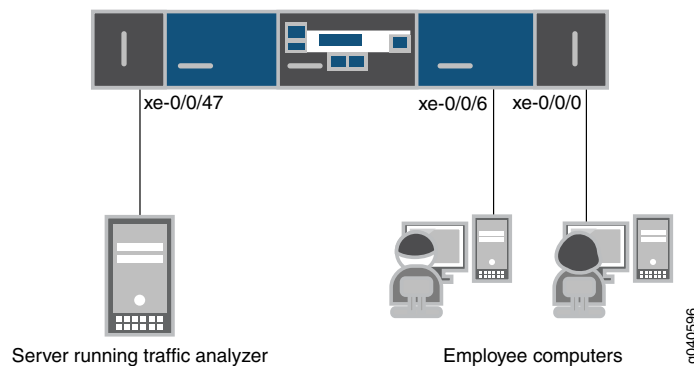
In this example, **xe-0/0/0** and **xe-0/0/6** serve as connections for employee computers. Interface **xe-0/0/47** is connected to a device running an analyzer application.



NOTE: Multiple ports mirrored to one interface can cause buffer overflow and dropped packets.

[Figure 29 on page 952](#) shows the network topology for this example.

Figure 33: Network Topology for Local Port Mirroring Example



Mirroring All Employee Traffic for Local Analysis

To configure port mirroring for all traffic sent by employee computers for local analysis, perform the tasks explained in this section.

CLI Quick Configuration

To quickly configure local port mirroring for ingress traffic to the two ports connected to employee computers, copy the following commands and paste them into a switch terminal window:

```
[edit]
set interfaces xe-0/0/0 unit 0 family ethernet-switching
set interfaces xe-0/0/6 unit 0 family ethernet-switching
set interfaces xe-0/0/47 unit 0 family ethernet-switching
set ethernet-switching-options analyzer employee-monitor input ingress interface xe-0/0/0.0
set ethernet-switching-options analyzer employee-monitor input ingress interface xe-0/0/6.0
set ethernet-switching-options analyzer employee-monitor output interface xe-0/0/47.0
```

Step-by-Step Procedure

To configure an analyzer called **employee-monitor** and specify the input (source) interfaces and the output interface:

1. Configure the interfaces connected to employee computers as input interfaces for the port-mirror analyzer **employee-monitor**:

```
[edit ethernet-switching-options]
user@switch# set analyzer employee-monitor input ingress interface xe-0/0/0.0
user@switch# set analyzer employee-monitor input ingress interface xe-0/0/6.0
```

2. Configure the output analyzer interface for the **employee-monitor** analyzer. This will be the destination interface for the mirrored packets:

```
[edit ethernet-switching-options]
user@switch# set analyzer employee-monitor output interface xe-0/0/47.0
```

Results Check the results of the configuration:

```
[edit]
```

```

user@switch# show ethernet-switching-options
analyzer employee-monitor {
  input {
    ingress {
      interface xe-0/0/0.0;
      interface xe-0/0/6.0;
    }
  }
  output {
    interface {
      xe-0/0/47.0;
    }
  }
}

```

Mirroring Employee-to-Web Traffic for Local Analysis

To mirror only traffic sent by employees to the Web for local analysis, perform the tasks explained in this section.

CLI Quick Configuration

To quickly configure local port mirroring of traffic from employee computers that is destined for the Web, copy the following commands and paste them into a switch terminal window:

```

[edit]
set ethernet-switching-options analyzer employee-web-monitor output interface xe-0/0/47.0
set firewall family ethernet-switching filter watch-employee term employee-to-corp from
destination-address 192.0.2.16/28
set firewall family ethernet-switching filter watch-employee term employee-to-corp from
source-address 192.0.2.16/28
set firewall family ethernet-switching filter watch-employee term employee-to-corp then accept
set firewall family ethernet-switching filter watch-employee term employee-to-web from
destination-port 80
set firewall family ethernet-switching filter watch-employee term employee-to-web then analyzer
employee-web-monitor
set interfaces xe-0/0/0 unit 0 family ethernet-switching filter input watch-employee
set interfaces xe-0/0/6 unit 0 family ethernet-switching filter input watch-employee

```

Step-by-Step Procedure

To configure local port mirroring of employee-to-web traffic from the two ports connected to employee computers:

1. Configure the output interface:

```

[edit interfaces]
user@switch# set xe-0/0/47 unit 0 family ethernet-switching

```

2. Configure the **employee-web-monitor** analyzer output. (Configure only the output—the input comes from the filter.)

```

[edit ethernet-switching-options]
user@switch# set analyzer employee-web-monitor output interface xe-0/0/47.0

```

3. Configure a firewall filter called **watch-employee** that includes a term to match traffic sent to the Web and send it to the analyzer **employee-web-monitor**. Traffic to and from the corporate subnet (destination or source address of **192.0.2.16/28**) does not need to be copied, so create another term to accept that traffic before it reaches the term that sends Web traffic to the analyzer:

```
[edit firewall family ethernet-switching]
user@switch# set filter watch-employee term employee-to-corp from destination-address 192.0.2.16/28
user@switch# set filter watch-employee term employee-to-corp from source-address 192.0.2.16/28
user@switch# set filter watch-employee term employee-to-corp then accept
user@switch# set filter watch-employee term employee-to-web from destination-port 80
user@switch# set filter watch-employee term employee-to-web then analyzer employee-web-monitor
```

4. Apply the firewall filter to the appropriate interfaces as an ingress filter (egress filters do not allow analyzers):

```
[edit interfaces]
user@switch# set xe-0/0/0 unit 0 family ethernet-switching filter input watch-employee
user@switch# set xe-0/0/6 unit 0 family ethernet-switching filter input watch-employee
```

Results Check the results of the configuration:

```
[edit]
user@switch# show ethernet-switching-options
  analyzer employee-web-monitor {
    output {
      interface xe-0/0/47.0;
    }
  }
...
firewall family ethernet-switching {
  filter watch-employee {
    term employee-to-web {
      from {
        destination-port 80;
      }
      then analyzer employee-web-monitor;
    }
  }
}
...
interfaces {
  xe-0/0/0 {
    unit 0 {
      family ethernet-switching {
        filter {
          input watch-employee;
        }
      }
    }
  }
}
```

```

    }
  }
  xe-0/0/6 {
    family ethernet-switching {
      filter {
        input watch-employee;
      }
    }
  }
}

```

Verification

Verifying That the Analyzer Has Been Correctly Created

Purpose Verify that the analyzer named **employee-monitor** or **employee-web-monitor** has been created on the switch with the appropriate input interfaces and appropriate output interface.

Action You can verify that the port mirror analyzer has been configured as expected using the **show analyzer** command.

```
user@switch> show analyzer
```

```

Analyzer name           : employee-monitor
Output interface        : xe-0/0/47.0
Mirror ratio            : 1
Loss priority           : Low
Ingress monitored interfaces : xe-0/0/0.0
Ingress monitored interfaces : xe-0/0/6.0
Egress monitored interfaces  : None

```

Meaning This output shows that the **employee-monitor** analyzer:

- Has a ratio of 1 (mirroring every packet, the default setting)
- Has a loss priority of low (set this option to high only when the analyzer output is to a VLAN)
- Is mirroring the traffic entering the **xe-0/0/0** and **xe-0/0/6** interfaces
- Is sending the mirrored traffic to the **xe-0/0/47** interface

Related Documentation

- [Understanding Port Mirroring on page 814](#)
- [Configuring Port Mirroring](#)

Example: Configuring Port Mirroring for Remote Analysis

Use port mirroring to send traffic to applications that analyze traffic for purposes such as monitoring compliance, enforcing policies, detecting intrusions, monitoring and predicting traffic patterns, correlating events, and so on. Port mirroring copies packets entering or exiting an interface or entering a VLAN and sends the copies either to a local interface for local monitoring or to a VLAN for remote monitoring. This example describes how to configure port mirroring for remote analysis.

- [Requirements on page 1032](#)
- [Overview and Topology on page 1032](#)
- [Mirroring All Employee Traffic for Remote Analysis on page 1033](#)
- [Mirroring Employee-to-Web Traffic for Remote Analysis on page 1034](#)
- [Verification on page 1036](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 13.2 for the QFX Series
- A switch

Overview and Topology

This topic includes two related examples that describe how to mirror traffic entering ports on the switch to an analyzer VLAN so that you can perform analysis using a remote device. The first example shows how to mirror all traffic sent by employee computers to the switch. The second example includes a filter to mirror only the employee traffic going to the Web.

In this example:

- Interfaces **ge-0/0/0** and **ge-0/0/1** are Layer 2 interfaces that connect to employee computers.
- Interface **ge-0/0/2** is a Layer 2 interface that connects to another switch.
- VLAN **remote-analyzer** is configured on all switches in the topology to carry the mirrored traffic.



NOTE: In addition to performing the configuration steps described here, you must also configure the analyzer VLAN (**remote-analyzer** in this example) on the other switches that are used to connect the source switch (the one in this configuration) to the one that the monitoring station is connected to.

Mirroring All Employee Traffic for Remote Analysis

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

```
[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/10 unit 0 family ethernet-switching port-mode trunk
set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan members 999
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/0.0
set forwarding-options analyzer employee-monitor input ingress interface ge-0/0/1.0
set forwarding-options analyzer employee-monitor output vlan remote-analyzer
```

Step-by-Step Procedure To configure basic remote port mirroring:

1. Configure the analyzer VLAN (called **remote-analyzer** in this example):

```
[edit vlans]
user@switch# set vlans remote-analyzer vlan-id 999
```

2. Configure the interface connected to another switch for trunk mode and associate it with the **remote-analyzer** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/10 unit 0 family ethernet-switching port-mode trunk
user@switch# set ge-0/0/10 unit 0 family ethernet-switching vlan members 999
```

3. Configure the **employee-monitor** analyzer:

```
[edit forwarding-options]
user@switch# set analyzer employee-monitor
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/0.0
user@switch# set analyzer employee-monitor input ingress interface ge-0/0/1.0
user@switch# set analyzer employee-monitor output vlan remote-analyzer
```

4. Configure the **remote-analyzer** VLAN on the switches that connect this switch to the monitoring workstation.

Results Check the results of the configuration:

```
[edit]
user@switch# show
forwarding-options {
  analyzer employee-monitor {
    input {
      ingress {
        interface ge-0/0/0.0;
        interface ge-0/0/1.0;
      }
    }
  }
}
```

```

    }
    output {
      vlan {
        remote-analyzer;
      }
    }
  }
}

```

Mirroring Employee-to-Web Traffic for Remote Analysis

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

```

[edit]
set vlans remote-analyzer vlan-id 999
set interfaces ge-0/0/10 unit 0 family ethernet-switching interface-mode trunk
set interfaces ge-0/0/10 unit 0 family ethernet-switching vlan members 999
set forwarding-options port-mirroring instance employee-web-monitor loss-priority high output vlan 999
set firewall family ethernet-switching filter watch-employee term employee-to-web from destination-port 80
set firewall family ethernet-switching filter watch-employee term employee-to-web then port-mirror-instance employee-web-monitor employee-web-monitor
set ge-0/0/0 unit 0 family ethernet-switching filter input watch-employee
set interfaces ge-0/0/1 unit 0 family ethernet-switching filter input watch-employee

```

Step-by-Step Procedure

1. Configure the analyzer VLAN (called **remote-analyzer** in this example):

```

[edit vlans]
user@switch# set remote-analyzer vlan-id 999

```

2. Configure an interface to associate it with the **remote-analyzer** VLAN:

```

[edit interfaces]
user@switch# set interfaces ge-0/0/10 unit 0 family ethernet-switching interface-mode trunk
user@switch# set ge-0/0/10 unit 0 family ethernet-switching vlan members 999

```

3. Configure the **employee-web-monitor** analyzer. (Configure only the output—the input comes from the filter.)

```

[edit forwarding-options]
user@switch# set forwarding-options port-mirroring instance employee-web-monitor output vlan 999

```

4. Configure a firewall filter called **watch-employee** to match traffic sent to the Web and send it to the analyzer **employee-web-monitor**:

```

[edit firewall family ethernet-switching]
user@switch# set filter watch-employee term employee-to-web from destination-port 80

```



```
user@switch# set filter watch-employee term employee-to-web then port-mirror-instance
employee-web-monitor
```

5. Apply the firewall filter to the appropriate interfaces as an ingress filter:

```
[edit interfaces]
user@switch# set ge-0/0/0 unit 0 family ethernet-switching filter input watch-employee
user@switch# set ge-0/0/1 unit 0 family ethernet-switching filter input watch-employee
```

6. Configure the **remote-analyzer** VLAN on the switches that connect this switch to the monitoring workstation.

Results Check the results of the configuration:

```
[edit]
user@switch# show
interfaces {
  ...
  ge-0/0/10 {
    unit 0 {
      family ethernet-switching {
        interface-mode trunk;
        vlan {
          members remote-analyzer;
        }
      }
    }
  }
  ge-0/0/0 {
    unit 0 {
      family ethernet-switching {
        filter {
          input watch-employee;
        }
      }
    }
  }
  ge-0/0/1 {
    unit 0 {
      family ethernet-switching {
        filter {
          input watch-employee;
        }
      }
    }
  }
}
...
firewall {
  family ethernet-switching {
    ...
    filter watch-employee {
      term employee-to-web {
```

```

        from {
            destination-port 80;
        }
        then port-mirror-instance employee-web-monitor;
    }
}
}
forwarding-options analyzer {
    employee-web-monitor {
        output {
            vlan {
                999;
            }
        }
    }
}
vlands {
    remote-analyzer {
        vlan-id 999;
    }
}
}

```

Verification

Verifying That the Analyzer Has Been Correctly Created

Purpose Verify that the analyzer named **employee-monitor** or **employee-web-monitor** has been created on the switch with the appropriate input interfaces and appropriate output interface.

Action You can verify the port mirror analyzer is configured as expected using the **show analyzer** command.

```
user@switch> show analyzer
```

```

Analyzer name           : employee-monitor
Output VLAN             : remote-analyzer
Ingress monitored interfaces : ge-0/0/0.0
Ingress monitored interfaces : ge-0/0/1.0

```

Meaning This output shows that the **employee-monitor** analyzer is mirroring the traffic entering **ge-0/0/0** and **ge-0/0/1** and is sending the mirror traffic to the analyzer **remote-analyzer**.

Related Documentation

- [Understanding Port Mirroring on page 814](#)
- [Configuring Port Mirroring on page 1017](#)
- [Examples: Configuring Port Mirroring for Local Analysis on page 1020](#)
- [Overview of Firewall Filters](#)

CHAPTER 42

Monitoring Port Mirroring

- [Displaying Layer 2 Port-Mirroring Instance Settings and Status on page 1037](#)
- [Displaying Next-Hop Group Settings and Status on page 1037](#)

Displaying Layer 2 Port-Mirroring Instance Settings and Status

To display the current state of port-mirroring instances, use the ***show forwarding-options port-mirroring*** *<terse | detail> <instance-name>* operational command.

For more information about displaying port mirroring instance settings and status, see the *Junos OS Administration Library*.

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Layer 2 Port Mirroring Global Instance on page 913](#)
- [Layer 2 Port Mirroring Named Instances](#)
- [Configuring the Global Instance of Layer 2 Port Mirroring](#)
- [Defining a Named Instance of Layer 2 Port Mirroring](#)
- [Disabling Layer 2 Port Mirroring Instances on page 923](#)
- [Examples: Layer 2 Port Mirroring at Multiple Levels of the Chassis on page 932](#)
- [Example: Layer 2 Port Mirroring with Multiple Instances](#)

Displaying Next-Hop Group Settings and Status

To display the current state of next-hop groups, use the ***show forwarding-options next-hop-group*** *<terse | brief | detail> <group-name>* operational command.

For more information, see the [CLI Explorer](#).

Related Documentation

- [Understanding Layer 2 Port Mirroring on page 822](#)
- [Understanding Layer 2 Port Mirroring to Multiple Destinations Using Next-Hop Groups on page 993](#)
- [Defining a Layer 2 Port-Mirroring Firewall Filter on page 944](#)

- [Defining a Next-Hop Group for Layer 2 Port Mirroring on page 994](#)
- [Example: Layer 2 Port Mirroring to Multiple Destinations on page 1001](#)

Troubleshooting Port Mirroring

- [Troubleshooting Port Mirroring on page 1039](#)
- [Troubleshooting Port Mirroring Configuration Error Messages on page 1043](#)

Troubleshooting Port Mirroring

- [Port Mirroring Constraints and Limitations on page 1039](#)
- [Egress Port Mirroring with VLAN Translation on page 1042](#)
- [Egress Port Mirroring with Private VLANs on page 1043](#)

Port Mirroring Constraints and Limitations

- [Local and Remote Port Mirroring on page 1039](#)
- [Remote Port Mirroring Only on page 1041](#)
- [Port Mirroring Constraints on OCX Series Switches on page 1041](#)

Local and Remote Port Mirroring

The following constraints and limitations apply to local and remote port mirroring:

- You can create a total of four port-mirroring configurations.
- You can create a total of four port-mirroring configurations on each Node group in a QFabric system, subject to the following constraints:
 - As many as four of the configurations can be for local port mirroring.
 - As many as three of the configurations can be for remote port mirroring.
- Regardless of whether you are configuring a standalone switch or a Node group, the following limits apply:
 - There can be no more than two configurations that mirror ingress traffic. (If you configure a firewall filter to send traffic to a port mirror—that is, you use the **analyzer** action modifier in a filter term—this counts as an ingress mirroring configuration for switch or Node group on which the filter is applied.)
 - There can be no more than two configurations that mirror egress traffic.



NOTE: On QFabric systems, there is no system-wide limit on the total number of mirror sessions.

- You can configure no more than one type of output in one port-mirroring configuration. That is, you can use no more than one of the following to complete a **set analyzer name output** statement:
 - **interface**
 - **ip-address**
 - **vlan**
- If you configure Junos OS to mirror egress packets, do not configure more than 2000 VLANs on a standalone switch or QFabric system. If you do so, some VLAN packets might contain incorrect VLAN IDs. This applies to any VLAN packets—not only the mirrored copies.
- The **ratio** and **loss-priority** options are not supported.
- Packets with physical layer errors are filtered out and are not sent to the output port or VLAN.
- If you use sFlow monitoring to sample traffic, it does not sample the mirror copies when they exit from the output interface.
- You cannot mirror packets exiting or entering the following ports:
 - Dedicated Virtual Chassis interfaces
 - Management interfaces (me0 or vme0)
 - Fibre Channel interfaces
 - Integrated routing and bridging (IRB) interfaces (also known as routed VLAN interfaces, or RVIs)
- An aggregated Ethernet interface cannot be an output interface if the input is a VLAN or if traffic is sent to the analyzer by a firewall filter.
- When packet copies are sent out the output interface, they are not modified for any changes that are normally applied on egress, such as CoS rewriting.
- An interface can be the input interface for only one mirroring configuration. Do not use the same interface as the input interface for multiple mirroring configurations.
- CPU-generated packets (such as ARP, ICMP, BPDU, and LACP packets) cannot be mirrored on egress.
- VLAN-based mirroring is not supported for STP traffic.
- (QFabric systems only) If you configure a QFabric analyzer to mirror egress traffic and the input and output interfaces are on different Node devices, the mirrored copies have incorrect VLAN IDs. This limitation does not apply if you configure a QFabric analyzer to mirror egress traffic and the input and output interfaces are on the *same* Node device.

In this case the mirrored copies have the correct VLAN IDs (as long as you do not configure more than 2000 VLANs on the QFabric system).

- True egress mirroring is defined as mirroring the exact number of copies and the exact packet modifications that went out the egress switched port. Because the processor on QFX5xxx (including QFX5100, QFX5110, QFX5120, QFX5200, and QFX5210) and EX4600 (including EX4600 and EX4650) switches implements egress mirroring in the ingress pipeline, those switches do not provide accurate egress packet modifications, so egress mirrored traffic can carry incorrect VLAN tags that differ from the tags in the original traffic.
- If you configure a port-mirroring instance to mirror traffic exiting from an interface that performs VXLAN encapsulation, the source and destination MAC addresses of the mirrored packets will not be the same as those of the original traffic.
- Mirroring on member interfaces of a LAG is not supported.
- Egress VLAN mirroring is not supported.

Remote Port Mirroring Only

The following constraints and limitations apply to remote port mirroring:

- If you configure an output IP address, the address cannot be in the same subnetwork as any of the switch's management interfaces.
- If you create virtual routing instances and also create an analyzer configuration that includes an output IP address, the output address belongs to the default virtual routing instance (inet.0 routing table).
- An output VLAN cannot be a private VLAN or VLAN range.
- An output VLAN cannot be shared by multiple **analyzer** statements.
- An output VLAN interface cannot be a member of any other VLAN.
- An output VLAN interface cannot be an aggregated Ethernet interface.
- If the output VLAN has more than one member interface, then traffic is mirrored only to the first member of the VLAN, and other members of the same VLAN do not carry any mirrored traffic.
- If you attempt to configure more than one analyzer session for remote port mirroring to an IP address (GRE encapsulation) and the IP addresses of the analyzers are reachable through the same interface, then only one analyzer session is configured.

Port Mirroring Constraints on OCX Series Switches

The following constraints and limitations apply to port mirroring on OCX Series switches:

- You can create a total of four port-mirroring configurations. The following constraints also apply:
 - There can be no more than two configurations that mirror ingress traffic.

- There can be no more than two configurations that mirror egress traffic.
- If you use sFlow monitoring to sample traffic, it does not sample the mirror copies when they exit from the output interface.
- You can create only one port-mirroring session.
- You cannot mirror packets exiting or entering the following ports:
 - Dedicated Virtual Chassis interfaces
 - Management interfaces (me0 or vme0)
 - Fibre Channel interfaces
 - Routed VLAN interfaces or IRB interfaces
- An aggregated Ethernet interface cannot be an output interface.
- Do not include an 802.1Q subinterface that has a unit number other than 0 in a port mirroring configuration. Port mirroring does not work with subinterfaces if their unit number is not 0. (You configure 802.1Q subinterfaces using the **vlan-tagging** statement.)
- When packet copies are sent out the output interface, they are not modified for any changes that are normally applied on egress, such as CoS rewriting.
- An interface can be the input interface for only one mirroring configuration. Do not use the same interface as the input interface for multiple mirroring configurations.
- CPU-generated packets (such as ARP, ICMP, BPDU, and LACP packets) cannot be mirrored on egress.
- VLAN-based mirroring is not supported for STP traffic.

Related Documentation

- [Understanding Port Mirroring on page 821](#)
- [Example: Mirroring Employee Web Traffic with a Firewall Filter on page 952](#)
- [Configuring Port Mirroring](#)

Egress Port Mirroring with VLAN Translation

Problem Description: If you create a port-mirroring configuration that mirrors customer VLAN (CVLAN) traffic on egress and the traffic undergoes VLAN translation before being mirrored, the VLAN translation does not apply to the mirrored packets. That is, the mirrored packets retain the service VLAN (SVLAN) tag that should be replaced by the CVLAN tag on egress. The original packets are unaffected—on these packets VLAN translation works properly, and the SVLAN tag is replaced with the CVLAN tag on egress.

Solution This is expected behavior.

See Also • [Understanding Q-in-Q Tunneling and VLAN Translation](#)

Egress Port Mirroring with Private VLANs

Problem Description: If you create a port-mirroring configuration that mirrors private VLAN (PVLAN) traffic on egress, the mirrored traffic (the traffic that is sent to the analyzer system) has the VLAN tag of the ingress VLAN instead of the egress VLAN. For example, assume the following PVLAN configuration:

- Promiscuous trunk port that carries primary VLANs pvlan100 and pvlan400.
- Isolated access port that carries secondary VLAN isolated200. This VLAN is a member of primary VLAN pvlan100.
- Community port that carries secondary VLAN comm300. This VLAN is also a member of primary VLAN pvlan100.
- Output interface (monitor interface) that connects to the analyzer system. This interface forwards the mirrored traffic to the analyzer.

If a packet for pvlan100 enters on the promiscuous trunk port and exits on the isolated access port, the original packet is untagged on egress because it is exiting on an access port. However, the mirror copy retains the tag for pvlan100 when it is sent to the analyzer.

Here is another example: If a packet for comm300 ingresses on the community port and egresses on the promiscuous trunk port, the original packet carries the tag for pvlan100 on egress, as expected. However, the mirrored copy retains the tag for comm300 when it is sent to the analyzer.

Solution This is expected behavior.

- Related Documentation**
- [Understanding Port Mirroring on page 814](#)
 - [Examples: Configuring Port Mirroring for Local Analysis on page 1020](#)
 - [Example: Configuring Port Mirroring for Remote Analysis on page 1032](#)
 - [Example: Mirroring Employee Web Traffic with a Firewall Filter on page 1023](#)

Troubleshooting Port Mirroring Configuration Error Messages

Troubleshooting issues with port mirroring on EX Series switches:

1. [An Analyzer Configuration Returns a “Multiple interfaces cannot be configured as a member of Analyzer output VLAN” Error Message on page 1044](#)

An Analyzer Configuration Returns a “Multiple interfaces cannot be configured as a member of Analyzer output VLAN” Error Message

Problem **Description:** In an analyzer configuration, if the VLAN to which mirrored traffic is sent contains more than one member interface, the following error message is displayed in the CLI when you commit the analyzer configuration and the commit fails:

```
Multiple interfaces cannot be configured as a member of Analyzer output VLAN <vlan
name>
```

Solution You must direct the mirrored traffic to a VLAN that has a single member interface. You can do this by completing either of these tasks:

- Reconfigure the existing VLAN to contain a single member interface. You can choose this method if you want to use the existing VLAN.
- Create a new VLAN with a single member interface and associate the VLAN with the analyzer.

To reconfigure the existing VLAN to contain only one member interface:

1. Remove member interfaces from the VLAN repeatedly by using either the **delete vlan** command or the **delete interface** command until the VLAN contains a single member interface:

- [edit]
user@switch# **delete vlan *vlan-id* interface *interface-name***
- [edit]
user@switch# **delete interface *interface-name* unit 0 family *family-name* vlan member *vlan-id***

2. (Optional) Confirm that the VLAN contains only one interface:

```
[edit]  
user@switch# show vlans vlan-name
```

The output for this command must display only one interface.

To create a new VLAN with a single member interface:

1. Configure a VLAN to carry the mirrored traffic:

```
[edit]  
user@switch# set vlans vlan-name
```

2. Associate an interface with the VLAN:

```
[edit]  
user@switch# set interfaces interface-name unit logical-unit-number family family-name vlan  
members vlan-name
```

3. Associate the VLAN with the analyzer:

```
[edit ethernet-switching-options]  
user@switch# set analyzer analyzer-name output vlan vlan-name
```


PART 11

System Log Messages

- [Overview to System Logging on page 1049](#)
- [Configuring System Logging for a Single-Chassis System on page 1061](#)
- [Configuring System Logging for a TX Matrix or TX Matrix Plus Router on page 1083](#)
- [Directing System Log Messages to a Remote Destination on page 1101](#)
- [Displaying System Log Files on page 1115](#)
- [Displaying and Interpreting System Log Message Descriptions on page 1119](#)
- [Configuring System Logging for a Security Device on page 1133](#)
- [Monitoring Log Messages on page 1157](#)

Overview to System Logging

- [Junos OS System Log Overview on page 1049](#)
- [Overview of Junos OS System Log Messages on page 1050](#)
- [Junos OS System Log Configuration Hierarchy on page 1050](#)
- [Junos OS System Logging Facilities and Message Severity Levels on page 1051](#)
- [Junos OS Default System Log Settings on page 1053](#)
- [Junos OS Platform-Specific Default System Log Messages on page 1054](#)
- [Interpreting Messages Generated in Standard Format on page 1055](#)
- [Managing Host OS System Log and Core Files on page 1056](#)

Junos OS System Log Overview

Junos OS generates system log messages (also called *syslog messages*) to record events that occur on the device, including the following:

- Routine operations, such as creation of an Open Shortest Path First (OSPF) protocol adjacency or a user login to the configuration database
- Failure and error conditions, such as failure to access a configuration file or unexpected closure of a connection to a peer process
- Emergency or critical conditions, such as router power-down due to excessive temperature

Each system log message identifies the Junos OS process that generated the message and briefly describes the operation or error that occurred.

In Junos OS Release 17.3R1, the syslog-event daemon is able to handle the fxp0 in dedicated management routing instance for IPv4 addressed remote host. As of Junos OS Release 18.1R1, the syslog-event daemon supports IPv6-based configuration when connecting to a remote host or an archival site and fxp0 is moved to dedicated management instance. In Junos OS Release 18.4R1, the syslog client can send messages through any routing instance you define at appropriate hierarchies. See [routing-instance \(Syslog\)](#).



NOTE: This topic describes system log messages for Junos OS processes and libraries and not the system logging services on a Physical Interface Card (PIC) such as the Adaptive Services PIC.

**Related
Documentation**

- [Junos OS System Log Configuration Hierarchy on page 1050](#)
- [Junos OS Minimum System Logging Configuration on page 1066](#)

Overview of Junos OS System Log Messages

The Junos OS generates system log messages (also called *syslog messages*) to record events that occur on the switch, including the following:

- Routine operations, such as a user login into the configuration database.
- Failure and error conditions, such as failure to access a configuration file.
- Emergency or critical conditions, such as power-down of the switch due to excessive temperature.

Each system log message identifies the Junos OS process that generated the message and briefly describes the operation or error that occurred. For detailed information about specific system log messages, see the [System Log Explorer](#).



NOTE: OCX Series switches comprise both the Junos OS and the host operating system (OS). For information about system logging on the host OS, see “[Managing Host OS System Log and Core Files](#)” on page 1056.

**Related
Documentation**

- [Junos OS System Log Configuration Statements on page 1065](#)
- [Junos OS Minimum System Logging Configuration on page 1066](#)

Junos OS System Log Configuration Hierarchy

To configure the router to log system messages, include the **syslog** statement at the **[edit system]** hierarchy level:

```
[edit system]
syslog {
  archive <files number> <size size <world-readable | no-world-readable>;
  console {
    facility severity;
  }
  file filename {
    facility severity;
```



```
archive <archive-sites {ftp-url <password password>}> <files number> <size size>
  <start-time "YYYY-MM-DD.hh:mm"> <transfer-interval minutes> <world-readable |
  no-world-readable>;
explicit-priority;
match "regular-expression";
structured-data {
  brief;
}
}
host (hostname | other-routing-engine | scc-master) {
  facility severity;
explicit-priority;
facility-override facility;
log-prefix string
match "regular-expression";
source-address source-address;
structured-data {
  brief;
}
}
source-address source-address;
time-format (year | millisecond | year millisecond);
user (username | *) {
  facility severity;
match "regular-expression";
}
}
```

Related Documentation

- [Junos OS System Log Overview on page 1049](#)

Junos OS System Logging Facilities and Message Severity Levels

Table 160 on page 1051 lists the Junos OS system logging facilities that you can specify in configuration statements at the `[edit system syslog]` hierarchy level.

Table 160: Junos OS System Logging Facilities

Facility	Type of Event or Error
any	All (messages from all facilities)
authorization	Authentication and authorization attempts
change-log	Changes to the Junos OS configuration
conflict-log	Specified configuration is invalid on the router type
daemon	Actions performed or errors encountered by system processes
dfc	Events related to dynamic flow capture

Table 160: Junos OS System Logging Facilities (continued)

Facility	Type of Event or Error
explicit-priority	Include priority and facility in system log messages.
external	Actions performed or errors encountered by the local external applications.
firewall	Packet filtering actions performed by a firewall filter
ftp	Actions performed or errors encountered by the FTP process
interactive-commands	Commands issued at the Junos OS command-line interface (CLI) prompt or by a client application such as a Junos XML protocol or NETCONF XML client
kernel	Actions performed or errors encountered by the Junos OS kernel
ntp	Actions performed or errors encountered by the Network Time Protocol processes.
pfe	Actions performed or errors encountered by the Packet Forwarding Engine
security	Security related events or errors.
user	Actions performed or errors encountered by user-space processes

Table 161 on page 1052 lists the severity levels that you can specify in configuration statements at the **[edit system syslog]** hierarchy level. The levels from **emergency** through **info** are in order from highest severity (greatest effect on functioning) to lowest.

Unlike the other severity levels, the **none** level disables logging of a facility instead of indicating how seriously a triggering event affects routing functions. For more information, see “Disabling the System Logging of a Facility” on page 1079.

Table 161: System Log Message Severity Levels

Value	Severity Level	Description
N/A	none	Disables logging of the associated facility to a destination
0	emergency	System panic or other condition that causes the router to stop functioning
1	alert	Conditions that require immediate correction, such as a corrupted system database
2	critical	Critical conditions, such as hard errors
3	error	Error conditions that generally have less serious consequences than errors at the emergency, alert, and critical levels
4	warning	Conditions that warrant monitoring

Table 161: System Log Message Severity Levels (continued)

Value	Severity Level	Description
5	notice	Conditions that are not errors but might warrant special handling
6	info	Events or nonerror conditions of interest
7	any	Includes all severity levels

Related Documentation

- [Single-Chassis System Logging Configuration Overview on page 1061](#)
- [Examples: Configuring System Logging on page 1080](#)

Junos OS Default System Log Settings

Table 162 on page 1053 summarizes the default system log settings that apply to all routers that run the Junos OS, and specifies which statement to include in the configuration to override the default value.

Table 162: Default System Logging Settings

Setting	Default	Overriding Statement	Instructions
Alternative facility for message forwarded to a remote machine	For change-log : local6 For conflict-log : local5 For dfc : local1 For firewall : local3 For interactive-commands : local7 For pfe : local4	[edit system syslog] host <i>hostname</i> { facility-override <i>facility</i> ; }	“Changing the Alternative Facility Name for System Log Messages Directed to a Remote Destination” on page 1108
Format of messages logged to a file	Standard Junos OS format, based on UNIX format	[edit system syslog] file <i>filename</i> { structured-data; }	“Logging Messages in Structured-Data Format” on page 1069
Maximum number of files in the archived set	10	[edit system syslog] archive { files <i>number</i> ; } file <i>filename</i> { archive { files <i>number</i> ; } }	“Specifying Log File Size, Number, and Archiving Properties” on page 1070

Table 162: Default System Logging Settings (continued)

Setting	Default	Overriding Statement	Instructions
Maximum size of the log file	M Series, MX Series, and T Series: 1 megabyte (MB) TX Matrix: 10 MB	<pre>[edit system syslog] archive { size size; } file filename { archive { size size; } }</pre>	“Specifying Log File Size, Number, and Archiving Properties” on page 1070
Timestamp format	Month, date, hour, minute, second For example: Aug 21 12:36:30	<pre>[edit system syslog] time-format format;</pre>	“Including the Year or Millisecond in Timestamps” on page 1075
Users who can read log files	root user and users with the Junos OS maintenance permission	<pre>[edit system syslog] archive { world-readable; } file filename { archive { world-readable; } }</pre>	“Specifying Log File Size, Number, and Archiving Properties” on page 1070

- [Junos OS System Log Overview on page 1049](#)
- [Junos OS Platform-Specific Default System Log Messages on page 1054](#)

Junos OS Platform-Specific Default System Log Messages

The following messages are generated by default on specific routers. To view any of these types of messages, you must configure at least one destination for messages as described in [“Junos OS Minimum System Logging Configuration” on page 1066](#).

- To log the kernel process message on an M Series, MX Series, or T Series router, include the **kernel info** statement at the appropriate hierarchy level:

```
[edit system syslog]
(console | file filename | host destination | user username) {
  kernel info;
}
```

- On a routing matrix composed of a TX Matrix router and T640 routers, the master Routing Engine on each T640 router forwards all messages with a severity of **info** and higher to the master Routing Engine on the TX Matrix router. This is equivalent to the following configuration statement included on the TX Matrix router:

```
[edit system syslog]
host scc-master {
```

```
any info;
}
```

- Starting in Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1, likewise on a routing matrix composed of a TX Matrix Plus router with connected T1600 or T4000 routers, the master Routing Engine on each T1600 or T4000 LCC forwards to the master Routing Engine on the TX Matrix Plus router all messages with a severity of **info** and higher. This is equivalent to the following configuration statement included on the TX Matrix Plus router:



NOTE: From the perspective of the user interface, the routing matrix appears as a single router. The TX Matrix Plus router controls all the T1600 or T4000 routers connected to it in the routing matrix.

```
[edit system syslog]
host sfc0-master {
  any info;
}
```

Release History Table

Release	Description
15.1X49-D10	Starting in Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1, likewise on a routing matrix composed of a TX Matrix Plus router with connected T1600 or T4000 routers, the master Routing Engine on each T1600 or T4000 LCC forwards to the master Routing Engine on the TX Matrix Plus router all messages with a severity of info and higher.

Related Documentation

- [Junos OS System Log Overview on page 1049](#)
- [Junos OS Default System Log Settings on page 1053](#)
- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

Interpreting Messages Generated in Standard Format

The syntax of a standard-format message generated by a Junos OS process or subroutine library depends on whether it includes priority information:

- When the **explicit-priority** statement is included at the `[edit system syslog file filename]` or `[edit system syslog host hostname]` hierarchy level, a system log message has the following syntax:

```
timestamp message-source: %facility-severity-TAG: message-text
```

- When directed to the console or to users, or when the **explicit-priority** statement is not included for files or remote hosts, a system log message has the following syntax:

```
timestamp message-source: TAG: message-text
```

Table 163 on page 1056 describes the message fields.

Table 163: Fields in Standard-Format Messages

Field	Description
<i>timestamp</i>	Time at which the message was logged.
<i>message-source</i>	Identifier of the process or component that generated the message and the routing platform on which the message was logged. This field includes two or more subfields: hostname, process and process ID (PID). If the process does not report its PID, the PID is not displayed. The message source subfields are displayed in the following format: <p><i>hostname process[process-ID]</i></p>
<i>facility</i>	Code that specifies the facility to which the system log message belongs. For a mapping of codes to facility names, see Table: Facility Codes Reported in Priority Information in “Including Priority Information in System Log Messages” on page 1072.
<i>severity</i>	Numerical code that represents the severity level assigned to the system log message. For a mapping of codes to severity names, see Table: Numerical Codes for Severity Levels Reported in Priority Information in “Including Priority Information in System Log Messages” on page 1072.
<i>TAG</i>	Text string that uniquely identifies the message, in all uppercase letters and using the underscore (_) to separate words. The tag name begins with a prefix that indicates the generating software process or library. The entries in this reference are ordered alphabetically by this prefix. <p>Not all processes on a routing platform use tags, so this field does not always appear.</p>
<i>message-text</i>	Text of the message.

Managing Host OS System Log and Core Files

On Junos OS switches with a host OS, the Junos OS might generate system log messages (also called *syslog messages*) to record events that occur on the switch, including the following:

- Routine operations, such as a user login into the configuration database.
- Failure and error conditions.
- Emergency or critical conditions, such as power-down of the switch due to excessive temperature.

On OCX Series switches:

- System log messages are logged in the `/var/log/dcpfe.log` file in the host OS in the following scenarios:
 - When the forwarding daemon is initialized.
 - Messages are tagged as emergency (LOG_EMERG). A copy of the message is also sent to the `/var/log` directory on the switch.
- Messages from processes are available on the host system in the `/var/log` directory. System log messages from the host chassis management process are recorded in the `lcmd.log` file in the `/var/log` directory.

On QFX switches with a host OS:

- The Junos OS and host OS record log messages for system and process events, and generate core files upon certain system failures.
- These files are stored in directories such as `/var/log` for log messages, and `/var/tmp` or `/var/crash` for core files, depending on the type of host OS running on the switch.

For diagnostic purposes, you can access these host OS system log and core files from the Junos OS CLI on the switch. You can also clean up directories where the host OS stores temporary log and other files.

This topic includes these sections:

- [Viewing Log Files On the Host OS System on page 1057](#)
- [Copying Log Files From the Host System To the Switch on page 1057](#)
- [Viewing Core Files On the Host OS System on page 1057](#)
- [Copying Core Files From the Host System To the Switch on page 1058](#)
- [Cleaning Up Temporary Files on the Host OS on page 1058](#)

Viewing Log Files On the Host OS System

To view a list of the log files created on the host OS, enter the following command:

```
user@switch> show app-engine logs
```

Copying Log Files From the Host System To the Switch

To copy log files from the host OS to the switch, enter the following command:

```
user@switch> request app-engine file-copy log from-jhost source to-vjunos destination
```

For example, to copy the `lcmd` log file to the switch, enter the following command:

```
user@switch> request app-engine file-copy log from-jhost lcmd.log to-vjunos /var/tmp
```

Viewing Core Files On the Host OS System

To view the list of core files generated and stored on the host OS system, enter the following command:

```
user@switch> show app-engine crash
```

The list might look like this example output:

```
Compute cluster: default-cluster
Compute node: default-node

Crash Info
=====
total 13480
-rw-r--r-- 1 root root 178046 Feb 14 23:08
localhost.lcmd.26653.1455520135.core.tgz
-rw-r--r-- 1 root root 4330343 Feb 15 00:45
localhost.dcpfe.7155.1455525926.core.tgz
-rw-r--r-- 1 root root 4285901 Feb 15 01:49
localhost.dcpfe.25876.1455529782.core.tgz
-rw-r--r-- 1 root root 4288508 Feb 15 02:39
localhost.dcpfe.713.1455532774.core.tgz
-rw-r--r-- 1 root root 264079 Feb 15 17:02
localhost.lcmd.1144.1455584540.core.tgz
```

Copying Core Files From the Host System To the Switch

To copy core files from the host OS to the switch, enter the following command:

```
user@switch> request app-engine file-copy crash from-jhost source to-vjunos
destination-dir-or-file-path
```

When the destination Junos OS path is a directory, the source filename is used by default. To rename the file at the destination, enter the destination argument as a full path including the desired filename.

For example, to copy the *localhost.lcmd.26653.1455520135.core.tgz* core archive file to the switch, enter the following command:

```
user@switch> request app-engine file-copy crash from-jhost
localhost.lcmd.26653.1455520135.core.tgz to-vjunos /var/tmp
```

To see the results on the switch, enter the following command:

```
user@switch> show system core-dumps
re0:
-----
-rw-r--r-- 1 root field 178046 Feb 15 17:15
/var/tmp/localhost.lcmd.26653.1455520135.core.tgz
total files: 1
```

Cleaning Up Temporary Files on the Host OS

To remove temporary files created on the host OS, enter the following command:

```
user@switch> request app-engine cleanup
```


For example, the following sample output on a switch with a Linux host OS shows cleanup of temporary files stored in /var/tmp:

```
Compute cluster: default-cluster  
  
Compute node: default-node  
  
Cleanup (/var/tmp)  
=====
```

**Related
Documentation**

- [Overview of Junos OS System Log Messages on page 1050](#)

Configuring System Logging for a Single-Chassis System

- [Single-Chassis System Logging Configuration Overview on page 1061](#)
- [Overview of Single-Chassis System Logging Configuration on page 1063](#)
- [Junos OS System Log Configuration Hierarchy on page 1065](#)
- [Junos OS System Log Configuration Statements on page 1065](#)
- [Junos OS Minimum System Logging Configuration on page 1066](#)
- [Example: Configuring System Log Messages on page 1067](#)
- [Logging Messages in Structured-Data Format on page 1069](#)
- [Specifying Log File Size, Number, and Archiving Properties on page 1070](#)
- [Including Priority Information in System Log Messages on page 1072](#)
- [System Log Facility Codes and Numerical Codes Reported in Priority Information on page 1073](#)
- [Including the Year or Millisecond in Timestamps on page 1075](#)
- [Using Regular Expressions to Refine the Set of Logged Messages on page 1076](#)
- [Junos System Log Regular Expression Operators for the match Statement on page 1078](#)
- [Disabling the System Logging of a Facility on page 1079](#)
- [Examples: Configuring System Logging on page 1080](#)
- [Examples: Assigning an Alternative Facility on page 1081](#)

Single-Chassis System Logging Configuration Overview

The Junos system logging utility is similar to the UNIX **syslogd** utility. This section describes how to configure system logging for a single-chassis system that runs the Junos OS.

System logging configuration for the Junos-FIPS software and for Juniper Networks routers in a Common Criteria environment is the same as for the Junos OS. For more information, see the *Secure Configuration Guide for Common Criteria and Junos-FIPS*.

For information about configuring system logging for a routing matrix composed of a TX Matrix router and T640 routers, see [“Configuring System Logging for a TX Matrix Router” on page 1083](#).

Each system log message belongs to a *facility*, which groups together related messages. Each message is also preassigned a *severity level*, which indicates how seriously the triggering event affects router functions. You always specify the facility and severity of the messages to include in the log. For more information, see [“Specifying the Facility and Severity of Messages to Include in the Log” on page 1101](#).

You direct messages to one or more destinations by including the appropriate statement at the `[edit system syslog]` hierarchy level:

- To a named file in a local file system, by including the **file** statement. See [“Directing System Log Messages to a Log File” on page 1103](#).
- To the terminal session of one or more specific users (or all users) when they are logged in to the router, by including the **user** statement. See [“Directing System Log Messages to a User Terminal” on page 1104](#).
- To the router console, by including the **console** statement. See [“Directing System Log Messages to the Console” on page 1105](#).
- To a remote machine that is running the **syslogd** utility or to the other Routing Engine on the router, by including the **host** statement.

By default, messages are logged in a standard format, which is based on a UNIX system log format; for detailed information about message formatting, see the [System Log Explorer](#). You can alter the content and format of logged messages in the following ways:

- You can log messages to a file in structured-data format instead of the standard Junos format. Structured-data format provides more information without adding significant length, and makes it easier for automated applications to extract information from the message. For more information, see [“Logging Messages in Structured-Data Format” on page 1069](#).
- A message’s facility and severity level are together referred to as its *priority*. By default, the standard Junos format for messages does not include priority information (structured-data format includes a priority code by default.) To include priority information in standard-format messages directed to a file or a remote destination, include the **explicit-priority** statement. For more information, see [“Including Priority Information in System Log Messages” on page 1072](#).
- By default, the standard Junos format for messages specifies the month, date, hour, minute, and second when the message was logged. You can modify the timestamp on standard-format system log messages to include the year, the millisecond, or both. (Structured-data format specifies the year and millisecond by default.) For more information, see [“Including the Year or Millisecond in Timestamps” on page 1075](#).
- When directing messages to a remote machine, you can specify the IP address that is reported in messages as their source. You can also configure features that make it easier to separate messages generated by the Junos OS or messages generated on particular routers.
- The predefined facilities group together related messages, but you can also use regular expressions to specify more exactly which messages from a facility are logged to a

file, a user terminal, or a remote destination. For more information, see [“Using Regular Expressions to Refine the Set of Logged Messages” on page 1076](#).

Related Documentation

- [Examples: Configuring System Logging on page 1080](#)
- [Specifying the Facility and Severity of Messages to Include in the Log on page 1101](#)
- [Junos OS System Logging Facilities and Message Severity Levels on page 1051](#)
- [Directing System Log Messages to a Log File on page 1103](#)
- [Directing System Log Messages to a User Terminal on page 1104](#)
- [Directing System Log Messages to the Console on page 1105](#)

Overview of Single-Chassis System Logging Configuration

The Junos OS system logging utility on the QFX Series is similar to the UNIX **syslogd** utility. This topic describes how to configure system logging for a single-chassis system that runs the Junos OS.

Each system log message belongs to a *facility*, which groups together related messages. Each message is also preassigned a *severity level*, which indicates how seriously the triggering event affects router functions. You always specify the facility and severity of the messages to include in the log. For more information, see [“Specifying the Facility and Severity of Messages to Include in the Log” on page 1101](#).

You direct messages to one or more destinations by including the appropriate statement at the **[edit system syslog]** hierarchy level:

- To a named file in a local file system, by including the **file** statement. See [“Directing System Log Messages to a Log File” on page 1103](#).
- To the terminal session of one or more specific users (or all users) when they are logged in to the switch, by including the **user** statement. See [“Directing System Log Messages to a User Terminal” on page 1104](#).
- To the switch console, by including the **console** statement. See [“Directing System Log Messages to the Console” on page 1105](#).
- To a remote machine that is running the **syslogd** utility, by including the **host** statement. See [“Directing System Log Messages to a Remote Machine” on page 1106](#).

By default, messages are logged in a standard format, which is based on a UNIX system log format; for detailed information about message formatting, see the *Junos OS System Log Messages Reference*. You can alter the content and format of logged messages in the following ways:

- You can log messages to a file in structured-data format instead of the standard Junos OS format. Structured-data format provides more information without adding significant length, and makes it easier for automated applications to extract information from the message. For more information, see *Logging Messages in Structured-Data Format*.
- A message's facility and severity level are together referred to as its *priority*. By default, the standard Junos OS format for messages does not include priority information (structured-data format includes a priority code by default). To include priority information in standard-format messages directed to a file or a remote destination, include the **explicit-priority** statement. For more information, see [“Including Priority Information in System Log Messages” on page 1072](#).
- By default, the standard Junos OS format for messages specifies the month, date, hour, minute, and second when the message was logged. You can modify the timestamp on standard-format system log messages to include the year, the millisecond, or both. (Structured-data format specifies the year and millisecond by default.) For more information, see *Including the Year or Millisecond in Timestamps*.
- When directing messages to a remote machine, you can specify the IP address that is reported in messages as their source. You can also configure features that make it easier to separate messages generated by Junos OS or messages generated on particular switches. For more information, see [“Directing System Log Messages to a Remote Machine” on page 1106](#).
- The predefined facilities group together related messages, but you can also use regular expressions to specify more exactly which messages from a facility are logged to a file, a user terminal, or a remote destination. For more information, see [“Using Regular Expressions to Refine the Set of Logged Messages” on page 1076](#).



NOTE: During a commit check, warnings about the `traceoptions` configuration (for example, mismatch in trace file sizes or number of trace files) are not displayed on the console. However, these warnings are logged in the system log messages when the new configuration is committed.

Related Documentation

- *Examples: Configuring System Logging*
- [Specifying the Facility and Severity of Messages to Include in the Log on page 1101](#)
- [Junos OS System Logging Facilities and Message Severity Levels on page 1051](#)
- [Directing System Log Messages to a Log File on page 1103](#)
- [Directing System Log Messages to a Remote Machine on page 1106](#)
- [Directing System Log Messages to a User Terminal on page 1104](#)

- [Directing System Log Messages to the Console on page 1105](#)

Junos OS System Log Configuration Hierarchy

To configure the router to log system messages, include the **syslog** statement at the **[edit system]** hierarchy level:

```
[edit system]
syslog {
  archive <files number> <size size> <world-readable | no-world-readable>;
  console {
    facility severity;
  }
  file filename {
    facility severity;
    archive <archive-sites {ftp-url <password password>}> <files number> <size size>
      <start-time "YYYY-MM-DD.hh:mm"> <transfer-interval minutes> <world-readable |
      no-world-readable>;
    explicit-priority;
    match "regular-expression";
    structured-data {
      brief;
    }
  }
}
host (hostname | other-routing-engine | scc-master) {
  facility severity;
  explicit-priority;
  facility-override facility;
  log-prefix string
  match "regular-expression";
  source-address source-address;
  structured-data {
    brief;
  }
}
source-address source-address;
time-format (year | millisecond | year millisecond);
user (username | *) {
  facility severity;
  match "regular-expression";
}
}
```

Related Documentation • [Junos OS System Log Overview on page 1049](#)

Junos OS System Log Configuration Statements

To configure the switch to log system messages, include the **syslog** statement at the **[edit system]** hierarchy level:

```

[edit system]
syslog {
  archive <files number> <size size> <world-readable | no-world-readable>;
  console {
    facility severity;
  }
  file filename {
    facility severity;
    archive <archive-sites (ftp-url <password password>)> <files number> <size size>
      <start-time "YYYY-MM-DD.hh:mm"> <transfer-interval minutes> <world-readable |
      no-world-readable>;
    explicit-priority;
    match "regular-expression";
    structured-data {
      brief;
    }
  }
  host hostname {
    facility severity;
    explicit-priority;
    facility-override facility;
    log-prefix string
    match "regular-expression";
  }
  source-address source-address;
  time-format (year | millisecond | year millisecond);
  user (username | *) {
    facility severity;
    match "regular-expression";
  }
}

```

Related Documentation

- [Overview of Junos OS System Log Messages on page 1050](#)

Junos OS Minimum System Logging Configuration

To record or view system log messages, you must include the **syslog** statement at the **[edit system]** hierarchy level. Specify at least one destination for the messages, as described in [Table 164 on page 1066](#). For more information about the configuration statements, see “[Single-Chassis System Logging Configuration Overview](#)” on page 1061.

Table 164: Minimum Configuration Statements for System Logging

Destination	Minimum Configuration Statements
File	<pre> [edit system syslog] file filename { facility severity; } </pre>

Table 164: Minimum Configuration Statements for System Logging (continued)

Destination	Minimum Configuration Statements
Terminal session of one, several, or all users	<code>[edit system syslog] user (username *) { facility severity; }</code>
Router or switch console	<code>[edit system syslog] console { facility severity; }</code>
Remote machine or the other Routing Engine on the router or switch	<code>[edit system syslog] host (hostname other-routing-engine) { facility severity; }</code>

Related Documentation

- [Junos OS System Log Overview on page 1049](#)

Example: Configuring System Log Messages

The QFabric system monitors events that occur on its component devices and distributes system log messages about those events to all external system log message servers (hosts) that are configured. Component devices may include Node devices, Interconnect devices, Director devices, and the Virtual Chassis. Messages are stored for viewing only in the QFabric system database. To view the messages, issue the **show log** command.

This example describes how to configure system log messages on the QFabric system.

- [Requirements on page 1067](#)
- [Overview on page 1067](#)
- [Configuration on page 1068](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 12.2
- QFabric system
- External servers that can be configured as system log message hosts

Overview

Component devices that generate system log message events may include Node devices, Interconnect devices, Director devices, and the control plane switches. The following configuration example includes these components in the QFabric system:

- Director software running on the Director group
- Control plane switches
- Interconnect device
- Multiple Node devices

Configuration

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

```
set system syslog host 10.1.1.12 any error
set system syslog file qflogs
set system syslog file qflogs structured-data brief
set system syslog file qflogs archive size 1g
```

Step-by-Step Procedure The following example requires that you navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide* .

To configure system messages from the QFabric Director device:

1. Specify a host, any facility, and the **error** severity level.

```
[edit system syslog]
user@switch# set host 10.1.1.12 any error
```



NOTE: You can configure more than one system log message server (host). The QFabric system sends the messages to each server configured.

2. (Optional) Specify a filename to capture log messages.



NOTE: On the QFabric system, a syslog file named **messages** is configured implicitly with facility and severity levels of **any any** and a file size of 100 MBs. Therefore, you cannot specify the filename **messages** in your configuration, and automatic command completion does not work for that filename.

```
[edit system syslog]
user@switch# set file qflogs structured-data brief
```

```
user@switch# set file qflogs
```

3. (Optional) Configure the maximum size of your system log message archive file. This example specifies an archive size of 1 GB.

```
[edit system syslog]
user@switch# set file qflogs archive size 1g
```

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

```
[edit]
user@switch# show system
syslog {
  file qflogs {
  }
  host 10.1.1.12 {
    any error;
  }
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Related Documentation

- *Understanding the Implementation of System Log Messages on the QFabric System*
- *syslog (QFabric System)*
- [show log on page 2057](#)

Logging Messages in Structured-Data Format

You can log messages to a file in structured-data format instead of the standard Junos OS format. Structured-data format provides more information without adding significant length, and makes it easier for automated applications to extract information from a message.

The structured-data format complies with Internet standard RFC 5424, *The Syslog Protocol*, which is at <https://tools.ietf.org/html/rfc5424>. The RFC establishes a standard message format regardless of the source or transport protocol for logged messages.

To output messages to a file in structured-data format, include the **structured-data** statement at the **[edit system syslog file filename]** hierarchy level:

```
[edit system syslog file filename]
facility severity;
structured-data {
```

```
brief;  
}
```

The optional **brief** statement suppresses the English-language text that appears by default at the end of a message to describe the error or event.

The structured format is used for all messages logged to the file that are generated by a Junos process or software library.



NOTE: If you include either or both of the **explicit-priority** and **time-format** statements along with the **structured-data** statement, they are ignored. These statements apply to the standard Junos OS system log format, not to structured-data format.

**Related
Documentation**

- [Single-Chassis System Logging Configuration Overview on page 1061](#)
- [Examples: Configuring System Logging on page 1080](#)

Specifying Log File Size, Number, and Archiving Properties

To prevent log files from growing too large, by default the Junos OS system logging utility writes messages to a sequence of files of a defined size. The files in the sequence are referred to as *archive* files to distinguish them from the *active* file to which messages are currently being written. The default maximum size depends on the platform type:

- 128 kilobytes (KB) for EX Series switches
- 1 megabyte (MB) for M Series, MX Series, and T Series routers
- 10 MB for TX Matrix or TX Matrix Plus routers
- 1 MB for the QFX Series

When an active log file called **logfile** reaches the maximum size, the logging utility closes the file, compresses it, and names the compressed archive file **logfile.0.gz**. The logging utility then opens and writes to a new active file called **logfile**. This process is also known as file rotation. When the new **logfile** reaches the configured maximum size, **logfile.0.gz** is renamed **logfile.1.gz**, and the new **logfile** is closed, compressed, and renamed **logfile.0.gz**. By default, the logging utility creates up to 10 archive files in this manner. When the maximum number of archive files is reached and when the size of the active file reaches the configured maximum size, the contents of the last archived file are overwritten by the current active file. The logging utility by default also limits the users who can read log files to the **root** user and users who have Junos OS **maintenance** permission.

Junos OS provides a configuration statement **log-rotate-frequency** that configures the system log file rotation frequency by configuring the time interval for checking the log file size. The frequency can be set to a value of 1 minute through 59 minutes. The default frequency is 15 minutes.

To configure the log rotation frequency, include the **log-rotate-frequency** statement at the **[edit system syslog]** hierarchy level.

You can include the **archive** statement to change the maximum size of each file, how many archive files are created, and who can read log files.

To configure values that apply to all log files, include the **archive** statement at the **[edit system syslog]** hierarchy level:

```
archive <files number> <size size> <world-readable | no-world-readable>;
```

To configure values that apply to a specific log file, include the **archive** statement at the **[edit system syslog file *filename*]** hierarchy level:

```
archive <archive-sites (ftp-url <password password>)> <files number> <size size>  
<start-time "YYYY-MM-DD.hh:mm"> <transfer-interval minutes> <world-readable |  
no-world-readable>;
```

archive-sites *site-name* specifies a list of archive sites that you want to use for storing files. The ***site-name*** value is any valid FTP URL to a destination. If more than one site name is configured, a list of archive sites for the system log files is created. When a file is archived, the router or switch attempts to transfer the file to the first URL in the list, moving to the next site only if the transfer does not succeed. The log file is stored at the archive site with the specified log filename. For information about how to specify valid FTP URLs, see [Format for Specifying Filenames and URLs in Junos OS CLI Commands](#).

binary-data Mark file as containing binary data. This allows proper archiving of binary files, such as WTMP files (login records for UNIX based systems). To restore the default setting, include the **no-binary-data** statement.

files *number* specifies the number of files to create before the oldest file is overwritten. The value can be from 1 through 1000.

size *size* specifies the maximum size of each file. The value can be from 64 KB (64k) through 1 gigabyte (1g); to represent megabytes, use the letter **m** after the integer. There is no space between the digits and the **k**, **m**, or **g** units letter.

start-time "YYYY-MM-DD.hh:mm" defines the date and time in the local time zone for a one-time transfer of the active log file to the first reachable site in the list of sites specified by the **archive-sites** statement.

transfer-interval *interval* defines the amount of time the current log file remains open (even if it has not reached the maximum possible size) and receives new statistics before it is closed and transferred to an archive site. This interval value can be from 5 through 2880 minutes.

world-readable enables all users to read log files. To restore the default permissions, include the **no-world-readable** statement.

Related Documentation

- [Single-Chassis System Logging Configuration Overview on page 1061](#)
- [Examples: Configuring System Logging on page 1080](#)

- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

Including Priority Information in System Log Messages

The facility and severity level of a message are together referred to as its *priority*. By default, messages logged in the standard Junos OS format do not include information about priority. To include priority information in standard-format messages directed to a file, include the **explicit-priority** statement at the **[edit system syslog file *filename*]** hierarchy level:

```
[edit system syslog file filename]  
facility severity;  
explicit-priority;
```



NOTE: Messages logged in structured-data format include priority information by default. If you include the **structured-data** statement at the **[edit system syslog file *filename*]** hierarchy level along with the **explicit-priority** statement, the **explicit-priority** statement is ignored and messages are logged in structured-data format.

For information about the **structured-data** statement, see [“Logging Messages in Structured-Data Format” on page 1069](#). For information about the contents of a structured-data message, see the *Junos OS System Log Reference for Security Devices*.

To include priority information in messages directed to a remote machine or the other Routing Engine, include the **explicit-priority** statement at the **[edit system syslog host (*hostname* | other-routing-engine)]** hierarchy level:

```
[edit system syslog host (hostname | other-routing-engine)]  
facility severity;  
explicit-priority;
```



NOTE: The **other-routing-engine** option does not apply to the QFX Series.

The priority recorded in a message always indicates the original, local facility name. If the **facility-override** statement is included for messages directed to a remote destination, the Junos OS system logging utility still uses the alternative facility name for the messages themselves when directing them to the remote destination. For more information, see [“Changing the Alternative Facility Name for System Log Messages Directed to a Remote Destination” on page 1108](#).

When the **explicit-priority** statement is included, the Junos OS logging utility prepends codes for the facility name and severity level to the message tag name, if the message has one:

FACILITY-severity[-TAG]

(The tag is a unique identifier assigned to some Junos OS system log messages.)

In the following example, the **CHASSISD_PARSE_COMPLETE** message belongs to the **daemon** facility and is assigned severity **info** (6):

```
Aug 21 12:36:30 router1 chassisd[522]: %DAEMON-6-CHASSISD_PARSE_COMPLETE:
Using new configuration
```

When the **explicit-priority** statement is not included, the priority does not appear in the message:

```
Aug 21 12:36:30 router1 chassisd[522]: CHASSISD_PARSE_COMPLETE: Using new
configuration
```

For more information about message formatting, see the *Junos OS System Log Reference for Security Devices*.

- Related Documentation**
- [Single-Chassis System Logging Configuration Overview on page 1061](#)
 - [Examples: Configuring System Logging on page 1080](#)

System Log Facility Codes and Numerical Codes Reported in Priority Information

Table 165 on page 1073 lists the facility codes that can appear in system log messages and maps them to facility names.



NOTE: If the second column in Table 165 on page 1073 does not include the Junos OS facility name for a code, the facility cannot be included in a statement at the [edit system syslog] hierarchy level. Junos OS might use the facilities in Table 165 on page 1073—and others that are not listed—when reporting on internal operations.

Table 165: Facility Codes Reported in Priority Information

Code	Junos Facility Name	Type of Event or Error
AUTH	authorization	Authentication and authorization attempts
AUTHPRIV		Authentication and authorization attempts that can be viewed by superusers only
CHANGE	change-log	Changes to Junos OS configuration
CONFLICT	conflict-log	Specified configuration is invalid on the router type

Table 165: Facility Codes Reported in Priority Information (continued)

Code	Junos Facility Name	Type of Event or Error
CONSOLE		Messages written to /dev/console by the kernel console output r
CRON		Actions performed or errors encountered by the cron process
DAEMON	daemon	Actions performed or errors encountered by system processes
DFC	dfc	Actions performed or errors encountered by the dynamic flow capture process
FIREWALL	firewall	Packet filtering actions performed by a firewall filter
FTP	ftp	Actions performed or errors encountered by the FTP process
INTERACT	interactive-commands	Commands issued at the Junos OS CLI prompt or invoked by a client application such as a Junos XML protocol or NETCONF client
KERN	kernel	Actions performed or errors encountered by the Junos kernel
NTP		Actions performed or errors encountered by the Network Time Protocol (NTP)
PFE	pfe	Actions performed or errors encountered by the Packet Forwarding Engine
SYSLOG		Actions performed or errors encountered by the Junos system logging utility
USER	user	Actions performed or errors encountered by user-space processes

Table 166 on page 1074 lists the numerical severity codes that can appear in system log messages and maps them to severity levels.

Table 166: Numerical Codes for Severity Levels Reported in Priority Information

Numerical Code	Severity Level	Description
0	emergency	System panic or other condition that causes the router to stop functioning
1	alert	Conditions that require immediate correction, such as a corrupted system database
2	critical	Critical conditions, such as hard errors

Table 166: Numerical Codes for Severity Levels Reported in Priority Information (continued)

Numerical Code	Severity Level	Description
3	error	Error conditions that generally have less serious consequences than errors in the emergency, alert, and critical levels
4	warning	Conditions that warrant monitoring
5	notice	Conditions that are not errors but might warrant special handling
6	info	Events or nonerror conditions of interest
7	debug	Software debugging messages (these appear only if a technical support representative has instructed you to configure this severity level)

Related Documentation

- [Single-Chassis System Logging Configuration Overview on page 1061](#)
- [Examples: Configuring System Logging on page 1080](#)

Including the Year or Millisecond in Timestamps

By default, the timestamp recorded in a standard-format system log message specifies the month, date, hour, minute, and second when the message was logged, as in the following example:

```
Aug 21 12:36:30
```

To include the year, the millisecond, or both in the timestamp, include the **time-format** statement at the **[edit system syslog]** hierarchy level:

```
[edit system syslog]
time-format (year | millisecond | year millisecond);
```

However, the timestamp for traceoption messages is specified in milliseconds by default, and is independent of the **[edit system syslog time-format]** statement.

The modified timestamp is used in messages directed to each destination configured by a **file**, **console**, or **user** statement at the **[edit system syslog]** hierarchy level, but not to destinations configured by a **host** statement.



NOTE: By default, in a FreeBSD console, the additional time information is not available in system log messages directed to each destination configured by a **host** statement. However, in a Junos OS specific implementation using the FreeBSD console, the additional time information is available in system log messages directed to each destination.

The following example illustrates the format for a timestamp that includes both the millisecond (401) and the year (2006):

```
Aug 21 12:36:30.401 2006
```



NOTE: Messages logged in structured-data format include the year and millisecond by default. If you include the structured-data statement at the [edit system syslog file *filename*] hierarchy level along with the time-format statement, the time-format statement is ignored and messages are logged in structured-data format.

For information about the structured-data statement, see [“Logging Messages in Structured-Data Format” on page 1069](#). For information about the contents of a structured-data message, see the *Junos OS System Log Reference for Security Devices*.

Related Documentation

- [Single-Chassis System Logging Configuration Overview on page 1061](#)
- [Examples: Configuring System Logging on page 1080](#)

Using Regular Expressions to Refine the Set of Logged Messages

The predefined facilities group together related messages, but you can also use regular expression matching to specify more exactly which messages from a facility are logged to a file, a user terminal, or a remote destination.

Starting with Junos OS Release 16.1, to specify the text string that must (or must not) appear in a message for the message to be logged to a destination, include the **match** and the **match-string** statements. Specify the regular expression which the text string must match:

```
match "regular-expression";
```

To specify the text substring that must appear in a message for the message to be logged to a destination, include the **match-string** statement and specify the regular expression which the text substring must match:

```
match-string <string-name>;
```

You can include this statement at the following hierarchy levels:

- [edit system syslog file *filename*] (for a file)
- [edit system syslog user (*username* | *)] (for a specific user session or for all user sessions on a terminal)
- [edit system syslog host (*hostname* | other-routing-engine)] (for a remote destination)

In specifying the regular expression, use the notation defined in POSIX Standard 1003.2 for extended (modern) UNIX regular expressions. Explaining regular expression syntax is beyond the scope of this document, but POSIX standards are available from the Institute of Electrical and Electronics Engineers (IEEE, <http://www.ieee.org>).

Table 167 on page 1077 specifies which character or characters are matched by some of the regular expression operators that you can use in the match statement. In the descriptions, the term *term* refers to either a single alphanumeric character or a set of characters enclosed in square brackets, parentheses, or braces.



NOTE: The match statement is not case-sensitive.

Table 167: Regular Expression Operators for the match Statement

Operator	Matches
. (period)	One instance of any character except the space.
* (asterisk)	Zero or more instances of the immediately preceding term.
+ (plus sign)	One or more instances of the immediately preceding term.
? (question mark)	Zero or one instance of the immediately preceding term.
(pipe)	One of the terms that appears on either side of the pipe operator.
! (exclamation point)	Any string except the one specified by the expression, when the exclamation point appears at the start of the expression. Use of the exclamation point is Junos OS-specific.
^ (caret)	Start of a line, when the caret appears outside square brackets. One instance of any character that does not follow it within square brackets, when the caret is the first character inside square brackets.
\$ (dollar sign)	End of a line.
[] (paired square brackets)	One instance of one of the enclosed alphanumeric characters. To indicate a range of characters, use a hyphen (-) to separate the beginning and ending characters of the range. For example, [a-z0-9] matches any letter or number.
() (paired parentheses)	One instance of the evaluated value of the enclosed term. Parentheses are used to indicate the order of evaluation in the regular expression.

Using Regular Expressions

Filter messages that belong to the **interactive-commands** facility, directing those that include the string **configure** to the terminal of the root user:

```
[edit system syslog]
user root {
```

```
interactive-commands any;
match ".*configure.*";
}
```

Messages like the following appear on the **root** user's terminal when a user issues a **configure** command to enter configuration mode:

```
timestamp router-name mgd[PID]: UI_CMDLINE_READ_LINE: User 'user', command
'configure private'
```

Filter messages that belong to the **daemon** facility and have a severity of **error** or higher, directing them to the file **/var/log/process-errors**. Omit messages generated by the SNMP process (snmpd), instead directing them to the file **/var/log/snmpd-errors**:

```
[edit system syslog]
file process-errors {
  daemon error;
  match "!(.*snmpd.*)";
}
file snmpd-errors {
  daemon error;
  match ".*snmpd.*";
}
```

Release History Table

Release	Description
16.1	Starting with Junos OS Release 16.1, to specify the text string that must (or must not) appear in a message for the message to be logged to a destination, include the match and the match-string statements

Related Documentation

- [Single-Chassis System Logging Configuration Overview on page 1061](#)
- [Examples: Configuring System Logging on page 1080](#)

Junos System Log Regular Expression Operators for the match Statement

Table 168: Regular Expression Operators for the match Statement

Operator	Matches
.	(period) One instance of any character except the space.
*	(asterisk) Zero or more instances of the immediately preceding term.
+	(plus sign) One or more instances of the immediately preceding term.
?	(question mark) Zero or one instance of the immediately preceding term.
	(pipe) One of the terms that appear on either side of the pipe operator.

Table 168: Regular Expression Operators for the match Statement (continued)

Operator	Matches
! (exclamation point)	Any string except the one specified by the expression, when the exclamation point appears at the start of the expression. Use of the exclamation point is Junos OS–specific.
^ (caret)	The start of a line, when the caret appears outside square brackets. One instance of any character that does not follow it within square brackets, when the caret is the first character inside square brackets.
\$ (dollar sign)	The end of a line.
[] (paired square brackets)	One instance of one of the enclosed alphanumeric characters. To indicate a range of characters, use a hyphen (-) to separate the beginning and ending characters of the range. For example, [a-z0-9] matches any letter or number.
() (paired parentheses)	One instance of the evaluated value of the enclosed term. Parentheses are used to indicate the order of evaluation in the regular expression.

- Related Documentation**
- [Single-Chassis System Logging Configuration Overview on page 1061](#)
 - [Examples: Configuring System Logging on page 1080](#)

Disabling the System Logging of a Facility

To disable the logging of messages that belong to a particular facility, include the **facility none** statement in the configuration. This statement is useful when, for example, you want to log messages that have the same severity level and belong to all but a few facilities. Instead of including a statement for each facility you want to log, you can include the **any severity** statement and then a **facility none** statement for each facility that you do not want to log. For example, the following logs all messages at the **error** level or higher to the console, except for messages from the **daemon** and **kernel** facilities. Messages from those facilities are logged to the file `>/var/log/internals` instead:

```
[edit system syslog]
console {
  any error;
  daemon none;
  kernel none;
}
file internals {
  daemon info;
  kernel info;
}
```

- Related Documentation**
- [Single-Chassis System Logging Configuration Overview on page 1061](#)

Examples: Configuring System Logging

The following example shows how to configure the logging of messages about all commands entered by users at the CLI prompt or invoked by client applications such as Junos OS XML protocol or NETCONF client applications, and all authentication or authorization attempts, both to the file **cli-commands** and to the terminal of any user who is logged in:

```
[edit system]
syslog {
  file cli-commands {
    interactive-commands info;
    authorization info;
  }
  user * {
    interactive-commands info;
    authorization info;
  }
}
```

The following example shows how to configure the logging of all changes in the state of alarms to the file **/var/log/alarms**:

```
[edit system]
syslog {
  file alarms {
    kernel warning;
  }
}
```

The following example shows how to configure the handling of messages of various types, as described in the comments. Information is logged to two files, to the terminal of user **alex**, to a remote machine, and to the console:

```
[edit system]
syslog {
  /* write all security-related messages to file /var/log/security */
  file security {
    authorization info;
    interactive-commands info;
  }
  /* write messages about potential problems to file /var/log/messages: */
  /* messages from "authorization" facility at level "notice" and above, */
  /* messages from all other facilities at level "warning" and above */
  file messages {
    authorization notice;
    any warning;
  }
  /* write all messages at level "critical" and above to terminal of user "alex" if */
  /* that user is logged in */
  user alex {
    any critical;
  }
}
```

```

}
/* write all messages from the "daemon" facility at level "info" and above, and */
/* messages from all other facilities at level "warning" and above, to the */
/* machine monitor.mycompany.com */
host monitor.mycompany.com {
    daemon info;
    any warning;
}
/* write all messages at level "error" and above to the system console */
console {
    any error;
}
}

```

The following example shows how to configure the handling of messages generated when users issue Junos OS CLI commands, by specifying the **interactive-commands** facility at the following severity levels:

- **info**—Logs a message when users issue any command at the CLI operational or configuration mode prompt. The example writes the messages to the file `/var/log/user-actions`.
- **notice**—Logs a message when users issue the configuration mode commands **rollback** and **commit**. The example writes the messages to the terminal of user **philip**.
- **warning**—Logs a message when users issue a command that restarts a software process. The example writes the messages to the console.

```

[edit system]
syslog {
    file user-actions {
        interactive-commands info;
    }
    user philip {
        interactive-commands notice;
    }
    console {
        interactive-commands warning;
    }
}

```

Related Documentation

- [Single-Chassis System Logging Configuration Overview on page 1061](#)

Examples: Assigning an Alternative Facility

Log all messages generated on the local routing platform at the error level or higher to the **local0** facility on the remote machine called **monitor.mycompany.com**:

```

[edit system syslog]
host monitor.mycompany.com {
    any error;
}

```

```
facility-override local0;
}
```

Configure routing platforms located in California and routing platforms located in New York to send messages to a single remote machine called **central-logger.mycompany.com**. The messages from California are assigned alternative facility **local0** and the messages from New York are assigned to alternative facility **local2**.

- Configure California routing platforms to aggregate messages in the **local0** facility:

```
[edit system syslog]
host central-logger.mycompany.com {
  change-log info;
  facility-override local0;
}
```

- Configure New York routing platforms to aggregate messages in the **local2** facility:

```
[edit system syslog]
host central-logger.mycompany.com {
  change-log info;
  facility-override local2;
}
```

On **central-logger**, you can then configure the system logging utility to write messages from the **local0** facility to the file **california-config** and the messages from the **local2** facility to the file **new-york-config**.

Related Documentation

- [Alternate Facilities for System Log Messages Directed to a Remote Destination on page 1110](#)

Configuring System Logging for a TX Matrix or TX Matrix Plus Router

- [Configuring System Logging for a TX Matrix Router on page 1083](#)
- [Configuring System Logging for a TX Matrix Plus Router on page 1085](#)
- [Configuring Message Forwarding to the TX Matrix Router on page 1087](#)
- [Configuring Message Forwarding to the TX Matrix Plus Router on page 1088](#)
- [Impact of Different Local and Forwarded Severity Levels on System Log Messages on a TX Matrix Router on page 1089](#)
- [Impact of Different Local and Forwarded Severity Levels on System Log Messages on a TX Matrix Plus Router on page 1092](#)
- [Configuring Optional Features for Forwarded Messages on a TX Matrix Router on page 1094](#)
- [Configuring Optional Features for Forwarded Messages on a TX Matrix Plus Router on page 1095](#)
- [Configuring System Logging Differently on Each T640 Router in a Routing Matrix on page 1097](#)
- [Configuring System Logging Differently on Each T1600 or T4000 Router in a Routing Matrix on page 1098](#)

Configuring System Logging for a TX Matrix Router

To configure system logging for all routers in a routing matrix composed of a TX Matrix router and T640 routers, include the **syslog** statement at the **[edit system]** hierarchy level on the TX Matrix router. The **syslog** statement applies to every router in the routing matrix.

```
[edit system]
syslog {
  archive <files number> <size size <world-readable | no-world-readable>;
  console {
    facility severity;
  }
  file filename {
    facility severity;
```

```

archive <archive-sites {ftp-url <password password>} > <files number> <size size>
    <start-time "YYYY-MM-DD.hh:mm"> <transfer-interval minutes> <world-readable |
    no-world-readable>;
explicit-priority;
match "regular-expression";
structured-data {
    brief;
}
}
host (hostname | other-routing-engine | scc-master) {
    facility severity;
    explicit-priority;
    facility-override facility;
    log-prefix string;
    match "regular-expression";
    source-address source-address;
    port port number;
}
source-address source-address;
time-format (year | millisecond | year millisecond);
(username | *) {
    facility severity;
    match "regular-expression";
}
}

```

When included in the configuration on the TX Matrix router, the following configuration statements have the same effect as on a single-chassis system, except that they apply to every router in the routing matrix:

- **archive**—Sets the size and number of log files on each platform in the routing matrix. See “[Specifying Log File Size, Number, and Archiving Properties](#)” on page 1070.
- **console**—Directs the specified messages to the console of each platform in the routing matrix. See “[Directing System Log Messages to the Console](#)” on page 1105.
- **file**—Directs the specified messages to a file of the same name on each platform in the routing matrix. See “[Directing System Log Messages to a Log File](#)” on page 1103.
- **match**—Limits the set of messages logged to a destination to those that contain (or do not contain) a text string matching a regular expression. See “[Using Regular Expressions to Refine the Set of Logged Messages](#)” on page 1076.

The separate **match** statement at the **[edit system syslog host scc-master]** hierarchy level applies to messages forwarded from the T640 routers to the TX Matrix router. See “[Configuring Optional Features for Forwarded Messages on a TX Matrix Router](#)” on page 1094.

- **port**—Specifies the port number of the remote syslog server.
- **source-address**—Sets the IP address of the router to report in system log messages as the message source, when the messages are directed to the remote machines specified in all **host hostname** statements at the **[edit system syslog]** hierarchy level, for each platform in the routing matrix. On a routing matrix composed of a TX Matrix router and T640 routers, the address is not reported by the T640 routers in messages directed

to the other Routing Engine on each router or to the TX Matrix router. See [“Specifying an Alternative Source Address for System Log Messages Directed to a Remote Destination”](#) on page 1107.

- **structured-data**—Writes messages to a file in structured-data format. See [“Logging Messages in Structured-Data Format”](#) on page 1069.
- **time-format**—Adds the millisecond, year, or both to the timestamp in each standard-format message. See [“Including the Year or Millisecond in Timestamps”](#) on page 1075.
- **user**—Directs the specified messages to the terminal session of one or more specified users on each platform in the routing matrix that they are logged in to. See [“Directing System Log Messages to a User Terminal”](#) on page 1104.

The effect of the other statements differs somewhat for a routing matrix than for a single-chassis system.

Related Documentation

- [Configuring Message Forwarding to the TX Matrix Router on page 1087](#)
- [Impact of Different Local and Forwarded Severity Levels on System Log Messages on a TX Matrix Router on page 1089](#)
- [Configuring Optional Features for Forwarded Messages on a TX Matrix Router on page 1094](#)
- [Directing Messages to a Remote Destination from the Routing Matrix Based on the TX Matrix Router on page 1112](#)
- [Configuring System Logging Differently on Each T640 Router in a Routing Matrix on page 1097](#)

Configuring System Logging for a TX Matrix Plus Router

From the perspective of the user interface, the routing matrix appears as a single router. The TX Matrix Plus router (also called the switch-fabric chassis SFC) controls all the T1600 or T4000 routers (also called the line-card chassis LCC) in the routing matrix.

To configure system logging for all routers in a routing matrix composed of a TX Matrix Plus router with connected T1600 or T4000 LCCs, include the **syslog** statement at the **[edit system]** hierarchy level on the SFC. The **syslog** statement applies to every router in the routing matrix.

```
[edit system]
syslog {
  archive <files number> <size size <world-readable | no-world-readable>;
  console {
    facility severity;
  }
  file filename {
    facility severity;
```

```

archive <archive-sites {ftp-url <password password>} > <files number> <size size>
    <start-time "YYYY-MM-DD.hh:mm"> <transfer-interval minutes> <world-readable |
    no-world-readable>;
explicit-priority;
match "regular-expression";
structured-data {
    brief;
}
}
host (hostname | other-routing-engine | sfc0-master) {
    facility severity;
    explicit-priority;
    facility-override facility;
    log-prefix string;
    match "regular-expression";
}
source-address source-address;
time-format (year | millisecond | year millisecond);
(username | *) {
    facility severity;
    match "regular-expression";
}
}

```

When included in the configuration on the TX Matrix Plus router, the following configuration statements have the same effect as on a single-chassis system, except that they apply to every router in the routing matrix.

- **archive**—Sets the size and number of log files on each router in the routing matrix. See [“Specifying Log File Size, Number, and Archiving Properties” on page 1070](#).
- **console**—Directs the specified messages to the console of each router in the routing matrix. See [“Directing System Log Messages to the Console” on page 1105](#).
- **file**—Directs the specified messages to a file of the same name on each router in the routing matrix. See [“Directing System Log Messages to a Log File” on page 1103](#).
- **match**—Limits the set of messages logged to a destination to those that contain (or do not contain) a text string matching a regular expression. See [“Using Regular Expressions to Refine the Set of Logged Messages” on page 1076](#).

The separate **match** statement at the **[edit system syslog host sfc0-master]** hierarchy level applies to messages forwarded from the T1600 or T4000 LCCs to the SFC. See [“Configuring Optional Features for Forwarded Messages on a TX Matrix Plus Router” on page 1095](#).

- **source-address**—Sets the IP address of the router as the message source in system log messages when the messages are directed to the remote machines specified in all **host hostname** statements at the **[edit system syslog]** hierarchy level, for each router in the routing matrix. On a routing matrix composed of a TX Matrix Plus router with connected T1600 or T4000 LCCs, the address is not reported by the T1600 or T4000 routers in messages directed to the other Routing Engine on each router or to the TX Matrix Plus router. See [“Specifying an Alternative Source Address for System Log Messages Directed to a Remote Destination” on page 1107](#).

- **structured-data**—Writes messages to a file in structured-data format. See [“Logging Messages in Structured-Data Format” on page 1069](#).
- **time-format**—Adds the millisecond, year, or both to the timestamp in each standard-format message. See [“Including the Year or Millisecond in Timestamps” on page 1075](#).
- **user**—Directs the specified messages to the terminal session of one or more specified users on each router in the routing matrix that they are logged in to. See [“Directing System Log Messages to a User Terminal” on page 1104](#).

The effect of the other statements differs somewhat for a routing matrix than for a single-chassis system.

Related Documentation

- [Configuring Message Forwarding to the TX Matrix Plus Router on page 1088](#)
- [Impact of Different Local and Forwarded Severity Levels on System Log Messages on a TX Matrix Plus Router on page 1092](#)
- [Configuring Optional Features for Forwarded Messages on a TX Matrix Plus Router on page 1095](#)
- [Directing Messages to a Remote Destination from the Routing Matrix Based on a TX Matrix Plus Router on page 1113](#)
- [Configuring System Logging Differently on Each T1600 or T4000 Router in a Routing Matrix on page 1098](#)
- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

Configuring Message Forwarding to the TX Matrix Router

By default, the master Routing Engine on each T640 router forwards to the master Routing Engine on the TX Matrix router all messages from all facilities with severity level of **info** and higher. To change the facility, the severity level, or both, include the **host scc-master** statement at the **[edit system syslog]** hierarchy level on the TX Matrix router:

```
[edit system syslog]
host scc-master {
    facility severity;
}
```

To disable message forwarding, set the facility to **any** and the severity level to **none**:

```
[edit system syslog]
host scc-master {
    any none;
}
```

In either case, the setting applies to all T640 routers in the routing matrix.

To capture the messages forwarded by the T640 routers (as well as messages generated on the TX Matrix router itself), you must also configure system logging on the TX Matrix router. Direct the messages to one or more destinations by including the appropriate statements at the **[edit system syslog]** hierarchy level on the TX Matrix router:

- To a file, as described in [“Directing System Log Messages to a Log File” on page 1103](#).
- To the terminal session of one or more specific users (or all users), as described in [“Directing System Log Messages to a User Terminal” on page 1104](#).
- To the console, as described in [“Directing System Log Messages to the Console” on page 1105](#).
- To a remote machine that is running the syslogd utility or to the other Routing Engine. For more information, see [“Directing Messages to a Remote Destination from the Routing Matrix Based on the TX Matrix Router” on page 1112](#).

As previously noted, the configuration statements included on the TX Matrix router also configure the same destinations on each T640 router in the routing matrix.

When specifying the severity level for local messages (at the **[edit system syslog (file | host | console | user)]** hierarchy level) and forwarded messages (at the **[edit system syslog host scc-master]** hierarchy level), you can set the same severity level for both, set a lower severity level for local messages, or set a higher severity level for local messages. The following examples describe the consequence of each configuration. (For simplicity, the examples use the **any** facility in every case. You can also specify different severities for different facilities, with more complex consequences.)

**Related
Documentation**

- [Configuring System Logging for a TX Matrix Router on page 1083](#)

Configuring Message Forwarding to the TX Matrix Plus Router

From the perspective of the user interface, the routing matrix appears as a single router. The TX Matrix Plus router (also called the switch-fabric chassis SFC) controls all the T1600 or T4000 routers (also called the line-card chassis LCC) in the routing matrix.

By default, the master Routing Engine on each connected T1600 or T4000 LCC forwards to the master Routing Engine on the SFC all messages from all facilities with severity level of **info** and higher. To change the facility, the severity level, or both, include the **host sfc0-master** statement at the **[edit system syslog]** hierarchy level on the SFC:

```
[edit system syslog]
host sfc0-master {
    facility severity;
}
```

To disable message forwarding, set the facility to **any** and the severity level to **none**:

```
[edit system syslog]
host sfc0-master {
    any none;
```

```
}
```

In either case, the setting applies to all connected LCCs in the routing matrix.

To capture the messages forwarded by the T1600 or T4000 LCCs (as well as messages generated on the SFC itself), you must also configure system logging on the SFC. Direct the messages to one or more destinations by including the appropriate statements at the **[edit system syslog]** hierarchy level on the SFC:

- To a file, as described in [“Directing System Log Messages to a Log File” on page 1103](#).
- To the terminal session of one or more specific users (or all users), as described in [“Directing System Log Messages to a User Terminal” on page 1104](#).
- To the console, as described in [“Directing System Log Messages to the Console” on page 1105](#).
- To a remote machine that is running the syslogd utility or to the other Routing Engine. For more information, see [“Directing Messages to a Remote Destination from the Routing Matrix Based on a TX Matrix Plus Router” on page 1113](#).

As previously noted, the configuration statements included on the SFC also configure the same destinations on each connected LCC.

When specifying the severity level for local messages (at the **[edit system syslog (file | host | console | user)]** hierarchy level) and forwarded messages (at the **[edit system syslog host sfc0-master]** hierarchy level), you can set the same severity level for both, set a lower severity level for local messages, or set a higher severity level for local messages. The following examples describe the consequence of each configuration. (For simplicity, the examples use the **any** facility in every case. You can also specify different severities for different facilities, with more complex consequences.)

Related Documentation

- [Configuring System Logging for a TX Matrix Plus Router on page 1085](#)
- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

Impact of Different Local and Forwarded Severity Levels on System Log Messages on a TX Matrix Router

This topic describes the impact of different local and forwarded severity levels configured for system log messages on a TX Matrix router:

- [Messages Logged When the Local and Forwarded Severity Levels Are the Same on page 1089](#)
- [Messages Logged When the Local Severity Level Is Lower on page 1090](#)
- [Messages Logged When the Local Severity Level Is Higher on page 1091](#)

Messages Logged When the Local and Forwarded Severity Levels Are the Same

When the severity level is the same for local and forwarded messages, the log on the TX Matrix router contains all messages from the logs on the T640 routers. For example, you

can specify severity **info** for the `/var/log/messages` file, which is the default severity level for messages forwarded by T640 routers:

```
[edit system syslog]
file messages {
  any info;
}
```

[Table 169 on page 1090](#) specifies which messages are included in the logs on the T640 routers and the TX Matrix router.

Table 169: Example: Local and Forwarded Severity Level Are Both info

Log Location	Source of Messages	Lowest Severity Included
T640 router	Local	info
TX Matrix router	Local	info
	Forwarded from T640 routers	info

Messages Logged When the Local Severity Level Is Lower

When the severity level is lower for local messages than for forwarded messages, the log on the TX Matrix router includes fewer forwarded messages than when the severities are the same. Locally generated messages are still logged at the lower severity level, so their number in each log is the same as when the severities are the same.

For example, on a TX Matrix router, you can specify severity **notice** for the `/var/log/messages` file and severity **critical** for forwarded messages:

```
[edit system syslog]
file messages {
  any notice;
}
host scc-master {
  any critical;
}
```

[Table 170 on page 1090](#) specifies which messages in a routing matrix are included in the logs on the T640 routers and the TX Matrix router. The T640 routers forward only those messages with severity **critical** and higher, so the log on the TX Matrix router does not include the messages with severity **error**, **warning**, or **notice** that the T640 routers log locally.

Table 170: Example: Local Severity Is notice, Forwarded Severity Is critical

Log Location	Source of Messages	Lowest Severity Included
T640 router	Local	notice

Table 170: Example: Local Severity Is notice, Forwarded Severity Is critical (continued)

Log Location	Source of Messages	Lowest Severity Included
TX Matrix router	Local	notice
	Forwarded from T640 routers	critical

Messages Logged When the Local Severity Level Is Higher

When the severity level is higher for local messages than for forwarded messages, the log on the TX Matrix router includes fewer forwarded messages than when the severities are the same, and all local logs contain fewer messages overall.

For example, you can specify severity **critical** for the `/var/log/messages` file and severity **notice** for forwarded messages:

```
[edit system syslog]
file messages {
  any critical;
}
host scc-master {
  any notice;
}
```

[Table 171 on page 1091](#) specifies which messages are included in the logs on the T640 routers and the TX Matrix router. Although the T640 routers forward messages with severity **notice** and higher, the TX Matrix router discards any of those messages with severity lower than **critical** (does not log forwarded messages with severity **error**, **warning**, or **notice**). None of the logs include messages with severity **error** or lower.

Table 171: Example: Local Severity Is critical, Forwarded Severity Is notice

Log Location	Source of Messages	Lowest Severity Included
T640 router	Local	critical
TX Matrix router	Local	critical
	Forwarded from T640 routers	critical

Related Documentation

- [Configuring System Logging for a TX Matrix Router on page 1083](#)

Impact of Different Local and Forwarded Severity Levels on System Log Messages on a TX Matrix Plus Router

This topic describes the impact of different local and forwarded severity levels configured for the system log messages on a TX Matrix Plus router:

- [Messages Logged When the Local and Forwarded Severity Levels Are the Same on page 1092](#)
- [Messages Logged When the Local Severity Level Is Lower on page 1092](#)
- [Messages Logged When the Local Severity Level Is Higher on page 1093](#)

Messages Logged When the Local and Forwarded Severity Levels Are the Same

When the severity level is the same for local and forwarded messages, the log on the TX Matrix Plus router contains all messages from the logs on the T1600 routers in the routing matrix. For example, you can specify severity **info** for the `/var/log/messages` file, which is the default severity level for messages forwarded by T1600 routers:

```
[edit system syslog]
file messages {
  any info;
}
```

[Table 172 on page 1092](#) specifies which messages in a routing matrix based on a TX Matrix Plus router are included in the logs on the T1600 routers and the TX Matrix Plus router:

Table 172: Example: Local and Forwarded Severity Level Are Both info

Log Location	Source of Messages	Lowest Severity Included
T1600 router	Local	info
TX Matrix Plus router	Local	info
	Forwarded from T1600 routers	info

Messages Logged When the Local Severity Level Is Lower

When the severity level is lower for local messages than for forwarded messages, the log on the TX Matrix Plus router includes fewer forwarded messages than when the severities are the same. Locally generated messages are still logged at the lower severity level, so their number in each log is the same as when the severities are the same.

For example, on a TX Matrix Plus router, you can specify severity **notice** for the `/var/log/messages` file and severity **critical** for forwarded messages:

```
[edit system syslog]
file messages {
  any notice;
}
```

```
host sfcO-master {
  any critical;
}
```

Table 173 on page 1093 specifies which messages in a routing matrix are included in the logs on the T1600 routers and the TX Matrix Plus router. The T1600 routers forward only those messages with severity **critical** and higher, so the log on the TX Matrix Plus router does not include the messages with severity **error**, **warning**, or **notice** that the T1600 routers log locally.

Table 173: Example: Local Severity Is notice, Forwarded Severity Is critical

Log Location	Source of Messages	Lowest Severity Included
T1600 router	Local	notice
TX Matrix Plus router	Local	notice
	Forwarded from T1600 routers	critical

Messages Logged When the Local Severity Level Is Higher

When the severity level is higher for local messages than for forwarded messages, the log on the TX Matrix Plus router includes fewer forwarded messages than when the severities are the same, and all local logs contain fewer messages overall.

For example, you can specify severity **critical** for the `/var/log/messages` file and severity **notice** for forwarded messages:

```
[edit system syslog]
file messages {
  any critical;
}
host sfcO-master {
  any notice;
}
```

Table 174 on page 1093 specifies which messages are included in the logs on the T1600 routers and the TX Matrix Plus router. Although the T1600 routers forward messages with severity **notice** and higher, the TX Matrix Plus router discards any of those messages with severity lower than **critical** (does not log forwarded messages with severity **error**, **warning**, or **notice**). None of the logs include messages with severity **error** or lower.

Table 174: Example: Local Severity Is critical, Forwarded Severity Is notice

Log Location	Source of Messages	Lowest Severity Included
T1600 router	Local	critical
TX Matrix Plus router	Local	critical
	Forwarded from T1600 routers	critical

- Related Documentation**
- [Configuring System Logging for a TX Matrix Plus Router on page 1085](#)

Configuring Optional Features for Forwarded Messages on a TX Matrix Router

To configure additional optional features when specifying how the T640 routers forward messages to the TX Matrix router, include statements at the **[edit system syslog host scc-master]** hierarchy level. To include priority information (facility and severity level) in each forwarded message, include the **explicit-priority** statement. To insert a text string in each forwarded message, include the **log-prefix** statement. To use regular expression matching to specify more exactly which messages from a facility are forwarded, include the **match** statement.

```
[edit system syslog]
host scc-master {
    facility severity;
    explicit-priority;
    log-prefix string;
    match "regular-expression";
}
```

You can also include the **facility-override** statement at the **[edit system syslog host scc-master]** hierarchy level, but we do not recommend doing so. It is not necessary to use alternative facilities for messages forwarded to the TX Matrix router, because it runs the Junos system logging utility and can interpret the Junos OS-specific facilities. For more information about alternative facilities, see [“Changing the Alternative Facility Name for System Log Messages Directed to a Remote Destination” on page 1108](#).

- [Including Priority Information in Forwarded Messages on page 1094](#)
- [Adding a Text String to Forwarded Messages on page 1095](#)
- [Using Regular Expressions to Refine the Set of Forwarded Messages on page 1095](#)

Including Priority Information in Forwarded Messages

When you include the **explicit-priority** statement at the **[edit system syslog host scc-master]** hierarchy level, messages forwarded to the TX Matrix router include priority information. For the information to appear in a log file on the TX Matrix router, you must also include the **explicit-priority** statement at the **[edit system syslog file filename]** hierarchy level for the file on the TX Matrix router. As a consequence, the log file with the same name on each platform in the routing matrix also includes priority information for locally generated messages.

To include priority information in messages directed to a remote machine from all routers in the routing matrix, also include the **explicit-priority** statement at the **[edit system syslog host hostname]** hierarchy level for the remote machine. For more information, see [“Directing Messages to a Remote Destination from the Routing Matrix Based on the TX Matrix Router” on page 1112](#).

In the following example, the **/var/log/messages** file on all routers includes priority information for messages with severity **notice** and higher from all facilities. The log on

the TX Matrix router also includes messages with those characteristics forwarded from the T640 routers.

```
[edit system syslog]
host scc-master {
  any notice;
  explicit-priority;
}
file messages {
  any notice;
  explicit-priority;
}
```

Adding a Text String to Forwarded Messages

When you include the **log-prefix** statement at the **[edit system syslog host scc-master]** hierarchy level, the string that you define appears in every message forwarded to the TX Matrix router. For more information, see [“Adding a Text String to System Log Messages Directed to a Remote Destination” on page 1107](#).

Using Regular Expressions to Refine the Set of Forwarded Messages

When you include the **match** statement at the **[edit system syslog host scc-master]** hierarchy level, the regular expression that you specify controls which messages from the T640 routers are forwarded to the TX Matrix router. The regular expression is not applied to messages from the T640 router that are directed to destinations other than the TX Matrix router. For more information about regular expression matching, see [“Using Regular Expressions to Refine the Set of Logged Messages” on page 1076](#).

See Also • [Configuring System Logging for a TX Matrix Router on page 1083](#)

Configuring Optional Features for Forwarded Messages on a TX Matrix Plus Router

From the perspective of the user interface, the routing matrix appears as a single router. The TX Matrix Plus router (also called the switch-fabric chassis SFC) controls all the T1600 or T4000 routers (also called the line-card chassis LCC) in the routing matrix.

To configure additional optional features when specifying how the connected T1600 or T4000 LCCs forward messages to the SFC, include statements at the **[edit system syslog host sfc0-master]** hierarchy level. To include priority information (facility and severity level) in each forwarded message, include the **explicit-priority** statement. To insert a text string in each forwarded message, include the **log-prefix** statement. To use regular expression matching to specify more exactly which messages from a facility are forwarded, include the **match** statement.

```
[edit system syslog]
host sfc0-master {
  facility severity;
  explicit-priority;
  log-prefix string;
```

```
match "regular-expression;
}
```

You can also include the **facility-override** statement at the **[edit system syslog host sfc0-master]** hierarchy level, but we do not recommend doing so. It is not necessary to use alternative facilities for messages forwarded to the SFC, because it runs the Junos system logging utility and can interpret the Junos OS-specific facilities. For more information about alternative facilities, see [“Changing the Alternative Facility Name for System Log Messages Directed to a Remote Destination”](#) on page 1108.

1. [Including Priority Information in Forwarded Messages](#) on page 1096
2. [Adding a Text String to Forwarded Messages](#) on page 1096
3. [Using Regular Expressions to Refine the Set of Forwarded Messages](#) on page 1097

Including Priority Information in Forwarded Messages

When you include the **explicit-priority** statement at the **[edit system syslog host sfc0-master]** hierarchy level, messages forwarded to the TX Matrix Plus router (or the SFC) include priority information. For the information to appear in a log file on the SFC, you must also include the **explicit-priority** statement at the **[edit system syslog file filename]** hierarchy level for the file on the SFC. As a consequence, the log file with the same name on each platform in the routing matrix also includes priority information for locally generated messages.

To include priority information in messages directed to a remote machine from all routers in the routing matrix, also include the **explicit-priority** statement at the **[edit system syslog host hostname]** hierarchy level for the remote machine. For more information, see [“Directing Messages to a Remote Destination from the Routing Matrix Based on a TX Matrix Plus Router”](#) on page 1113.

In the following example, the **/var/log/messages** file on all routers includes priority information for messages with severity **notice** and higher from all facilities. The log on the TX Matrix Plus router SFC also includes messages with those characteristics forwarded from the connected T1600 or T4000 LCCs.

```
[edit system syslog]
host sfc0-master {
  any notice;
  explicit-priority;
}
file messages {
  any notice;
  explicit-priority;
}
```

Adding a Text String to Forwarded Messages

When you include the **log-prefix** statement at the **[edit system syslog host sfc0-master]** hierarchy level, the string that you define appears in every message forwarded to the TX Matrix Plus router. For more information, see [“Adding a Text String to System Log Messages Directed to a Remote Destination”](#) on page 1107.

Using Regular Expressions to Refine the Set of Forwarded Messages

When you include the **match** statement at the **[edit system syslog host sfc0-master]** hierarchy level, the regular expression that you specify controls which messages from the connected T1600 or T4000 LCCs are forwarded to the TX Matrix Plus SFC. The regular expression is not applied to messages from the connected LCCs that are directed to destinations other than the SFC. For more information about regular expression matching, see “Using Regular Expressions to Refine the Set of Logged Messages” on page 1076.

- See Also**
- [Configuring System Logging for a TX Matrix Plus Router on page 1085](#)
 - [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

Configuring System Logging Differently on Each T640 Router in a Routing Matrix

We recommend that all routers in a routing matrix composed of a TX Matrix router and T640 routers use the same configuration, which implies that you include system logging configuration statements on the TX Matrix router only. In rare circumstances, however, you might choose to log different messages on different routers. For example, if one router in the routing matrix is experiencing problems with authentication, a Juniper Networks support representative might instruct you to log messages from the **authorization** facility with severity **debug** on that router.

To configure routers separately, include configuration statements in the appropriate groups at the **[edit groups]** hierarchy level on the TX Matrix router:

- To configure settings that apply to the TX Matrix router but not the T640 routers, include them in the **re0** and **re1** configuration groups.
- To configure settings that apply to particular T640 routers, include them in the **lccn-re0** and **lccn-re1** configuration groups, where **n** is the line-card chassis (LCC) index number of the router.

When you use configuration groups, do not issue CLI configuration-mode commands to change statements at the **[edit system syslog]** hierarchy level on the TX Matrix router. If you do, the resulting statements overwrite the statements defined in configuration groups and apply to the T640 routers also. (We further recommend that you do not issue CLI configuration-mode commands on the T640 routers at any time.)

The following example shows how to configure the **/var/log/messages** files on three routers to include different sets of messages:

- On the TX Matrix router, local messages with severity **info** and higher from all facilities. The file does not include messages from the T640 routers, because the **host scc-master** statement disables message forwarding.
- On the T640 router designated **LCC0**, messages from the **authorization** facility with severity **info** and higher.
- On the T640 router designated **LCC1**, messages with severity **notice** from all facilities.

```

[edit groups]
re0 {
  system {
    syslog {
      file messages {
        any info;
      }
      host scc-master {
        any none;
      }
    }
  }
}
re1 {
  ... same statements as for re0 ...
}
lcc0-re0 {
  system {
    syslog {
      file messages {
        authorization info;
      }
    }
  }
}
lcc0-re1 {
  ... same statements as for lcc0-re0 ...
}
lcc1-re0 {
  system {
    syslog {
      file messages {
        any notice;
      }
    }
  }
}
lcc0-re1 {
  ... same statements as for lcc1-re0 ...
}

```

Related Documentation • [Configuring System Logging for a TX Matrix Router on page 1083](#)

Configuring System Logging Differently on Each T1600 or T4000 Router in a Routing Matrix

We recommend that all routers in a routing matrix composed of a TX Matrix Plus router with T1600 or T4000 routers use the same configuration, which implies that you include system logging configuration statements on the TX Matrix Plus router only. In rare circumstances, however, you might choose to log different messages on different routers. For example, if one router in the routing matrix is experiencing problems with

authentication, a Juniper Networks support representative might instruct you to log messages from the **authorization** facility with severity **debug** on that router.

To configure routers separately, include configuration statements in the appropriate groups at the **[edit groups]** hierarchy level on the TX Matrix Plus router:

- To configure settings that apply to the TX Matrix Plus router but not the T1600 or T4000 routers, include them in the **re0** and **re1** configuration groups.
- To configure settings that apply to particular T1600 or T4000 routers, include them in the **lccn-re0** and **lccn-re1** configuration groups, where **n** is the line-card chassis (LCC) index number of the router.

When you use configuration groups, do not issue CLI configuration-mode commands to change statements at the **[edit system syslog]** hierarchy level on the TX Matrix Plus router. If you do, the resulting statements overwrite the statements defined in configuration groups and apply to the T1600 or T4000 routers also. (We further recommend that you do not issue CLI configuration-mode commands on the T1600 or T4000 routers at any time.)

For more information about the configuration groups for a routing matrix, see the chapter about configuration groups in the *Junos OS CLI User Guide*.

The following example shows how to configure the **/var/log/messages** files on three routers to include different sets of messages:

- On the TX Matrix Plus router, local messages with severity **info** and higher from all facilities. The file does not include messages from the T1600 or T4000 routers, because the **host sfc0-master** statement disables message forwarding.
- On the T1600 or T4000 router designated **LCC0**, messages from the **authorization** facility with severity **info** and higher.
- On the T1600 or T4000 router designated **LCC1**, messages with severity **notice** from all facilities.

```
[edit groups]
re0 {
  system {
    syslog {
      file messages {
        any info;
      }
      host sfc0-master {
        any none;
      }
    }
  }
}
re1 {
  ... same statements as for re0 ...
}
lcc0-re0 {
  system {
```

```
syslog {
  file messages {
    authorization info;
  }
}
}
lcc0-re1 {
  ... same statements as for lcc0-re0 ...
}
lcc1-re0 {
  system {
    syslog {
      file messages {
        any notice;
      }
    }
  }
}
lcc0-re1 {
  ... same statements as for lcc1-re0 ...
}
```

- Related Documentation**
- [Configuring System Logging for a TX Matrix Plus Router on page 1085](#)
 - [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

CHAPTER 47

Directing System Log Messages to a Remote Destination

- [Specifying the Facility and Severity of Messages to Include in the Log on page 1101](#)
- [Directing System Log Messages to a Log File on page 1103](#)
- [Directing System Log Messages to a User Terminal on page 1104](#)
- [Directing System Log Messages to the Console on page 1105](#)
- [Directing System Log Messages to a Remote Machine or the Other Routing Engine on page 1105](#)
- [Directing System Log Messages to a Remote Machine on page 1106](#)
- [Specifying an Alternative Source Address for System Log Messages Directed to a Remote Destination on page 1107](#)
- [Adding a Text String to System Log Messages Directed to a Remote Destination on page 1107](#)
- [Changing the Alternative Facility Name for System Log Messages Directed to a Remote Destination on page 1108](#)
- [Default Facilities for System Log Messages Directed to a Remote Destination on page 1110](#)
- [Alternate Facilities for System Log Messages Directed to a Remote Destination on page 1110](#)
- [Examples: Assigning an Alternative Facility to System Log Messages Directed to a Remote Destination on page 1111](#)
- [Directing Messages to a Remote Destination from the Routing Matrix Based on the TX Matrix Router on page 1112](#)
- [Directing Messages to a Remote Destination from the Routing Matrix Based on a TX Matrix Plus Router on page 1113](#)

Specifying the Facility and Severity of Messages to Include in the Log

Each system log message belongs to a facility, which groups together messages that either are generated by the same source (such as a software process) or concern a similar condition or activity (such as authentication attempts). Each message is also preassigned a *severity level*, which indicates how seriously the triggering event affects routing platform functions.

When you configure logging for a facility and destination, you specify a severity level for each facility. Messages from the facility that are rated at that level and higher are logged to the following destination:

```
[edit system syslog]
(console | file filename | host destination | user username) {
  facility severity ;
}
```

For more information about the destinations, see [“Directing System Log Messages to a User Terminal” on page 1104](#), and, [“Directing System Log Messages to the Console” on page 1105](#).

To log messages belonging to more than one facility to a particular destination, specify each facility and associated severity as a separate statement within the set of statements for the destination.

[Table 160 on page 1051](#) lists the Junos OS system logging facilities that you can specify in configuration statements at the **[edit system syslog]** hierarchy level.

Table 175: Junos OS System Logging Facilities

Facility	Type of Event or Error
any	All (messages from all facilities)
authorization	Authentication and authorization attempts
change-log	Changes to the Junos OS configuration
conflict-log	Specified configuration is invalid on the router type
daemon	Actions performed or errors encountered by system processes
dfc	Events related to dynamic flow capture
firewall	Packet filtering actions performed by a firewall filter
ftp	Actions performed or errors encountered by the FTP process
interactive-commands	Commands issued at the Junos OS command-line interface (CLI) prompt or by a client application such as a Junos XML protocol or NETCONF XML client
kernel	Actions performed or errors encountered by the Junos OS kernel
pfe	Actions performed or errors encountered by the Packet Forwarding Engine
user	Actions performed or errors encountered by user-space processes

Table 161 on page 1052 lists the severity levels that you can specify in configuration statements at the `[edit system syslog]` hierarchy level. The levels from **emergency** through **info** are in order from highest severity (greatest effect on functioning) to lowest.

Unlike the other severity levels, the **none** level disables logging of a facility instead of indicating how seriously a triggering event affects routing functions. For more information, see “Disabling the System Logging of a Facility” on page 1079.

Table 176: System Log Message Severity Levels

Value	Severity Level	Description
N/A	none	Disables logging of the associated facility to a destination
0	emergency	System panic or other condition that causes the router to stop functioning
1	alert	Conditions that require immediate correction, such as a corrupted system database
2	critical	Critical conditions, such as hard errors
3	error	Error conditions that generally have less serious consequences than errors at the emergency, alert, and critical levels
4	warning	Conditions that warrant monitoring
5	notice	Conditions that are not errors but might warrant special handling
6	info	Events or nonerror conditions of interest
7	any	Includes all severity levels

Related Documentation

- [Junos OS System Logging Facilities and Message Severity Levels on page 1051](#)
- [Single-Chassis System Logging Configuration Overview on page 1061](#)
- [Examples: Configuring System Logging on page 1080](#)

Directing System Log Messages to a Log File

To direct system log messages to a file in the `/var/log` directory of the local Routing Engine, include the **file** statement at the `[edit system syslog]` hierarchy level:

```
[edit system syslog]
file filename {
    facility severity;
    archive <archive-sites (ftp-url <password password>) > <files number> <size size>
        <start-time "YYYY-MM-DD.hh:mm"> <transfer-interval minutes> <world-readable |
        no-world-readable>;
    explicit-priority;
    match "regular-expression";
```

```
structured-data {  
    brief;  
}  
}
```

For the list of facilities and severity levels, see [“Specifying the Facility and Severity of Messages to Include in the Log” on page 1101](#).

To prevent log files from growing too large, the Junos OS system logging utility by default writes messages to a sequence of files of a defined size. By including the **archive** statement, you can configure the number of files, their maximum size, and who can read them, either for all log files or for a certain log file. For more information, see [“Specifying Log File Size, Number, and Archiving Properties” on page 1070](#).

For information about the following statements, see the indicated sections:

- **explicit-priority**—See [“Including Priority Information in System Log Messages” on page 1072](#)
- **match**—See [“Using Regular Expressions to Refine the Set of Logged Messages” on page 1076](#)
- **structured-data**—See [“Logging Messages in Structured-Data Format” on page 1069](#)

**Related
Documentation**

- [Single-Chassis System Logging Configuration Overview on page 1061](#)
- [Overview of Junos OS System Log Messages on page 1050](#)
- [Logging Messages in Structured-Data Format on page 1069](#)
- [Examples: Configuring System Logging on page 1080](#)

Directing System Log Messages to a User Terminal

To direct system log messages to the terminal session of one or more specific users (or all users) when they are logged in to the local Routing Engine, include the **user** statement at the **[edit system syslog]** hierarchy level:

```
[edit system syslog]  
user (username | *) {  
    facility severity;  
    match "regular-expression";  
}
```

Specify one or more Junos OS usernames, separating multiple values with spaces, or use the asterisk (*) to indicate all users who are logged in to the local Routing Engine.

For the list of logging facilities and severity levels, see [“Specifying the Facility and Severity of Messages to Include in the Log” on page 1101](#). For information about the **match** statement, see [“Using Regular Expressions to Refine the Set of Logged Messages” on page 1076](#).

**Related
Documentation**

- [Single-Chassis System Logging Configuration Overview on page 1061](#)

- [Examples: Configuring System Logging on page 1080](#)

Directing System Log Messages to the Console

To direct system log messages to the console of the local Routing Engine, include the **console** statement at the **[edit system syslog]** hierarchy level:

```
[edit system syslog]
console {
  facility severity;
}
```

For the list of logging facilities and severity levels, see “[Specifying the Facility and Severity of Messages to Include in the Log](#)” on page 1101.

Related Documentation

- [Single-Chassis System Logging Configuration Overview on page 1061](#)
- [Examples: Configuring System Logging on page 1080](#)

Directing System Log Messages to a Remote Machine or the Other Routing Engine

To direct system log messages to a remote machine or to the other Routing Engine on the router, include the **host** statement at the **[edit system syslog]** hierarchy level:

```
[edit system syslog]
host (hostname | other-routing-engine) {
  facility severity;
  explicit-priority;
  facility-override facility;
  log-prefix string;
  match "regular-expression";
  source-address source-address;
  structured-data {
    brief;
  }
}
source-address source-address;
```

To direct system log messages to a remote machine, include the **host hostname** statement to specify the remote machine’s IP version 4 (IPv4) address, IP version 6 (IPv6) address, or fully qualified hostname. The remote machine must be running the standard **syslogd** utility. We do not recommend directing messages to another Juniper Networks router. In each system log message directed to the remote machine, the hostname of the local Routing Engine appears after the timestamp to indicate that it is the source for the message.

To direct system log messages to the other Routing Engine on a router with two Routing Engines installed and operational, include the **host other-routing-engine** statement. The statement is not automatically reciprocal, so you must include it in each Routing Engine configuration if you want the Routing Engines to direct messages to each other. In each

message directed to the other Routing Engine, the string **re0** or **re1** appears after the timestamp to indicate the source for the message.

To record facility and severity level information in each message, include the **explicit-priority** statement. For more information, see [“Including Priority Information in System Log Messages” on page 1072](#).

For information about the **match** statement, see [“Using Regular Expressions to Refine the Set of Logged Messages” on page 1076](#).

When directing messages to remote machines, you can include the **source-address** statement to specify the IP address of the router that is reported in the messages as their source. In each **host** statement, include the **facility-override** statement to assign an alternative facility and the **log-prefix** statement to add a string to each message. You can include the **structured-data** statement to enable the forwarding of structured system log messages to a remote system log server in the IETF system log message format.

Related Documentation

- [Single-Chassis System Logging Configuration Overview on page 1061](#)

Directing System Log Messages to a Remote Machine

To direct system log messages to a remote machine, include the **host** statement at the **[edit system syslog]** hierarchy level:

```
[edit system syslog]
host (hostname | other-routing-engine) {
  facility severity;
  explicit-priority;
  facility-override facility;
  log-prefix string;
  match "regular-expression";
}
source-address source-address;
```

To direct system log messages to a remote machine, include the **host hostname** statement to specify the remote machine's IP version 4 (IPv4) address or fully qualified hostname. The remote machine must be running the standard **syslogd** utility. We do not recommend directing messages to another Juniper Networks switch. In each system log message directed to the remote machine, the hostname of the local Routing Engine appears after the timestamp to indicate that it is the source for the message.

For the list of logging facilities and severity levels to configure under the **host** statement, see [“Specifying the Facility and Severity of Messages to Include in the Log” on page 1101](#).

To record facility and severity level information in each message, include the **explicit-priority** statement. For more information, see [“Including Priority Information in System Log Messages” on page 1072](#).

For information about the **match** statement, see [“Using Regular Expressions to Refine the Set of Logged Messages” on page 1076](#).

When directing messages to remote machines, you can include the **source-address** statement to specify the IP address of the switch that is reported in the messages as their source. In each **host** statement, you can also include the **facility-override** statement to assign an alternative facility and the **log-prefix** statement to add a string to each message.

Related Documentation

- [Overview of Single-Chassis System Logging Configuration on page 1063](#)

Specifying an Alternative Source Address for System Log Messages Directed to a Remote Destination

To specify the source router to be reported in system log messages when the messages are directed to a remote machine, include the **source-address** statement at the **[edit system syslog]** hierarchy level:

```
[edit system syslog]
source-address source-address;
```

source-address is a valid IPv4 or IPv6 address configured on one of the router interfaces. The address is reported in the messages directed to all remote machines specified in **host hostname** statements at the **[edit system syslog]** hierarchy level, but not in messages directed to the other Routing Engine.

Related Documentation

- [Single-Chassis System Logging Configuration Overview on page 1061](#)
- [Examples: Assigning an Alternative Facility to System Log Messages Directed to a Remote Destination on page 1111](#)

Adding a Text String to System Log Messages Directed to a Remote Destination

To add a text string to every system log message directed to a remote machine or to the other Routing Engine, include the **log-prefix** statement at the **[edit system syslog host]** hierarchy level:

```
[edit system syslog host (hostname | other-routing-engine)]
facility severity;
log-prefix string;
```

The string can contain any alphanumeric or special character except the equal sign (=) and the colon (:). It also cannot include the space character; do not enclose the string in quotation marks (" ") in an attempt to include spaces in it.

The Junos OS system logging utility automatically appends a colon and a space to the specified string when the system log messages are written to the log. The string is inserted after the identifier for the Routing Engine that generated the message.

The following example shows how to add the string M120 to all messages to indicate that the router is an M120 router, and direct the messages to the remote machine hardware-logger.mycompany.com:

```
[edit system syslog]
host hardware-logger.mycompany.com {
  any info;
  log-prefix M120;
}
```

When these configuration statements are included on an M120 router called origin1, a message in the system log on hardware-logger.mycompany.com looks like the following:

```
Mar 9 17:33:23 origin1 M120: mgd[477]: UI_CMDLINE_READ_LINE: user 'root', command 'run
show version'
```

**Related
Documentation**

- [Single-Chassis System Logging Configuration Overview on page 1061](#)
- [Specifying Log File Size, Number, and Archiving Properties on page 1070](#)

Changing the Alternative Facility Name for System Log Messages Directed to a Remote Destination

Some facilities assigned to messages logged on the local router or switch have Junos OS-specific names (see [Table 160 on page 1051](#)). In the recommended configuration, a remote machine designated at the `[edit system syslog host hostname]` hierarchy level is not a Juniper Networks router or switch, so its syslogd utility cannot interpret the Junos OS-specific names. To enable the standard syslogd utility to handle messages from these facilities when messages are directed to a remote machine, a standard **localX** facility name is used instead of the Junos OS-specific facility name.

[Table 177 on page 1110](#) lists the default alternative facility name next to the Junos OS-specific facility name it is used for.

The syslogd utility on a remote machine handles all messages that belong to a facility in the same way, regardless of the source of the message (the Juniper Networks router or switch or the remote machine itself). For example, the following statements in the configuration of the router called **local-router** direct messages from the **authorization** facility to the remote machine *monitor.mycompany.com*:

```
[edit system syslog]
host monitor.mycompany.com {
  authorization info;
}
```

The default alternative facility for the local **authorization** facility is also **authorization**. If the syslogd utility on **monitor** is configured to write messages belonging to the **authorization** facility to the file `/var/log/auth-attempts`, then the file contains the messages generated when users log in to **local-router** and the messages generated when users log in to **monitor**. Although the name of the source machine appears in each system log

message, the mixing of messages from multiple machines can make it more difficult to analyze the contents of the **auth-attempts** file.

To make it easier to separate the messages from each source, you can assign an alternative facility to all messages generated on **local-router** when they are directed to **monitor**. You can then configure the syslogd utility on **monitor** to write messages with the alternative facility to a different file from messages generated on **monitor** itself.

To change the facility used for all messages directed to a remote machine, include the **facility-override** statement at the **[edit system syslog host *hostname*]** hierarchy level:

```
[edit system syslog host hostname]
facility severity;
facility-override facility;
```

In general, it makes sense to specify an alternative facility that is not already in use on the remote machine, such as one of the **localX** facilities. On the remote machine, you must also configure the syslogd utility to handle the messages in the desired manner.

[Table 178 on page 1111](#) lists the facilities that you can specify in the **facility-override** statement.

We do not recommend including the **facility-override** statement at the **[edit system syslog host *other-routing-engine*]** hierarchy level. It is not necessary to use alternative facility names when directing messages to the other Routing Engine, because its Junos OS system logging utility can interpret the Junos OS-specific names.

The following example shows how to log all messages generated on the local router at the error level or higher to the local0 facility on the remote machine called **monitor.mycompany.com**:

```
[edit system syslog]
host monitor.mycompany.com {
    any error;
    facility-override local0;
}
```

The following example shows how to configure routers located in California and routers located in New York to send messages to a single remote machine called **central-logger.mycompany.com**. The messages from California are assigned to alternative facility **local0** and the messages from New York are assigned to alternative facility **local2**.

- Configure California routers to aggregate messages in the local0 facility:

```
[edit system syslog]
host central-logger.mycompany.com {
    change-log info;
    facility-override local0;
}
```

- Configure New York routers to aggregate messages in the local2 facility:

```
[edit system syslog]
host central-logger.mycompany.com {
  change-log info;
  facility-override local2;
}
```

On central-logger, you can then configure the system logging utility to write messages from the local0 facility to the file **change-log** and the messages from the local2 facility to the file **new-york-config**.

Related Documentation

- [Table 177 on page 1110](#)
- [Alternate Facilities for System Log Messages Directed to a Remote Destination on page 1110](#)
- [Examples: Assigning an Alternative Facility to System Log Messages Directed to a Remote Destination on page 1111](#)

Default Facilities for System Log Messages Directed to a Remote Destination

[Table 177 on page 1110](#) lists the default alternative facility name next to the Junos OS-specific facility name for which it is used. For facilities that are not listed, the default alternative name is the same as the local facility name.

Table 177: Default Facilities for Messages Directed to a Remote Destination

Junos OS—Specific Local Facility	Default Facility When Directed to Remote Destination
change-log	local6
conflict-log	local5
dfc	local1
firewall	local3
interactive-commands	local7
pfe	local4

Related Documentation

- [Single-Chassis System Logging Configuration Overview on page 1061](#)

Alternate Facilities for System Log Messages Directed to a Remote Destination

[Table 178 on page 1111](#) lists the facilities that you can specify in the **facility-override** statement.

Table 178: Facilities for the facility-override Statement

Facility	Description
authorization	Authentication and authorization attempts
daemon	Actions performed or errors encountered by system processes
ftp	Actions performed or errors encountered by the FTP process
kernel	Actions performed or errors encountered by the Junos OS kernel
local0	Local facility number 0
local1	Local facility number 1
local2	Local facility number 2
local3	Local facility number 3
local4	Local facility number 4
local5	Local facility number 5
local6	Local facility number 6
local7	Local facility number 7
user	Actions performed or errors encountered by user-space processes

We do not recommend including the **facility-override** statement at the **[edit system syslog host other-routing-engine]** hierarchy level. It is not necessary to use alternative facility names when directing messages to the other Routing Engine, because its Junos OS system logging utility can interpret the Junos OS-specific names.

Related Documentation

- [Examples: Assigning an Alternative Facility to System Log Messages Directed to a Remote Destination on page 1111](#)
- [Single-Chassis System Logging Configuration Overview on page 1061](#)

Examples: Assigning an Alternative Facility to System Log Messages Directed to a Remote Destination

Log all messages generated on the local routing platform at the error level or higher to the **local0** facility on the remote machine called **monitor.mycompany.com**:

```
[edit system syslog]
host monitor.mycompany.com {
  any error;
```

```
facility-override local0;
}
```

Configure routing platforms located in California and routing platforms located in New York to send messages to a single remote machine called `central-logger.mycompany.com`. The messages from California are assigned alternative facility `local0` and the messages from New York are assigned to alternative facility `local2`.

- Configure California routing platforms to aggregate messages in the **local0** facility:

```
[edit system syslog]
host central-logger.mycompany.com {
  change-log info;
  facility-override local0;
}
```

- Configure New York routing platforms to aggregate messages in the **local2** facility:

```
[edit system syslog]
host central-logger.mycompany.com {
  change-log info;
  facility-override local2;
}
```

On **central-logger**, you can then configure the system logging utility to write messages from the **local0** facility to the file **california-config** and the messages from the **local2** facility to the file **new-york-config**.

**Related
Documentation**

- [Alternate Facilities for System Log Messages Directed to a Remote Destination on page 1110](#)

Directing Messages to a Remote Destination from the Routing Matrix Based on the TX Matrix Router

You can configure a routing matrix composed of a TX Matrix router and T640 routers to direct system logging messages to a remote machine or the other Routing Engine on each router, just as on a single-chassis system. Include the **host** statement at the **[edit system syslog]** hierarchy level on the TX Matrix router:

```
[edit system syslog]
host (hostname | other-routing-engine) {
  facility severity;
  explicit-priority;
  facility-override facility;
  log-prefix string;
  match "regular-expression";
}
source-address source-address;
```

The TX Matrix router directs messages to a remote machine or the other Routing Engine in the same way as a single-chassis system, and the optional statements (**explicit-priority**,

facility-override, **log-prefix**, **match**, and **source-address**) also have the same effect as on a single-chassis system.

For the TX Matrix router to include priority information when it directs messages that originated on a T640 router to the remote destination, you must also include the **explicit-priority** statement at the **[edit system syslog host scc-master]** hierarchy level.

The **other-routing-engine** statement does not interact with message forwarding from the T640 routers to the TX Matrix router. For example, if you include the statement in the configuration for the Routing Engine in slot 0 (**re0**), the **re0** Routing Engine on each T640 router sends messages to the **re1** Routing Engine on its platform only. It does not also send messages directly to the **re1** Routing Engine on the TX Matrix router.

Because the configuration on the TX Matrix router applies to the T640 routers, any T640 router that has interfaces for direct access to the Internet also directs messages to the remote machine. The consequences include the following:

- If the T640 routers are configured to forward messages to the TX Matrix router (as in the default configuration), the remote machine receives two copies of some messages: one directly from the T640 router and the other from the TX Matrix router. Which messages are duplicated depends on whether the severities are the same for local logging and for forwarded messages. For more information, see [“Configuring Message Forwarding to the TX Matrix Router” on page 1087](#).
- If the **source-address** statement is configured at the **[edit system syslog]** hierarchy level, all routers in the routing matrix report the same source address in messages directed to the remote machine. This is appropriate, because the routing matrix functions as a single router.
- If the **log-prefix** statement is included, the messages from all routers in the routing matrix include the same text string. You cannot use the string to distinguish between the routers in the routing matrix.

Related Documentation

- [Configuring System Logging for a TX Matrix Router on page 1083](#)

Directing Messages to a Remote Destination from the Routing Matrix Based on a TX Matrix Plus Router

From the perspective of the user interface, the routing matrix appears as a single router. The TX Matrix Plus router (also called the switch-fabric chassis SFC) controls all the T1600 or T4000 routers also called the line-card chassis LCC) in the routing matrix.

You can configure a routing matrix composed of a TX Matrix Plus router with connected T1600 or T4000 LCCs to direct system logging messages to a remote machine or the other Routing Engine on each routing router, just as on a single-chassis system. Include the **host** statement at the **[edit system syslog]** hierarchy level on the SFC:

```
[edit system syslog]
host (hostname | other-routing-engine) {
```

```
facility severity;  
explicit-priority;  
facility-override facility;  
log-prefix string;  
match "regular-expression";  
}  
source-address source-address;
```

The TX Matrix Plus router directs messages to a remote machine or the other Routing Engine in the same way as a single-chassis system, and the optional statements (**explicit-priority**, **facility-override**, **log-prefix**, **match**, and **source-address**) also have the same effect as on a single-chassis system.

For the TX Matrix Plus router to include priority information when it directs messages that originated on a connected T1600 or T4000 LCC to the remote destination, you must also include the **explicit-priority** statement at the **[edit system syslog host sfc0-master]** hierarchy level.

The **other-routing-engine** statement does not interact with message forwarding from the connected T1600 or T4000 LCCs to the SFC. For example, if you include the statement in the configuration for the Routing Engine in slot 0 (**re0**), the **re0** Routing Engine on each connected T1600 or T4000 LCC sends messages to the **re1** Routing Engine on its router only. It does not also send messages directly to the **re1** Routing Engine on the SFC.

Because the configuration on the SFC applies to the connected T1600 or T4000 LCCs, any LCC that has interfaces for direct access to the Internet also directs messages to the remote machine. The consequences include the following:

- If the LCCs are configured to forward messages to the SFC (as in the default configuration), the remote machine receives two copies of some messages: one directly from the T1600 or T4000 LCC and the other from the SFC. Which messages are duplicated depends on whether the severities are the same for local logging and for forwarded messages. For more information, see [“Configuring Message Forwarding to the TX Matrix Plus Router” on page 1088](#).
- If the **source-address** statement is configured at the **[edit system syslog]** hierarchy level, all routers in the routing matrix report the same source address in messages directed to the remote machine. This is appropriate, because the routing matrix functions as a single routing router.
- If the **log-prefix** statement is included, the messages from all routers in the routing matrix include the same text string. You cannot use the string to distinguish between the routers in the routing matrix.

**Related
Documentation**

- [Configuring System Logging for a TX Matrix Plus Router on page 1085](#)
- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

Displaying System Log Files

- [Displaying a Log File from a Single-Chassis System on page 1115](#)
- [Log File Sample Content on page 1116](#)
- [Displaying a Log File from a Routing Matrix on page 1117](#)

Displaying a Log File from a Single-Chassis System

To display a log file stored on a single-chassis system, enter Junos OS CLI operational mode and issue either of the following commands:

```
user@host> show log log-filename
user@host> file show log-file-pathname
```

By default, the commands display the file stored on the local Routing Engine. To display the file stored on a particular Routing Engine, prefix the file or pathname with the string **re0** or **re1** and a colon. The following examples both display the **/var/log/messages** file stored on the Routing Engine in slot 1:

```
user@host> show log re1:messages
user@host> file show re1:/var/log/messages
```

For information about the fields in a log message, see [“Interpreting Messages Generated in Standard Format by a Junos OS Process or Library” on page 1124](#), [“Interpreting Messages Generated in Standard Format by Services on a PIC” on page 1125](#), and [“Interpreting Messages Generated in Structured-Data Format” on page 1126](#). For examples, see [“Log File Sample Content” on page 1116](#).

Log File Sample Content

This topic contains sample content from the `/var/log` directory. You can display the contents of the `/var/log/messages` file stored on the local Routing Engine. (The `/var/log` directory is the default location for log files, so you do not need to include it in the filename. The `messages` file is a commonly configured destination for system log messages.)

```
user@host> show log messages Apr 11 10:27:25 router1 mgd[3606]:
  UI_DBASE_LOGIN_EVENT: User 'barbara' entering configuration mode
Apr 11 10:32:22 router1 mgd[3606]: UI_DBASE_LOGOUT_EVENT: User 'barbara' exiting
configuration mode
Apr 11 11:36:15 router1 mgd[3606]: UI_COMMIT: User 'root' performed commit: no comment
Apr 11 11:46:37 router1 mib2d[2905]: SNMP_TRAP_LINK_DOWN: ifIndex 82, ifAdminStatus
up(1), ifOperStatus down(2), ifName at-1/0/0
```

You can display the contents of the file `/var/log/processes`, which has been previously configured to include messages from the `daemon` facility. When issuing the `file show` command, you must specify the full pathname of the file:

```
user@host> file show /var/log/processes Feb 22 08:58:24 router1 snmpd[359]:
  SNMPD_TRAP_WARM_START: trap_generate_warm: SNMP trap: warm start
Feb 22 20:35:07 router1 snmpd[359]: SNMPD_THROTTLE_QUEUE_DRAINED:
  trap_throttle_timer_handler: cleared all throttled traps
Feb 23 07:34:56 router1 snmpd[359]: SNMPD_TRAP_WARM_START: trap_generate_warm:
  SNMP trap: warm start
Feb 23 07:38:19 router1 snmpd[359]: SNMPD_TRAP_COLD_START: trap_generate_cold:
  SNMP trap: cold start
```

You can display the contents of the file `/var/log/processes` when the `explicit-priority` statement is included at the `[edit system syslog file processes]` hierarchy level:

```
user@host> file show /var/log/processes Feb 22 08:58:24 router1 snmpd[359]:
  %DAEMON-3-SNMPD_TRAP_WARM_START: trap_generate_warm: SNMP trap: warm
  start
Feb 22 20:35:07 router1 snmpd[359]:
  %DAEMON-6-SNMPD_THROTTLE_QUEUE_DRAINED: trap_throttle_timer_handler: cleared
  all throttled traps
Feb 23 07:34:56 router1 snmpd[359]:
  %DAEMON-3-SNMPD_TRAP_WARM_START: trap_generate_warm: SNMP trap: warm
  start
Feb 23 07:38:19 router1 snmpd[359]:
  %DAEMON-2-SNMPD_TRAP_COLD_START: trap_generate_cold: SNMP trap: cold start
```

Warning Message Support for Throughput Overuse:

The SRX4100 device supports up to 20 Gbps and 7 Mpps of Internet mix (IMIX) firewall performance. When IMIX throughput exceeds 20 Gbps and 7 Mpps on an SRX4100 device, new log messages are logged. These log messages remind you that there is throughput overuse. You can see the following sample log messages when you issue the `show log messages` command.

```

user@host> show log messages
Apr 25 14:01:12 user Throughput exceed 20Gbps and 7Mpps in 35% of last 15 minutes,
above the time threshold 10%!
Apr 25 14:16:12 user Throughput exceed 20Gbps and 7Mpps in 95% of last 15 minutes,
above the time threshold 10%!

```

As a reminder of throughput overuse, every 15 minutes the system calculates how many minutes the throughput has exceeded 20 Gbps and 7 Mpps. The system triggers a log message if the throughput has exceeded more than 1 minute, 30 seconds (10%) of the last 15 minutes. For example, suppose you see the following log message:

```
Throughput exceed 20 Gbps and 7 Mpps in 35% of last 15 minutes, above the time
threshold 10%!
```

It means your throughput has exceeded 20 Gbps and 7 Mpps for 5 minutes, 15 seconds of the last 15 minutes (35% of 15 minutes) that triggered the log message.

To turn off this log message, we recommend that you bring down the throughput level below 20 Gbps and 7 Mpps or install the enhanced performance upgrade license.



NOTE: This feature requires a license. Please refer to the [Juniper Licensing Guide](#) for general information about License Management. Please refer to the product Data Sheets at [SRX Series Services Gateways](#) for details, or contact your Juniper Account Team or Juniper Partner.

Displaying a Log File from a Routing Matrix

One way to display a log file stored on the local Routing Engine of any of the individual platforms in a routing matrix (T640 routing nodes or TX Matrix platform) is to log in to a Routing Engine on the platform, enter Junos OS CLI operational mode, and issue the **show log** or **file show** command described in “[Displaying a Log File from a Single-Chassis System](#)” on page 1115.

To display a log file stored on a T640 routing node during a terminal session on the TX Matrix platform, issue the **show log** or **file show** command and add a prefix that specifies the T640 routing node's LCC index number as *lccn*, followed by a colon. The index can be from 0 (zero) through 3:

```

user@host> show log lccn:log-filename
user@host> file show lccn:log-file-pathname

```

By default, the **show log** and **file show** commands display the specified log file stored on the master Routing Engine on the T640 routing node. To display the log from a particular Routing Engine, prefix the file- or pathname with the string *lccn-master*, *lccn-re0*, or *lccn-re1*, followed by a colon. The following examples all display the */var/log/messages* file stored on the master Routing Engine (in slot 0) on routing node LCC2:

```
user@host> show log lcc2:messages
user@host> show log lcc2-master:messages
user@host> show log lcc2-re0:messages
user@host> file show lcc2:/var/log/messages
```

If the T640 routing nodes are forwarding messages to the TX Matrix platform (as in the default configuration), another way to view messages generated on a T640 routing node during a terminal session on the TX Matrix platform is simply to display a local log file. However, the messages are intermixed with messages from other T640 routing nodes and the TX Matrix platform itself. For more information about message forwarding, see [“Impact of Different Local and Forwarded Severity Levels on System Log Messages on a TX Matrix Router”](#) on page 1089.

For information about the fields in a log message, see [“Interpreting Messages Generated in Structured-Data Format”](#) on page 1126, [“Interpreting Messages Generated in Standard Format by Services on a PIC”](#) on page 1125, and [“Interpreting Messages Generated in Standard Format by a Junos OS Process or Library”](#) on page 1124. For examples, see [“Log File Sample Content”](#) on page 1116.

Displaying and Interpreting System Log Message Descriptions

- [Displaying and Interpreting System Log Message Descriptions on page 1119](#)
- [The message-source Field on a Single-Chassis System on page 1121](#)
- [The message-source Field on a TX Matrix Platform on page 1121](#)
- [The message-source Field on a T640 Routing Node in a Routing Matrix on page 1123](#)
- [Interpreting Messages Generated in Standard Format by a Junos OS Process or Library on page 1124](#)
- [Interpreting Messages Generated in Standard Format by Services on a PIC on page 1125](#)
- [Interpreting Messages Generated in Structured-Data Format on page 1126](#)
- [Examples: Displaying System Log Message Descriptions on page 1131](#)

Displaying and Interpreting System Log Message Descriptions

This reference lists the messages available at the time of its publication. To display the list of messages that applies to the version of Junos OS that is running on a routing platform, enter the Junos OS CLI operational mode and issue the following command:

```
user@host> help syslog ?
```

To display the list of available descriptions for tags whose names begin with a specific character string, substitute the string (in all capital letters) for the variable **TAG-PREFIX** (there is no space between the prefix and the question mark):

```
user@host> help syslog TAG-PREFIX?
```

To display the complete descriptions for tags whose name includes a regular expression, substitute a Perl-based expression for the variable **regex**. The match is not case-sensitive. For information about Perl-based regular expressions, consult a Perl reference manual or website such as <http://perldoc.perl.org>.

```
user@host> help syslog regex
```

To display the complete description of a particular message, substitute its name for the variable **TAG** (in all capital letters):

```
user@host> help syslog TAG
```

Table 179 on page 1120 describes the fields in a system log message description in this reference or in the CLI.

Table 179: Fields in System Log Message Descriptions

Field Name in Reference	Field Name in CLI	Description
—	Name	The message tag in all capital letters.
System Log Message	Message	<p>Text of the message written to the system log. In the log, a specific value is substituted for each variable that appears in italics in this reference or in angle brackets (< >) in the CLI.</p> <p>In this reference, the message text appears on the second line of the System Log Message field. The first line is the message tag (the same text as in the CLI Name field). The prefix on each tag identifies the message source and the rest of the tag indicates the specific event or error.</p>
—	Help	Short description of the message, which also appears in the right-hand column of CLI output for the help syslog command when the output lists multiple messages.
Description	Description	More detailed explanation of the message.
Type	Type	<p>Category to which the message belongs:</p> <ul style="list-style-type: none"> • Error: The message reports an error or failure condition that might require corrective action. • Event: The message reports a condition or occurrence that does not generally require corrective action.
Severity	Severity	Message severity level as described in Table: System Log Message Severity Levels in “Specifying the Facility and Severity of Messages to Include in the Log” on page 1101.

Table 179: Fields in System Log Message Descriptions (continued)

Field Name in Reference	Field Name in CLI	Description
Cause	Cause	(Optional) Possible cause for message generation. There can be more than one cause.
Action	Action	(Optional) Action you can perform to resolve the error or failure condition described in the message. If this field does not appear in an entry, either no action is required or the action is self-explanatory.

The message-source Field on a Single-Chassis System

The format of the **message-source** field in a message on a single-chassis system depends on whether the message was generated on the local Routing Engine or the other Routing Engine (on a system with two Routing Engines installed and operational). Messages from the other Routing Engine appear only if its configuration includes the **other-routing-engine** statement at the **[edit system syslog host]** hierarchy level.

- When the local Routing Engine generated the message, there are two subfields:

```
hostname process[process-ID]
```

- When the other Routing Engine generated the message, there are three subfields:

```
hostname reX process[process-ID]
```

hostname is the hostname of the local Routing Engine.

process[process-ID] is the name and PID of the process that generated the message. If the **reX** field also appears, the process is running on the other Routing Engine. If a process does not report its PID, the **[process-ID]** part does not appear.

reX indicates that the other Routing Engine generated the message (X is 0 or 1).

The message-source Field on a TX Matrix Platform

The format of the **message-source** field in a message on a TX Matrix platform depends on several factors:

- Whether the message was generated on the TX Matrix platform or a T640 routing node in the routing matrix. By default, the master Routing Engine on each T640 routing node forwards messages from all facilities with severity info and higher to the master Routing Engine on the TX Matrix platform. When you configure system logging on the TX Matrix platform, its logs include the forwarded messages. For more information,

see [“Impact of Different Local and Forwarded Severity Levels on System Log Messages on a TX Matrix Router”](#) on page 1089.

- Whether the message was generated on the local Routing Engine or the other Routing Engine on the originating machine (TX Matrix platform or T640 routing node). Messages from the other Routing Engine appear only if its configuration includes the **other-routing-engine** statement at the **[edit system syslog host]** hierarchy level.
- Whether the message was generated by a kernel or user-space process, or by the microkernel on a hardware component.

[Table 180 on page 1122](#) specifies the format of the message-source field in the various cases.

Table 180: Format of message-source Field in Messages Logged on TX Matrix Platform

Generating Machine	Generating Routing Engine	Process or Component	Format
TX Matrix platform	Local	Process	<i>hostname process[processID]</i>
		Component	<i>hostname scc-reX process[processID]</i>
	Other	Process	<i>hostname scc-reX scc-componentZ process</i>
		Component	<i>hostname scc-reX scc-componentZ process</i>
T640 routing node	Local	Process	<i>hostname lccY-masterprocess[processID]</i>
		Component	<i>hostname lccY-master scc-componentZ process</i>
	Other	Process	<i>hostname lccY-master lccY-reX process[processID]</i>
		Component	<i>hostname lccY-master lccY-reX lccY-componentZ process</i>

hostname is the hostname of the local Routing Engine on the TX Matrix platform.

lccY-master is the master Routing Engine on the T640 routing node with the indicated LCC index number (**Y** is from 0 through 3).

lccY-reX indicates that the backup Routing Engine on the T640 routing node generated the message (**X** is 0 or 1). The routing node has the indicated LCC index number (**Y** matches the value in the **lccY-master** field).

lccY-componentZ process identifies the hardware component and process on the T640 routing node that generated the message (**Y** matches the value in the **lccY-master** field and the range of values for **Z** depends on the component type). For example, **lcc2-fpc1**

PFEMAN refers to a process on the FPC in slot 1 on the T640 routing node with index LCC2.

process[process-ID] is the name and PID of the kernel or user-space process that generated the message. If the **scc-reX** or **lccY-reX** field also appears, the process is running on the other Routing Engine. If a process does not report its PID, the **[process-ID]** part does not appear.

scc-componentZ process identifies the hardware component and process on the TX Matrix platform that generated the message (the range of values for **Z** depends on the component type). For example, **spmb1 GSIB** refers to a process on one of the processor boards in the Switch Interface Board (SIB) with index 1.

scc-reX indicates that the other Routing Engine on the TX Matrix platform generated the message (**X** is 0 or 1).

The message-source Field on a T640 Routing Node in a Routing Matrix

The format of the **message-source** field in a message on a T640 routing node in a routing matrix depends on two factors:

- Whether the message was generated on the local Routing Engine or the other Routing Engine. Messages from the other Routing Engine appear only if its configuration includes the **other-routing-engine** statement at the **[edit system syslog host]** hierarchy level.
- Whether the message was generated by a kernel or user-space process, or by the microkernel on a hardware component.

Table 181 on page 1123 specifies the format of the **message-source** field in the various cases.

Table 181: Format of message-source Field in Messages Logged on TX Matrix Platform

Generating Routing Engine	Process or Component	Format
Local	Process	<i>hostname-lccY process[processID]</i>
	Component	<i>hostname-lccY lccY-componentZ process</i>
Other	Process	<i>hostname-lccY lccY-reX process[processID]</i>
	Component	<i>hostname-lccY lccY-reX lccY-componentZ process</i>

hostname-lccY is the hostname of the local Routing Engine and the T640 routing node's LCC index number.

lccY-componentZ process identifies the hardware component and process that generated the message (**Y** matches the value in the **hostname-lccY** field and the range of values for **Z** depends on the component type). For example, **lcc0-fpc0 CMLC** refers to a process on the FPC in slot 0. The T640 routing node has index LCC0 in the routing matrix.

lccY-reX indicates that the other Routing Engine on the routing node generated the message (*Y* matches the value in the **hostname-lccY** field and *X* is 0 or 1).

process[process-ID] is the name and PID of the kernel or user-space process that generated the message. If the **lccY-reX** field also appears, the process is running on the other Routing Engine. If a process does not report its PID, the **[process-ID]** part does not appear.

Interpreting Messages Generated in Standard Format by a Junos OS Process or Library

The syntax of a standard-format message generated by a Junos OS process or subroutine library depends on whether it includes priority information:

- When the **explicit-priority** statement is included at the **[edit system syslog file filename]** or **[edit system syslog host (hostname | other-routing-engine)]** hierarchy level, a system log message has the following syntax:

```
timestamp message-source: %facility-severity-TAG: message-text
```

- When directed to the console or to users, or when the **explicit-priority** statement is not included for files or remote hosts, a system log message has the following syntax:

```
timestamp message-source: TAG: message-text
```

Table 182 on page 1124 describes the message fields.

Table 182: Fields in Standard-Format Messages Generated by a Junos OS process or Library

Field	Description
timestamp	Time at which the message was logged.
message-source	Identifier of the process or component that generated the message and the routing platform on which the message was logged. This field includes two or more subfields, depending on how system logging is configured. See “The message-source Field on a TX Matrix Platform” on page 1121 , “The message-source Field on a T640 Routing Node in a Routing Matrix” on page 1123 , and “The message-source Field on a Single-Chassis System” on page 1121 .
facility	Code that specifies the facility to which the system log message belongs. For a mapping of codes to facility names, see Table: Numerical Codes for Severity Levels Reported in Priority Information in “Including Priority Information in System Log Messages” on page 1072 .
severity	Numerical code that represents the severity level assigned to the system log message. For a mapping of codes to severity names, see Table: Numerical Codes for Severity Levels Reported in Priority Information in “Including Priority Information in System Log Messages” on page 1072 .

Table 182: Fields in Standard-Format Messages Generated by a Junos OS process or Library (continued)

Field	Description
TAG	Text string that uniquely identifies the message, in all uppercase letters and using the underscore (_) to separate words. The tag name begins with a prefix that indicates the generating software process or library. The entries in this reference are ordered alphabetically by this prefix. Not all processes on a routing platform use tags, so this field does not always appear.
message-text	Text of the message. For the text for each message, see the chapters following System Log Messages.

Interpreting Messages Generated in Standard Format by Services on a PIC

Standard-format system log messages generated by services on a PIC, such as the Adaptive Services (AS) PIC, have the following syntax:

```
timestamp (FPC Slot fpc-slot, PIC Slot pic-slot) {service-set} [SERVICE]:
optional-string TAG: message-text
```



NOTE: System logging for services on PICs is not configured at the [edit system syslog] hierarchy level as discussed in this chapter. For configuration information, see the *Junos Services Interfaces Configuration Guide*.

The (FPC Slot *fpc-slot*, PIC Slot *pic-slot*) field appears only when the standard system logging utility that runs on the Routing Engine writes the messages to the system log. When the PIC writes the message directly, the field does not appear.

Table 183 on page 1125 describes the message fields.

Table 183: Fields in Messages Generated by a PIC

Field	Description
timestamp	Time at which the message was logged.
fpc-slot	Slot number of the Flexible PIC Concentrator (FPC) that houses the PIC that generated the message.
pic-slot	Number of the PIC slot on the FPC in which the PIC that generated the message resides.
service-set	Name of the service set that generated the message.

Table 183: Fields in Messages Generated by a PIC (continued)

Field	Description
SERVICE	Code representing the service that generated the message. The codes include the following: <ul style="list-style-type: none"> • FWNAT—Network Address Translation (NAT) service • IDS—Intrusion detection service
optional-string	A text string that appears if the configuration for the PIC includes the log-prefix statement at the [edit interfaces interface-name services-options syslog] hierarchy level. For more information, see the <i>Junos Services Interfaces Configuration Guide</i> .
TAG	Text string that uniquely identifies the message, in all uppercase letters and using the underscore (_) to separate words. The tag name begins with a prefix that indicates the generating PIC. The entries in this reference are ordered alphabetically by this prefix.
message-text	Text of the message. For the text of each message, see System Log Messages.

Interpreting Messages Generated in Structured-Data Format

Beginning in Junos OS Release 8.3, when the **structured-data** statement is included in the configuration for a log file, Junos OS processes and software libraries write messages to the file in structured-data format instead of the standard Junos OS format. For information about the **structured-data** statement, see “[Logging Messages in Structured-Data Format](#)” on page 1069.

Structured-format makes it easier for automated applications to extract information from the message. In particular, the standardized format for reporting the value of variables (elements in the English-language message that vary depending on the circumstances that triggered the message) makes it easy for an application to extract those values. In standard format, the variables are interspersed in the message text and not identified as variables.

The structured-data format for a message includes the following fields (which appear here on two lines only for legibility):

```
<priority code>version timestamp hostname process processID TAG [junos@2636.platform
variable-value-pairs] message-text
```

Table 184 on page 1127 describes the fields. If the system logging utility cannot determine the value in a particular field, a hyphen (-) appears instead.

Table 184: Fields in Structured-Data Messages

Field	Description	Examples
<priority code>	Number that indicates the message's facility and severity. It is calculated by multiplying the facility number by 8 and then adding the numerical value of the severity. For a mapping of the numerical codes to facility and severity, see Table: Facility and Severity Codes in the priority-code Field in "Specifying the Facility and Severity of Messages to Include in the Log" on page 1101.	<165> for a message from the pfe facility (facility=20) with severity notice (severity=5).
version	Version of the Internet Engineering Task Force (IETF) system logging protocol specification.	1 for the initial version
timestamp	Time when the message was generated, in one of two representations: <ul style="list-style-type: none"> YYYY-MM-DDTHH:MM:SS.MSZ is the year, month, day, hour, minute, second and millisecond in Universal Coordinated Time (UTC) YYYY-MM-DDTHH:MM:SS.MS+/-HH:MM is the year, month, day, hour, minute, second and millisecond in local time; the hour and minute that follows the plus sign (+) or minus sign (-) is the offset of the local time zone from UTC 	2007-02-15T09:17:15.719Z is 9:17 AM UTC on 15 February 2007. 2007-02-15T01:17:15.719-08:00 is the same timestamp expressed as Pacific Standard Time in the United States.
hostname	Name of the host that originally generated the message.	router1
process	Name of the Junos OS process that generated the message.	mgd
processID	UNIX process ID (PID) of the Junos OS process that generated the message.	3046
TAG	Junos OS system log message tag, which uniquely identifies the message.	UI_DBASE_LOGOUT_EVENT
junos@2636.platform	An identifier for the type of hardware platform that generated the message. The junos@2636 prefix indicates that the platform runs Junos OS. It is followed by a dot-separated numerical identifier for the platform type. For a list of the identifiers, see Table 186 on page 1130 .	junos@2636.1.1.1.2.18 for the M120 router

Table 184: Fields in Structured-Data Messages (continued)

Field	Description	Examples
<i>variable-value-pairs</i>	A variable-value pair for each element in the <i>message-text</i> string that varies depending on the circumstances that triggered the message. Each pair appears in the format <i>variable = "value"</i> .	username="user"
<i>message-text</i>	English-language description of the event or error (omitted if the brief statement is included at the [edit system syslog file <i>filename</i> structured-data] hierarchy level). For the text for each message, see the chapters following System Log Messages.	User 'user' exiting configuration mode

By default, the structured-data version of a message includes English text at the end, as in the following example (which appears on multiple lines only for legibility):

```
<165>1 2007-02-15T09:17:15.719Z router1 mgd 3046 UI_DBASE_LOGOUT_EVENT
[junos@2636.1.1.1.2.18 username="user"] User 'user' exiting configuration mode
```

When the brief statement is included at the [edit system syslog file *filename* structured-data] hierarchy level, the English text is omitted, as in this example:

```
<165>1 2007-02-15T09:17:15.719Z router1 mgd 3046 UI_DBASE_LOGOUT_EVENT
[junos@2636.1.1.1.2.18 username="user"]
```

Table 185 on page 1128 maps the codes that appear in the *priority-code* field to facility and severity level.



NOTE: Not all of the facilities and severities listed in Table 185 on page 1128 can be included in statements at the [edit system syslog] hierarchy level (some are used by internal processes). For a list of the facilities and severity levels that can be included in the configuration, see “Specifying the Facility and Severity of Messages to Include in the Log” on page 1101.

Table 185: Facility and Severity Codes in the priority-code Field

Facility (number)	Severity emergency	alert	critical	error	warning	notice	info	debug
kernel (0)	1	1	2	3	4	5	6	7
user (1)	8	9	10	11	12	13	14	15
mail (2)	16	17	18	19	20	21	22	23
daemon (3)	24	25	26	27	28	29	30	31

Table 185: Facility and Severity Codes in the priority-code Field (continued)

Facility (number)	Severity emergency	alert	critical	error	warning	notice	info	debug
authorization (4)	32	33	34	35	36	37	38	39
syslog (5)	40	41	42	43	44	45	46	47
printer (6)	48	49	50	51	52	53	54	55
news (7)	56	57	58	59	60	61	62	63
uucp (8)	64	65	66	67	68	69	70	71
clock (9)	72	73	74	75	76	77	78	79
authorization-private (10)	80	81	82	83	84	85	86	87
ftp (11)	88	89	90	91	92	93	94	95
ntp (12)	96	97	98	99	100	101	102	103
security (13)	104	105	106	107	108	109	110	111
console (14)	112	113	114	115	116	117	118	119
local0 (16)	128	129	130	131	132	133	134	135
dfc (17)	136	137	138	139	140	141	142	143
local2 (18)	144	145	146	147	148	149	150	151
firewall (19)	152	153	154	155	156	157	158	159
pfe (20)	160	161	162	163	164	165	166	167
conflict-log (21)	168	169	170	171	172	173	174	175
change-log (22)	176	177	178	179	180	181	182	183
interactive-commands (23)	184	185	186	187	188	189	190	191

Table 186 on page 1130 lists the numerical identifiers for routing platforms that appear in the **platform** field. The identifier is derived from the platform's SNMP object identifier (OID) as defined in the Juniper Networks routing platform MIB. For more information about OIDs, see the *Network Management and Monitoring Guide*.

Table 186: Platform Identifiers in the platform Field

Identifier	Platform Name
1.1.1.2.1	M40 router
1.1.1.2.2	M20 router
1.1.1.2.3	M160 router
1.1.1.2.4	M10 router
1.1.1.2.5	M5 router
1.1.1.2.6	T640 routing node
1.1.1.2.7	T320 router
1.1.1.2.8	M40e router
1.1.1.2.9	M320 router
1.1.1.2.10	M7i router
1.1.1.2.11	M10i router
1.1.1.2.13	J2300 Services Router
1.1.1.2.14	J4300 Services Router
1.1.1.2.15	J6300 Services Router
1.1.1.2.17	TX Matrix platform
1.1.1.2.18	M120 router
1.1.1.2.19	J4350 Services Router
1.1.1.2.20	J6350 Services Router
1.1.1.2.23	J2320 Services Router
1.1.1.2.24	J2350 Services Router
1.1.1.2.27	T1600 router
1.1.1.2.37	TX Matrix Plus platform
1.1.1.2.83	T4000 router

Examples: Displaying System Log Message Descriptions

Display the list of all currently available system log message descriptions:

```
user@host> help syslog ?
```

```
Possible completions:
<syslog-tag>   Syslog tag
. . . . .
BOOTPD_ARG_ERR  Command-line option was invalid
BOOTPD_BAD_ID   Request failed because assembly ID was unknown
BOOTPD_BOOTSTRING tnp.bootpd provided boot string
BOOTPD_CONFIG_ERR tnp.bootpd could not parse configuration file;
                  used default settings
BOOTPD_CONF_OPEN tnp.bootpd could not open configuration file
BOOTPD_DUP_REV   Extra boot string definitions for revision were
                  ignored
---(more 4%)---
```

Display the list of all currently available system log message descriptions for tags that begin with the letters **ACCT** (there is no space between **ACCT** and the question mark, and some descriptions are shortened for legibility):

```
user@host> help syslog ACCT?
```

```
Possible completions:
<syslog-tag>      System log tag or regular expression
ACCT_ACCOUNTING_FERROR Error occurred during file processing
ACCT_ACCOUNTING_FOPEN_ERROR Open operation failed on file
ACCT_ACCOUNTING_SMALL_FILE_SIZE Maximum file size is smaller than ...
ACCT_BAD_RECORD_FORMAT Record format does not match accounting profile
ACCT_CU_RTSLIB_ERROR Error occurred obtaining current class usage ...
ACCT_FORK_ERR      Could not create child process
ACCT_FORK_LIMIT_EXCEEDED Could not create child process because of limit
ACCT_GETHOSTNAME_ERROR gethostname function failed
ACCT_MALLOC_FAILURE Memory allocation failed
ACCT_UNDEFINED_COUNTER_NAME Filter profile used undefined counter name
ACCT_XFER_FAILED   Attempt to transfer file failed
ACCT_XFER_POPEN_FAIL File transfer failed
```

Display the description of the **UI_CMDLINE_READ_LINE** message:

```
user@host> help syslog UI_CMDLINE_READ_LINE
```

```
Name:      UI_CMDLINE_READ_LINE
Message:   User '<users>', command '<input>'
Help:      User entered command at CLI prompt
Description: The indicated user typed the indicated command at the CLI
              prompt and pressed the Enter key, sending the command string
              to the management process (mgd).
```

Type: Event: This message reports an event, not an error
Severity: info

Configuring System Logging for a Security Device

- [Understanding System Logging for Security Devices on page 1133](#)
- [Understanding Stream Logging for Security Devices on page 1135](#)
- [Understanding Binary Format for Security Logs on page 1136](#)
- [Understanding On-Box Logging and Reporting on page 1137](#)
- [Monitoring Reports on page 1141](#)
- [Configuring On-Box Binary Security Log Files on page 1148](#)
- [Configuring Off-Box Binary Security Log Files on page 1150](#)
- [Sending System Log Messages to a File on page 1151](#)
- [Setting the System to Send All Log Messages Through eventd on page 1151](#)
- [Setting the System to Stream Security Logs Through Revenue Ports on page 1152](#)

Understanding System Logging for Security Devices

Junos OS supports configuring and monitoring of system log messages (also called *syslog messages*). You can configure files to log system messages and also assign attributes, such as severity levels, to messages. Reboot requests are recorded to the system log files, which you can view with the **show log** command.

This section contains the following topics:

- [Control Plane and Data Plane Logs on page 1133](#)
- [Redundant System Log Server on page 1134](#)

Control Plane and Data Plane Logs

Junos OS generates separate log messages to record events that occur on the system's control and data planes.

- The control plane logs, also called system logs, include events that occur on the routing platform. The system sends control plane events to the **eventd** process on the Routing Engine, which then handles the events by using Junos OS policies, by generating system log messages, or both. You can choose to send control plane logs to a file, user terminal,

routing platform console, or remote machine. To generate control plane logs, use the **syslog** statement at the **[system]** hierarchy level.

- The data plane logs, also called *security logs*, primarily include security events that are handled inside the data plane. Security logs can be in text or binary format, and they can be saved locally (event mode) or sent to an external server (stream mode). Binary format is required for stream mode and recommended to conserve log space in event mode.

Note the following:

- Security logs can be saved locally (on box) or externally (off box), but not both.
- SRX1400, SRX1500, SRX3400, SRX3600, SRX4100, SRX4200, SRX4600, SRX5400, SRX5600, and SRX5800 devices default to stream mode. To specify binary format and an external server, see [“Configuring Off-Box Binary Security Log Files” on page 1150](#).



NOTE: Logs might be dropped if you configure event mode logging on these devices.



NOTE: Starting with Junos OS Release 15.1X49-D100, the default mode for SRX1500 device is stream mode. Prior to Junos OS Release 15.1X49-D100, the default mode for SRX1500 device was event mode.

-
- SRX300, SRX320, SRX340, SRX345, SRX550, SRX550M, SRX650 devices default to event mode and text format. Data plane events are written to system log files in a similar manner to control plane events. To specify binary format for the security logs, see [“Configuring On-Box Binary Security Log Files” on page 1148](#).

Redundant System Log Server

Security system logging traffic intended for remote servers is sent through the network interface ports, which support two simultaneous system log destinations. Each system logging destination must be configured separately. When two system log destination addresses are configured, identical logs are sent to both destinations. While two destinations can be configured on any device that supports the feature, adding a second destination is primarily useful as a redundant backup for standalone and active/backup configured chassis cluster deployments.

The following redundant server information is available:

- Facility: **cron**
- Description: cron scheduling process
- Severity Level (from highest to lowest severity): **debug**
- Description: Software debugging messages

Release History Table

Release	Description
15.1X49-D100	Starting with Junos OS Release 15.1X49-D100, the default mode for SRX1500 device is stream mode. Prior to Junos OS Release 15.1X49-D100, the default mode for SRX1500 device was event mode.

Understanding Stream Logging for Security Devices

Junos OS supports forwarding logs using stream mode and event mode. All the categories can be configured for sending specific category logs to different log servers for stream mode log forwarding.

Stream mode log forwarding includes the following steps:

- An RTLOG system log message is generated by the data plane and is sent out from the Packet Forwarding Engine.
- An RTLOG system log message is generated by fpe process and is sent from Packet Forwarding Engine.
- An RTLOG system log message is generated by the Routing Engine unified threat management (utmd) process and is sent by rtlogd process from the Routing Engine.

For stream mode log forwarding, the transport protocol used between Packet Forwarding Engine and the log server can be UDP, TCP, or TLS. These transport protocols UDP, TCP, and TLS are configurable. The transport protocol used between the Routing Engine and the log server can only be UDP.

Starting in Junos OS Release 17.4R2 and later, on SRX300, SRX320, SRX340, SRX345 Series devices and vSRX instances, when the device is configured in stream mode, you can configure maximum of eight system log hosts.

In Junos OS Release 17.4R2 and earlier releases, you can configure only three system log hosts in the stream mode. If you configure more than three system log hosts, then the following error message is displayed **error: configuration check-out failed**.

Release History Table

Release	Description
17.4R2	Starting in Junos OS Release 17.4R2 and later, on SRX300, SRX320, SRX340, SRX345 Series devices and vSRX instances, when the device is configured in stream mode, you can configure maximum of eight system log hosts. In Junos OS Release 17.4R2 and earlier releases, you can configure only three system log hosts in the stream mode. If you configure more than three system log hosts, then the following error message is displayed error: configuration check-out failed .

Related Documentation

- [log \(Security\) on page 1817](#)
- [Understanding Binary Format for Security Logs on page 1136](#)
- [Setting the System to Send All Log Messages Through eventd on page 1151](#)

- [Setting the System to Stream Security Logs Through Revenue Ports on page 1152](#)
- [Sending System Log Messages to a File on page 1151](#)
- [Monitoring System Log Messages with the J-Web Event Viewer](#)

Understanding Binary Format for Security Logs

The Junos OS generates separate log messages to record events that occur on the system's control plane and data plane. The control plane monitors events that occur on the routing platform. Such events are recorded in system log messages. To generate system log messages, use the **syslog** statement at the **[system]** hierarchy level.

Data plane log messages, referred to as security log messages, record security events that the system handles directly inside the data plane. To generate security log messages, use the **log** statement at the **[security]** hierarchy level.

System log messages are maintained in log files in text-based formats, such as BSD Syslog, Structured Syslog, and WebTrends Enhanced Log Format (WELF).

Security log messages can also be maintained in text-based formats. Because security logging can produce large amounts of data, however, text-based log files can quickly consume storage and CPU resources. Depending on your implementation of security logging, a log file in a binary-based format can provide more efficient use of on-box or off-box storage and improved CPU utilization. Binary format for security log messages is available on all SRX Series devices.

When configured in event mode, security log messages generated in the data plane are directed to the control plane and stored locally on the device. Security log messages stored in binary format are maintained in a log file separate from that used to maintain system log messages. Events stored in a binary log file are not accessible with advanced log-scripting commands intended for text-based log files. A separate CLI operational command supports decoding, converting, and viewing binary log files that are stored locally on the device.

When configured in stream mode, security log messages generated in the data plane are streamed to a remote device. When these messages are stored in binary format, they are streamed directly to an external log collection server in a Juniper-specific binary format. Externally-stored binary log files can only be read using Juniper Secure Analytics (JSA) or Security Threat Response Manager (STRM).

Starting in Junos OS Release 17.4R2 and later, on SRX300, SRX320, SRX340, SRX345 Series devices and vSRX instances, when the device is configured in stream mode, you can configure maximum of eight system log hosts.

In Junos OS Release 17.4R2 and earlier releases, you can configure only three system log hosts in the stream mode. If you configure more than three system log hosts, then the following error message is displayed **error: configuration check-out failed**.

For information about configuring on-box (event-mode) binary security logs, please see ["Configuring On-Box Binary Security Log Files" on page 1148](#). For information about

configuring off-box (stream-mode) binary security logs, please see [“Configuring Off-Box Binary Security Log Files” on page 1150](#).

Release History Table

Release	Description
17.4R2	Starting in Junos OS Release 17.4R2 and later, on SRX300, SRX320, SRX340, SRX345 Series devices and vSRX instances, when the device is configured in stream mode, you can configure maximum of eight system log hosts. In Junos OS Release 17.4R2 and earlier releases, you can configure only three system log hosts in the stream mode. If you configure more than three system log hosts, then the following error message is displayed error: configuration check-out failed .

Related Documentation

- [Understanding System Logging for Security Devices on page 1133](#)

Understanding On-Box Logging and Reporting

This topic describes the on-box logging and reporting CLI functionality and the design aspects of on-box reporting for the SRX devices.

Overview

On-box traffic logging to solid-state drives (SSDs) supports eight external log servers or files.

An all-in-one XML file is added that contains all the traffic logs information. The XML file also generates all the logging header files and traffic log related documents.

A new process (daemon) called *local log management daemon (llmd)* is supported in Services Processing Cards 0 (SPCs0) to handle on-box traffic logging. Traffic produced by flowd in SPCs is listed in traffics logs. The llmd saves these logs to the local SSD. Traffic logs are saved in the following four different formats:

- syslog
- sd-syslog
- welf
- binary

On-box reporting mechanism is an enhancement to the existing logging functionality. The existing logging functionality is modified to collect system traffic logs, analyzes the logs, and generate reports of these logs in the form of tables using the CLI. On-box reporting feature is intended to provide a simple and easy to use interface for viewing security logs. The on-box reports are easy to use J-Web pages of various security events in the form of tables and graphs. The reports allow the IT security management to identify security information at a glance, and quickly decide the actions to be taken.



NOTE: The on-box reporting feature is enabled by default when you load the factory-default configurations on the SRX Series device with Junos OS Release 15.1X49-D100 or later.

If you are upgrading your SRX Series device from a Junos OS Release prior to Junos OS 15.1X49-D100, then the SRX device inherits the existing configuration and the on-box reporting feature is disabled by default. You need to configure the `set security log report` command and the `set security log mode stream` command to enable the on-box reporting feature on the device that are upgraded.



NOTE: You must configure security policy for the session using the `set security policies from-zone zone-name to-zone zone-name policy policy-name` then `log session-close` command to list all the applications and nested applications in Application Tracking on J-Web using the on-box reporting feature. See for more *log (Security Policies)* for details.

After the log message is recorded, the log is stored within a log file which is then stored in the database table of the RE for further analysis (on SRX300, SRX320, SRX340, SRX345, and SRX550M devices) or on the SSD card for further analysis (on SRX1500, SRX4100, and SRX4200 devices).



NOTE: This feature supports receiving top most reports based on count or volume of the session or the type of log, captures events occurring in each second within a specified time range, captures log content for a specified CLI condition. Various CLI conditions like “summary”, “top”, “in-detail”, and “in-interval” are used to generate reports. You can generate only one report at one time using the CLI. All the CLI conditions cannot be used at the same time. You can generate only one report at one time using the CLI.

The benefits of this feature are:

- Reports are stored locally on the SRX Series device and there is no requirement for separate devices or tools for logs and reports storage.
- The on-box reports are easy-to-use J-Web pages of various security events in the form of tables and graphs.
- Provides a simple and easy-to-use interface for viewing security logs.
- The reports generated enables the IT security management team to identify security information at a glance and quickly decide the actions to be taken.

The on-box reporting feature supports:

- Generating reports based on the requirements. For example: count or volume of the session, types of logs for activities such as IDP, UTM, IPsec VPN.

- Capturing real-time events within a specified time range.
- Capturing all the network activities in a logical, organized, and easy-to-understand format based on various CLI specified conditions.

Understanding On-box logging and Reporting

In the on-box reporting mechanism, CLI is used to fetch the reporting data from the device. The SRX series device collects and saves all the required logs. These recorded logs are then used for further analysis to calculate and generate reports in the form of tables using the CLI. The data generated using CLI in the form of reports can be further retrieved in the form of tables and graphs in J-Web. The reports generated are easy-to-understand tables and graphs in J-Web. Thorough analysis of logs is performed (based on session types) for features such as screen, IDP, UTM and IPSec.

You can define filters for the log data that is reported on based on the following criteria:



NOTE: The **top**, **in-detail**, and **in-interval** conditions cannot be used at the same time.

- **top <number>**—This option allow you to generate reports for top security events as specified in the command. for example: top 5 IPS attacks or top 6 URLs detected through UTM.
- **in-detail <number>**—This option allow you to generate detail log content.
- **in-interval <time-period>**—This option allows you to generate the events logged between certain time intervals.
- **summary**—This option allows you to generate the summary of the events. In this way, you can fine-tune the report to your needs, and displays only the data that you want to use.

The maximum in-interval number which shows the count in intervals is 30. If large duration is specified, then the counters are assembled to ensure the maximum in-interval is less than 30.

Both in-detail and summary have the “all” option, since different table have different attribute (like session table does not have the attribute “reason” but UTM has), the “all” option does not have any filter except start-time and stop-time. If there is any other filter other than start time and stop time then an error is displayed.

For example: root@kujang> show security log report in-detail all reason reason1

```
error: "query condition error"
```

The application firewall logs for application and user visibility will list applications and nested applications. When the logs of these features list nested applications then nested applications are listed in J-Web. When the logs list nested applications as not-applicable or unknown then only the applications are listed in J-Web.

Use the following CLI commands for application and user visibility for all the applications and nested applications listing:

- For top nested-application by count—**show security log report top session-close top-number <number> group-by application order-by count with user**
- For top nested-application by volume—**show security log report top session-close top-number <number> group-by application order-by volume with user**
- For top user by count with nested application—**show security log report top session-close top-number <number> group-by user order-by count with application**

On-Box Reporting Features

The on-box reporting feature supports:

- **Sqlite3 support as a library**—sqlite3 was not supported prior to Junos OS release 15.1X49-D100. Starting with Junos OS Release 15.1X49-D100, an SQL log database (SQLite Version 3) is used by the daemons running on the RE as well as other potential modules to store logs on SRX Series devices.
- **Running llmd in both Junos OS and Linux OS**—The forwarding daemon (flowd) decodes database index from binary logs and sends both index and log to the local log management daemon (llmd).

On SRX300, SRX320, SRX340, SRX345, and SRX550M devices, llmd runs in Junos OS. On SRX1500, SRX4100, and SRX4200 devices, llmd runs in Linux. So, for supporting llmd to run in both Junos OS and Linux OS, the llmd code directory is moved from the Linux side to the Junos OS side.

- **Storing of logs into specified table of the sqlite3 database by llmd**— A new syslog daemon is introduced to collect local logs on SRX Series devices and saving them into the database.
 - **Database table definition**—For session logs, the data types are source-address, destination-address, application, user, and so on. For logs related to security features, the data types are attack-name, URL, profile protocol, and so on. Therefore, different tables are designed to store different types of logs to help improve the performance and save disk space. SRX device creates a database table for each log type, when log data is recorded.
 - **Database table rotation**—Each type of database table has its maximum record number that is device specific. When the table record number reaches the limitation, new logs replace the oldest logs.
- **Calculating and displaying the reports that are triggered by CLI**—The reports from the database are received from the CLI as the interface. Using the CLI, you can calculate and display the reporting details.

Chassis Cluster Scenario

For on-box reporting in a chassis cluster, the logs are stored in the local disk on which the device is processing active traffic. These logs are not synchronized to the chassis cluster peer.

Each node is responsible to store logs when each node is processing active traffic. In case of active/passive mode, only the active node processes the traffic and logs are also stored only in the active node. In case of failover, the new active node is processes the traffic and stores logs in its local disk. In case of active/active mode, each node processes its own traffic and logs are stored in the respective nodes.

- Related Documentation**
- [report on page 1831](#)
 - *Example: Configuring AppTrack*

Monitoring Reports

On-box reporting offers a comprehensive reporting facility where your security management team can spot a security event when it occurs, immediately access and review pertinent details about the event, and quickly decide appropriate remedial action. The J-Web reporting feature provides one- or two-page reports that are equivalent to a compilation of numerous log entries.

This section contains the following topics:

- [Threats Monitoring Report on page 1141](#)
- [Traffic Monitoring Report on page 1146](#)

Threats Monitoring Report

Purpose Use the Threats Report to monitor general statistics and activity reports of current threats to the network. You can analyze logging data for threat type, source and destination details, and threat frequency information. The report calculates, displays, and refreshes the statistics, providing graphic presentations of the current state of the network.

Action To view the Threats Report:

1. Click **Threats Report** in the bottom right of the Dashboard, or select **Monitor>Reports>Threats** in the J-Web user interface. The Threats Report appears.
2. Select one of the following tabs:
 - **Statistics** tab. See [Table 133 on page 722](#) for a description of the page content.
 - **Activities** tab. See [Table 134 on page 724](#) for a description of the page content.

Table 187: Statistics Tab Output in the Threats Report

Field	Description
General Statistics Pane	

Table 187: Statistics Tab Output in the Threats Report (continued)

Field	Description
Threat Category	One of the following categories of threats: <ul style="list-style-type: none"> • Traffic • IDP • Content Security <ul style="list-style-type: none"> • Antivirus • Antispam • Web Filter—Click the Web filter category to display counters for 39 subcategories. • Content Filter • Firewall Event
Severity	Severity level of the threat: <ul style="list-style-type: none"> • emerg • alert • crit • err • warning • notice • info • debug
Hits in past 24 hours	Number of threats encountered per category in the past 24 hours.
Hits in current hour	Number of threats encountered per category in the last hour.
Threat Counts in the Past 24 Hours	
By Severity	Graph representing the number of threats received each hour for the past 24 hours sorted by severity level.
By Category	Graph representing the number of threats received each hour for the past 24 hours sorted by category.
X Axis	Twenty-four hour span with the current hour occupying the right-most column of the display. The graph shifts to the left every hour.
Y Axis	Number of threats encountered. The axis automatically scales based on the number of threats encountered.
Most Recent Threats	
Threat Name	Names of the most recent threats. Depending on the threat category, you can click the threat name to go to a scan engine site for a threat description.

Table 187: Statistics Tab Output in the Threats Report (continued)

Field	Description
Category	Category of each threat: <ul style="list-style-type: none"> • Traffic • IDP • Content Security <ul style="list-style-type: none"> • Antivirus • Antispam • Web Filter • Content Filter • Firewall Event
Source IP/Port	Source IP address (and port number, if applicable) of the threat.
Destination IP/Port	Destination IP address (and port number, if applicable) of the threat.
Protocol	Protocol name of the threat.
Description	Threat identification based on the category type: <ul style="list-style-type: none"> • Antivirus—URL • Web filter—category • Content filter—reason • Antispam—sender e-mail
Action	Action taken in response to the threat.
Hit Time	Time the threat occurred.
Threat Trend in past 24 hours	
Category	Pie chart graphic representing comparative threat counts by category: <ul style="list-style-type: none"> • Traffic • IDP • Content Security <ul style="list-style-type: none"> • Antivirus • Antispam • Web Filter • Content Filter • Firewall Event
Web Filter Counters Summary	
Category	Web filter count broken down by up to 39 subcategories. Clicking on the Web filter listing in the General Statistics pane opens the Web Filter Counters Summary pane.
Hits in past 24 hours	Number of threats per subcategory in the last 24 hours.

Table 187: Statistics Tab Output in the Threats Report (continued)

Field	Description
Hits in current hour	Number of threats per subcategory in the last hour.

Table 188: Activities Tab Output in the Threats Report

Field	Function
Most Recent Virus Hits	
Threat Name	Name of the virus threat. Viruses can be based on services, like Web, FTP, or e-mail, or based on severity level.
Severity	Severity level of each threat: <ul style="list-style-type: none"> • emerg • alert • crit • err • warning • notice • info • debug
Source IP/Port	IP address (and port number, if applicable) of the source of the threat.
Destination IP/Port	IP address (and port number, if applicable) of the destination of the threat.
Protocol	Protocol name of the threat.
Description	Threat identification based on the category type: <ul style="list-style-type: none"> • Antivirus—URL • Web filter—category • Content filter—reason • Antispam—sender e-mail
Action	Action taken in response to the threat.
Last Hit Time	Last time the threat occurred.
Most Recent Spam E-Mail Senders	
From e-mail	E-mail address that was the source of the spam.

Table 188: Activities Tab Output in the Threats Report (continued)

Field	Function
Severity	Severity level of the threat: <ul style="list-style-type: none"> • emerg • alert • crit • err • warning • notice • info • debug
Source IP	IP address of the source of the threat.
Action	Action taken in response to the threat.
Last Send Time	Last time that the spam e-mail was sent.
Recently Blocked URL Requests	
URL	URL request that was blocked.
Source IP/Port	IP address (and port number, if applicable) of the source.
Destination IP/Port	IP address (and port number, if applicable) of the destination.
Hits in current hour	Number of threats encountered in the last hour.
Most Recent IDP Attacks	
Attack	
Severity	Severity of each threat: <ul style="list-style-type: none"> • emerg • alert • crit • err • warning • notice • info • debug
Source IP/Port	IP address (and port number, if applicable) of the source.
Destination IP/Port	IP address (and port number, if applicable) of the destination.
Protocol	Protocol name of the threat.

Table 188: Activities Tab Output in the Threats Report (continued)

Field	Function
Action	Action taken in response to the threat.
Last Send Time	Last time the IDP threat was sent.

- See Also**
- [Traffic Monitoring Report on page 726](#)
 - [Monitoring Address Pools on page 677](#)

Traffic Monitoring Report

Purpose Monitor network traffic by reviewing reports of flow sessions over the past 24 hours. You can analyze logging data for connection statistics and session usage by a transport protocol.

Action To view network traffic in the past 24 hours, select **Monitor>Reports>Traffic** in the J-Web user interface. See [Table 135 on page 727](#) for a description of the report.

Table 189: Traffic Report Output

Field	Description
Sessions in Past 24 Hours per Protocol	
Protocol Name	Name of the protocol. To see hourly activity by protocol, click the protocol name and review the "Protocol activities chart" in the lower pane. <ul style="list-style-type: none"> • TCP • UDP • ICMP
Total Session	Total number of sessions for the protocol in the past 24 hours.
Bytes In (KB)	Total number of incoming bytes in KB.
Bytes Out (KB)	Total number of outgoing bytes in KB.
Packets In	Total number of incoming packets.
Packets Out	Total number of outgoing packets.
Most Recently Closed Sessions	
Source IP/Port	Source IP address (and port number, if applicable) of the closed session.
Destination IP/Port	Destination IP address (and port number, if applicable) of the closed session.

Table 189: Traffic Report Output (continued)

Field	Description
Protocol	Protocol of the closed session. <ul style="list-style-type: none"> • TCP • UDP • ICMP
Bytes In (KB)	Total number of incoming bytes in KB.
Bytes Out (KB)	Total number of outgoing bytes in KB.
Packets In	Total number of incoming packets.
Packets Out	Total number of outgoing packets.
Timestamp	The time the session was closed.
Protocol Activities Chart	
Bytes In/Out	Graphic representation of traffic as incoming and outgoing bytes per hour. The byte count is for the protocol selected in the Sessions in Past 24 Hours per Protocol pane. Changing the selection causes this chart to refresh immediately.
Packets In/Out	Graphic representation of traffic as incoming and outgoing packets per hour. The packet count is for the protocol selected in the Sessions in Past 24 Hours per Protocol pane. Changing the selection causes this chart to refresh immediately.
Sessions	Graphic representation of traffic as the number of sessions per hour. The session count is for the protocol selected in the Sessions in Past 24 Hours per Protocol pane. Changing the selection causes this chart to refresh immediately.
X Axis	One hour per column for 24 hours.
Y Axis	Byte, packet, or session count.
Protocol Session Chart	
Sessions by Protocol	Graphic representation of the traffic as the current session count per protocol. The protocols displayed are TCP, UDP, and ICMP.

See Also • [Threats Monitoring Report on page 722](#)

Related Documentation • [Monitoring Overview on page 15](#)
• [Monitoring Interfaces on page 680](#)

Configuring On-Box Binary Security Log Files

SRX Series devices have two types of log: system logs and security logs. System logs record control plane events, for example admin login to the device. For more about system logs, please see [“Junos OS System Log Overview” on page 1049](#). Security logs, also known as traffic logs, record data plane events regarding specific traffic handling, for example when a security policy denies certain traffic due to some violation of the policy. For more information about security logs, please see [“Understanding System Logging for Security Devices” on page 1133](#).

Data plane events are written to system log files in a similar manner to control plane events.

The two types of log can be collected and saved either on-box or off-box. The procedure below explains how to configure security logs in binary format for on-box (event-mode) logging.

You can configure security files in binary format using the **log** statement at the **[security]** hierarchy level.

The following procedure specifies binary format for event-mode security logging, and defines the log filename, path, and log file characteristics. For stream-mode, off-box security logging, please see [“Configuring Off-Box Binary Security Log Files” on page 1150](#).

1. Specify the logging mode and the format for the log file. For on-box, event-mode logging:

```
set security log mode event
set security log format binary
```



NOTE: If system logging has been set to send system logs to an external destination, security logs will also be sent to that destination when using security log event-mode. More information about sending system logs to an external destination is available here [“Examples: Configuring System Logging” on page 1080](#).



NOTE: Off-box and on-box security logging modes cannot be enabled simultaneously.

2. Optionally, define a log filename and a path. By default, the file `bin_messages` is created in the `/var/log` directory.

```
set security log file name security-binary-log
set security log file path security/log-folder
```

3. Optionally, change the maximum size of the log file and the maximum number of log files that can be archived. By default the maximum size of the log file is 3 MB, and a total of three log files can be archived.

```
set security log file size 5
set security log file files 5
```

4. Optionally, select the hpl flag to enable diagnostic traces for binary logging. The prefix smf_hpl identifies all binary logging traces.

```
set security log traceoptions flag hpl
```

5. View the content of the event-mode log file stored on the device.

```
show security log file
```



NOTE: The `show security log` command displays event-mode security log messages if they are in a text-based format. The `show security log file` command displays event-mode security log messages if they are in binary format.

Use the following command to clear the content of the binary event-mode security log file.

```
clear security log file
```

Related Documentation

- [Understanding Binary Format for Security Logs on page 1136](#)
- [Setting the System to Send All Log Messages Through eventd on page 1151](#)

Configuring Off-Box Binary Security Log Files

SRX Series devices have two types of log: system logs and security logs. System logs record control plane events, for example admin login to the device. For more about system logs, please see [“Junos OS System Log Overview” on page 1049](#). Security logs, also known as traffic logs, record data plane events regarding specific traffic handling, for example when a security policy denies certain traffic due to some violation of the policy. For more information about security logs, please see [“Understanding System Logging for Security Devices” on page 1133](#).

The two types of log can be collected and saved either on-box or off-box. The procedure below explains how to configure security logs in binary format for off-box (stream-mode) logging.

You can configure security files in binary format using the **log** statement at the **[security]** hierarchy level.

The following procedure specifies binary format for stream-mode security logging, and defines the log filename, path, and log file characteristics. For event-mode, on-box security logging, please see [“Configuring On-Box Binary Security Log Files” on page 1148](#).

1. Specify the logging mode and the format for the log file. For off-box, stream-mode logging:

```
set security log mode stream
set security log stream test-stream format binary host 1.3.54.22
```



NOTE: Off-box and on-box security logging modes cannot be enabled simultaneously.

2. For off-box security logging, specify the source address, which identifies the SRX Series device that generated the log messages. The source address is required.

```
set security log source-address 2.3.45.66
```

3. Optionally, define a log filename and a path. By default, the file `bin_messages` is created in the `/var/log` directory.

```
set security log file name security-binary-log
set security log file path security/log-folder
```

4. Optionally, change the maximum size of the log file and the maximum number of log files that can be archived. By default the maximum size of the log file is 3 MB, and a total of three log files can be archived.

```
set security log file size 5
```

```
set security log file files 5
```

5. Optionally, select the `hpl` flag to enable diagnostic traces for binary logging. The prefix `smf_hpl` identifies all binary logging traces.

```
set security log traceoptions flag hpl
```

6. View the content of the event-mode log file stored on the device using either Juniper Secure Analytics (JSA) or Security Threat Response Manager (STRM).

Related Documentation

- [Understanding Binary Format for Security Logs on page 1136](#)
- [Setting the System to Send All Log Messages Through eventd on page 1151](#)
- [Setting the System to Stream Security Logs Through Revenue Ports on page 1152](#)

Sending System Log Messages to a File

You can direct system log messages to a file on the CompactFlash (CF) card. The default directory for log files is `/var/log`. To specify a different directory on the CF card, include the complete pathname.

Create a file named **security**, and send log messages of the **authorization** class at the severity level **info** to the file.

To set the filename, the facility, and severity level:

```
{primary:node0}
user@host# set system syslog file security authorization info
```

Related Documentation

- [Understanding System Logging for Security Devices on page 1133](#)
- [Understanding Binary Format for Security Logs on page 1136](#)
- [Setting the System to Send All Log Messages Through eventd on page 1151](#)
- [Setting the System to Stream Security Logs Through Revenue Ports on page 1152](#)
- [Monitoring System Log Messages with the J-Web Event Viewer](#)

Setting the System to Send All Log Messages Through eventd

The **eventd** process of logging configuration is most commonly used for Junos OS. In this configuration, control plane logs and data plane, or security, logs are forwarded from the data plane to the Routing Engine control plane **rtlogd** process. The **rtlogd** process then either forwards syslog or sd-syslog-formatted logs to the **eventd** process or the WELF-formatted logs to the external or remote WELF log collector.

To send all log messages through **eventd**:

1. Set the **eventd** process to handle security logs and send them to a remote server.

```
{primary:node0}  
user@host# set security log mode event
```

2. Configure the server that will receive the system log messages.

```
{primary:node0}  
user@host# set system syslog host hostname any any
```

where **hostname** is the fully qualified hostname or IP address of the server that will receive the logs.



NOTE: To send duplicate logs to a second remote server, repeat the command with a new fully qualified **hostname** or IP address of a second server.

If your deployment is an active/active chassis cluster, you can also configure security logging on the active node to be sent to separate remote servers to achieve logging redundancy.

To rename or redirect one of the logging configurations, you need to delete and recreate it. To delete a configuration:

```
{primary:node0}  
user@host# delete security log mode event
```

Related Documentation

- [Understanding System Logging for Security Devices on page 1133](#)
- [Understanding Binary Format for Security Logs on page 1136](#)
- [Setting the System to Stream Security Logs Through Revenue Ports on page 1152](#)
- [Sending System Log Messages to a File on page 1151](#)
- [Monitoring System Log Messages with the J-Web Event Viewer](#)

Setting the System to Stream Security Logs Through Revenue Ports

You can increase the number of data plane, or security, logs that are sent by modifying the manner in which they are sent. When the logging mode is set to **stream**, security logs generated in the data plane are streamed out a revenue traffic port directly to a remote server.



NOTE: If the route of the remote server exists in the forwarding table, then the logs are forwarded to next hop points, irrespective of a physical interface or a logical interface.

To use the **stream** mode, enter the following commands:

```
{primary:node0}
user@host# set security log source-address source-address
user@host# set security log stream streamname format (syslog|sd-syslog|welf) category
(all|content-security) host ipaddr
```

where *source-address* is the IP address of the source machine; **syslog**, **sd-syslog** (structured system logging messages) and **welf** are logging formats; **all** and **content-security** are the categories of logging; and *ipaddr* is the IP address of the server to which the logs will be streamed.



NOTE: WELF logs must be streamed through a revenue port because the **eventd** process does not recognize the WELF format. The category must be set to **content-security**. For example:

```
{primary:node0}
user@host# set security log stream securitylog1 format
welf category content-security host 10.121.23.5
```

To send duplicate logs to a second remote server, repeat the command with a new *ipaddr*. If your deployment is an active/active chassis cluster, you can also configure security logging on the active node to be sent to separate remote servers to achieve logging redundancy.

Starting in Junos OS Release 15.1X49-D70 and Junos OS Release 17.3R1, on SRX1500, SRX4100, and SRX4200 Series devices and vSRX instances, use the **set security log stream *stream_name*** command to configure the stream log file. The source address and source interface attributes are no longer required when you configure stream log file. The source address and source interface attributes are required when you configure host. On SRX300, SRX320, SRX340, and SRX345 Series devices, use the **set security log stream *stream_name* host *host_IP address*** command to configure the stream log file with the source address and source interface attributes configuration.

Example:

```
[edit]
user@host# set security log mode stream
user@host# set security log source-address 192.0.2.1
user@host# set security log stream S1 host 192.0.2.2
user@host# set security log stream S1 format syslog
user@host# set security log stream S1 category all
user@host# set security log stream S2 file name file1
```

You can use the **show security log** command to verify the log configuration.

The following sample output provides the log configuration:

user@host# show security log

```
mode stream;
source-address 192.0.2.1;
stream S1 {
    format syslog;
    category all;
    host {
        192.0.2.2;
    }
}
stream S2 {
    file {
        name file1;
    }
}
```

Starting from Junos OS Release 15.1X49-D120 and Junos OS Release 18.1R1 the maximum length of the syslog message in stream mode is increased from 1024 bytes to 1340 bytes.

Starting in Junos OS Release 17.4R2 and later, on SRX300, SRX320, SRX340, SRX345 Series devices and vSRX instances, when the device is configured in stream mode, you can configure maximum of eight system log hosts.

In Junos OS Release 17.4R2 and earlier releases, you can configure only three system log hosts in the stream mode. If you configure more than three system log hosts, then the following error message is displayed **error: configuration check-out failed**.

Release History Table

Release	Description
17.4R2	Starting in Junos OS Release 17.4R2 and later, on SRX300, SRX320, SRX340, SRX345 Series devices and vSRX instances, when the device is configured in stream mode, you can configure maximum of eight system log hosts. In Junos OS Release 17.4R2 and earlier releases, you can configure only three system log hosts in the stream mode. If you configure more than three system log hosts, then the following error message is displayed error: configuration check-out failed .
15.1X49-D70	Starting in Junos OS Release 15.1X49-D70 and Junos OS Release 17.3R1, on SRX1500, SRX4100, and SRX4200 Series devices and vSRX instances, use the set security log stream stream_name command to configure the stream log file. The source address and source interface attributes are no longer required when you configure stream log file. The source address and source interface attributes are required when you configure host. On SRX300, SRX320, SRX340, and SRX345 Series devices, use the set security log stream stream_name host host_IP address command to configure the stream log file with the source address and source interface attributes configuration.
15.1X49-D120	Starting from Junos OS Release 15.1X49-D120 and Junos OS Release 18.1R1 the maximum length of the syslog message in stream mode is increased from 1024 bytes to 1340 bytes.

Related Documentation

- [Understanding System Logging for Security Devices on page 1133](#)
- [Understanding Binary Format for Security Logs on page 1136](#)
- [Setting the System to Send All Log Messages Through eventd on page 1151](#)
- [Sending System Log Messages to a File on page 1151](#)
- [Monitoring System Log Messages with the J-Web Event Viewer](#)

CHAPTER 51

Monitoring Log Messages

- [Monitoring System Log Messages on page 1157](#)

Monitoring System Log Messages

Purpose Display system log messages about the QFX Series. By looking through a system log file for any entries pertaining to the interface that you are interested in, you can further investigate a problem with an interface on the switch.

Action To view system log messages:

```
user@switch1> show log messages
```

Sample Output

```
Nov  4 11:30:01 switch1 newsyslog[2283]: logfile turned over due to size>128K
Nov  4 11:30:01 switch1 newsyslog[2283]: logfile turned over due to size>128K
Nov  4 11:30:06 switch1 chassism[952]: CM ENV Monitor: set fan speed is 65 percent
for Fan 1
Nov  4 11:30:06 switch1 chassism[952]: CM ENV Monitor: set fan speed is 65 percent
for Fan 2
Nov  4 11:30:06 switch1 chassism[952]: CM ENV Monitor: set fan speed is 65 percent
for Fan 3
...
Nov  4 11:52:53 switch1 snmpd[944]: SNMPD_HEALTH_MON_INSTANCE: Health Monitor:
jroute daemon
memory usage (Management process): new instance detected (variable:
sysApp1ElmtRunMemory.5.6.2293)
Nov  4 11:52:53 switch1 snmpd[944]: SNMPD_HEALTH_MON_INSTANCE: Health Monitor:
jroute daemon
memory usage (Command-line interface): new instance detected (variable:
sysApp1ElmtRunMemory.5.8.2292)
...
Nov  4 12:10:24 switch1 mgd[2293]: UI_CMDLINE_READ_LINE: User 'jsmith', command
'exit '
Nov  4 12:10:27 switch1 mgd[2293]: UI_DBASE_LOGOUT_EVENT: User 'jsmith' exiting
configuration mode
Nov  4 12:10:31 switch1 mgd[2293]: UI_CMDLINE_READ_LINE: User 'jsmith', command
'show log messages'
```

Meaning The sample output shows the following entries in the **messages** file:

- A new log file was created when the previous file reached the maximum size of 128 kilobytes (KB).
- The fan speed for Fan 1, 2, and 3 is set at 65 percent.
- Health monitoring activity is detected.
- CLI commands were entered by the user jsmith.

**Related
Documentation**

- [Overview of Junos OS System Log Messages on page 1050](#)
- [Understanding the Implementation of System Log Messages on the QFabric System](#)
- [Example: Configuring System Log Messages on page 1067](#)
- [clear log on page 2046](#)
- [show log on page 2057](#)
- [syslog on page 1840](#)

PART 12

Network Management and Troubleshooting

- [Monitoring and Troubleshooting on page 1161](#)
- [Troubleshooting of System Performance with Resource Monitoring Methodology on page 1179](#)
- [Configuring Data Path Debugging and Trace Options on page 1189](#)
- [Using MPLS to Diagnose LSPs, VPNs, and Layer 2 Circuits on page 1205](#)
- [Using Packet Capture to Analyze Network Traffic on page 1217](#)
- [Troubleshooting Security Devices on page 1239](#)

Monitoring and Troubleshooting

- [Pinging Hosts on page 1161](#)
- [Monitoring Traffic Through the Router or Switch on page 1162](#)
- [Dynamic Ternary Content Addressable Memory Overview on page 1165](#)
- [Service Scaling on ACX5048 and ACX5096 Routers on page 1174](#)
- [Understanding and Configuring the Unified Forwarding Table on page 1175](#)
- [Troubleshooting and Monitoring TCAM Resource in ACX Series Routers on page 1177](#)

Pinging Hosts

Purpose Use the CLI **ping** command to verify that a host can be reached over the network. This command is useful for diagnosing host and network connectivity problems. The switch sends a series of Internet Control Message Protocol (ICMP) echo (ping) requests to a specified host and receives ICMP echo responses.

Action To use the **ping** command to send four requests (ping count) to host3:

ping *host* count *number*

Sample Output

ping host3 count 4

```
user@switch> ping host3 count 4
PING host3.site.net (192.0.2.111): 56 data bytes
64 bytes from 192.0.2.111: icmp_seq=0 ttl=122 time=0.661 ms
64 bytes from 192.0.2.111: icmp_seq=1 ttl=122 time=0.619 ms
64 bytes from 192.0.2.111: icmp_seq=2 ttl=122 time=0.621 ms
64 bytes from 192.0.2.111: icmp_seq=3 ttl=122 time=0.634 ms
```

```
--- host3.site.net ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max/stddev = 0.619/0.634/0.661/0.017 ms
```

Meaning • The **ping** results show the following information:

- Size of the ping response packet (in bytes).
- IP address of the host from which the response was sent.
- Sequence number of the ping response packet. You can use this value to match the ping response to the corresponding ping request.
- Time-to-live (ttl) hop-count value of the ping response packet.
- Total time between the sending of the ping request packet and the receiving of the ping response packet, in milliseconds. This value is also called round-trip time.
- Number of ping requests (probes) sent to the host.
- Number of ping responses received from the host.
- Packet loss percentage.
- Round-trip time statistics: minimum, average, maximum, and standard deviation of the round-trip time.

Related Documentation

- [Troubleshooting Overview](#)
- [Understanding Troubleshooting Resources](#)

Monitoring Traffic Through the Router or Switch

To help with the diagnosis of a problem, display real-time statistics about the traffic passing through physical interfaces on the router or switch.

To display real-time statistics about physical interfaces, perform these tasks:

1. [Displaying Real-Time Statistics About All Interfaces on the Router or Switch on page 1162](#)
2. [Displaying Real-Time Statistics About an Interface on the Router or Switch on page 1163](#)

Displaying Real-Time Statistics About All Interfaces on the Router or Switch

Purpose Display real-time statistics about traffic passing through all interfaces on the router or switch.

Action To display real-time statistics about traffic passing through all interfaces on the router or switch:

```
user@host> monitor interface traffic
```

Sample Output

```
user@host> monitor interface traffic
```

host name		Seconds: 15		Time: 12:31:09	
Interface	Link	Input packets	(pps)	Output packets	(pps)
so-1/0/0	Down	0	(0)	0	(0)
so-1/1/0	Down	0	(0)	0	(0)


```

so-1/1/1    Down          0          (0)          0          (0)
so-1/1/2    Down          0          (0)          0          (0)
so-1/1/3    Down          0          (0)          0          (0)
t3-1/2/0    Down          0          (0)          0          (0)
t3-1/2/1    Down          0          (0)          0          (0)
t3-1/2/2    Down          0          (0)          0          (0)
t3-1/2/3    Down          0          (0)          0          (0)
so-2/0/0    Up            211035     (1)          36778       (0)
so-2/0/1    Up            192753     (1)          36782       (0)
so-2/0/2    Up            211020     (1)          36779       (0)
so-2/0/3    Up            211029     (1)          36776       (0)
so-2/1/0    Up            189378     (1)          36349       (0)
so-2/1/1    Down          0          (0)          18747       (0)
so-2/1/2    Down          0          (0)          16078       (0)
so-2/1/3    Up            0          (0)          80338       (0)
at-2/3/0    Up            0          (0)          0           (0)
at-2/3/1    Down          0          (0)          0           (0)
Bytes=b, Clear=c, Delta=d, Packets=p, Quit=q or ESC, Rate=r, Up=^U, Down=^D

```

Meaning The sample output displays traffic data for active interfaces and the amount that each field has changed since the command started or since the counters were cleared by using the **C** key. In this example, the **monitor interface** command has been running for 15 seconds since the command was issued or since the counters last returned to zero.

Displaying Real-Time Statistics About an Interface on the Router or Switch

Purpose Display real-time statistics about traffic passing through an interface on the router or switch.

Action To display traffic passing through an interface on the router or switch, use the following Junos OS CLI operational mode command:

```
user@host> monitor interface interface-name
```

Sample Output

```

user@host> monitor interface so-0/0/1

Next='n', Quit='q' or ESC, Freeze='f', Thaw='t', Clear='c', Interface='i'
R1
Interface: so-0/0/1, Enabled, Link is Up
Encapsulation: PPP, Keepalives, Speed: 0C3 Traffic statistics:
  Input bytes:          5856541 (88 bps)
  Output bytes:         6271468 (96 bps)
  Input packets:        157629 (0 pps)
  Output packets:       157024 (0 pps)
Encapsulation statistics:
  Input keepalives:     42353
  Output keepalives:    42320
  LCP state: Opened
Error statistics:
  Input errors:         0
  Input drops:          0

```

```

Input framing errors:          0
Input runs:                   0
Input giants:                 0
Policed discards:            0
L3 incompletes:              0
L2 channel errors:           0
L2 mismatch timeouts:        0
Carrier transitions:          1
Output errors:                0
Output drops:                 0
Aged packets:                 0
Active alarms : None
Active defects: None
SONET error counts/seconds:
  LOS count                   1
  LOF count                   1
  SEF count                   1
  ES-S                        77
  SES-S                       77
SONET statistics:
  BIP-B1                      0
  BIP-B2                      0
  REI-L                       0
  BIP-B3                      0
  REI-P                       0
Received SONET overhead:  F1      : 0x00  J0      : 0xZ

```

Meaning The sample output shows the input and output packets for a particular SONET interface (**so-0/0/1**). The information can include common interface failures, such as SONET/SDH and T3 alarms, loopbacks detected, and increases in framing errors. For more information, see *Checklist for Tracking Error Conditions*.

To control the output of the command while it is running, use the keys shown in [Table 190 on page 1164](#).

Table 190: Output Control Keys for the monitor interface Command

Action	Key
Display information about the next interface. The monitor interface command scrolls through the physical or logical interfaces in the same order that they are displayed by the show interfaces terse command.	N
Display information about a different interface. The command prompts you for the name of a specific interface.	I
Freeze the display, halting the display of updated statistics.	F
Thaw the display, resuming the display of updated statistics.	T
Clear (zero) the current delta counters since monitor interface was started. It does not clear the accumulative counter.	C
Stop the monitor interface command.	Q

See the [CLI Explorer](#) for details on using match conditions with the **monitor traffic** command.

Dynamic Ternary Content Addressable Memory Overview

- [Understanding Dynamic Ternary Content Addressable Memory on page 1165](#)
- [Applications using Dynamic TCAM Infrastructure on page 1165](#)
- [Features Using TCAM Resource on page 1166](#)
- [Monitoring TCAM Resource Usage on page 1168](#)
- [Example: Monitoring and Troubleshooting the TCAM Resource on page 1169](#)

Understanding Dynamic Ternary Content Addressable Memory

In ACX Series routers, Ternary Content Addressable Memory (TCAM) is used by various applications like firewall, connectivity fault management, PTPoE, RFC 2544, etc. The Packet Forwarding Engine (PFE) in ACX Series routers uses TCAM with defined TCAM space limits. The allocation of TCAM resources for various filter applications are statically distributed. This static allocation leads to inefficient utilization of TCAM resources when all the filter applications might not use this TCAM resource simultaneously.

The dynamic allocation of TCAM space in ACX routers efficiently allocates the available TCAM resources for various filter applications. In the dynamic TCAM model, various filter applications (such as inet-firewall, bridge-firewall, cfm-filters, etc.) can optimally utilize the available TCAM resources as and when required. Dynamic TCAM resource allocation is usage driven and is dynamically allocated for filter applications on a need basis. When a filter application no longer uses the TCAM space, the resource is freed and available for use by other applications. This dynamic TCAM model caters to higher scale of TCAM resource utilization based on application's demand.

Applications using Dynamic TCAM Infrastructure

The following filter application categories use the dynamic TCAM infrastructure:

- Firewall filter—All the firewall configurations
- Implicit filter—Routing Engine (RE) demons using filters to achieve its functionality. For example, connectivity fault management, IP MAC validation, etc.
- Dynamic filters—Applications using filters to achieve the functionality at the PFE level. For example, logical interface level fixed classifier, RFC 2544, etc. RE demons will not know about these filters.
- System-init filters—Filters that require entries at the system level or fixed set of entries at router's boot sequence. For example, Layer 2 and Layer 3 control protocol trap, default ARP policer, etc.



NOTE: The System-init filter which has the applications for Layer 2 and Layer 3 control protocols trap is essential for the overall system functionality. The applications in this control group consume a fixed and minimal TCAM space from the overall TCAM space. The system-init filter will not use the dynamic TCAM infrastructure and will be created when the router is initialized during the boot sequence.

Features Using TCAM Resource

Applications using the TCAM resource is termed tcam-app in this document. For example, inet-firewall, bridge-firewall, connectivity fault management, link fault management, etc., are all different tcam-apps.

Table 191 on page 1166 describes the list of tcam-apps that use TCAM resources.

Table 191: Features Using TCAM Resource

TCAM Apps/TCAM Users	Feature/Functionality	TCAM Stage
bd-dtag-validate	Bridge domain dual-tagged validate NOTE: This feature is not supported on ACX5048 and ACX5096 routers.	Egress
bd-tpid-swap	Bridge domain vlan-map with swap tpid operation	Egress
cfm-bd-filter	Connectivity fault management implicit bridge-domain filters	Ingress
cfm-filter	Connectivity fault management implicit filters	Ingress
cfm-vpls-filter	Connectivity fault management implicit vpls filters NOTE: This feature is supported only on ACX5048 and ACX5096 routers.	Ingress
cfm-vpls-ifl-filter	Connectivity fault management implicit vpls logical interface filters NOTE: This feature is supported only on ACX5048 and ACX5096 routers.	Ingress
cos-fc	Logical interface level fixed classifier	Pre-ingress
fw-ccc-in	Circuit cross-connect family ingress firewall	Ingress
fw-family-out	Family level egress firewall	Egress
fw-fbf	Firewall filter-based forwarding	Pre-ingress
fw-fbf-inet6	Firewall filter-based forwarding for inet6 family	Pre-ingress
fw-ifl-in	Logical interface level ingress firewall	Ingress

Table 191: Features Using TCAM Resource (continued)

TCAM Apps/TCAM Users	Feature/Functionality	TCAM Stage
fw-ift-out	Logical interface level egress firewall	Egress
fw-inet-fff	Inet family ingress firewall on a forwarding-table	Ingress
fw-inet6-fff	Inet6 family ingress firewall on a forwarding-table	Ingress
fw-inet-in	Inet family ingress firewall	Ingress
fw-inet-rpf	Inet family ingress firewall on RPF fail check	Ingress
fw-inet6-in	Inet6 family ingress firewall	Ingress
fw-inet6-family-out	Inet6 Family level egress firewall	Egress
fw-inet6-rpf	Inet6 family ingress firewall on a RPF fail check	Ingress
fw-inet-pm	Inet family firewall with port-mirror action <i>NOTE:</i> This feature is not supported on ACX5048 and ACX5096 routers.	Ingress
fw-l2-in	Bridge family ingress firewall on Layer 2 interface	Ingress
fw-mpls-in	MPLS family ingress firewall	Ingress
fw-semantics	Firewall sharing semantics for CLI configured firewall	Pre-ingress
fw-vpls-in	VPLS family ingress firewall on VPLS interface	Ingress
ifd-src-mac-fil	Physical interface level source MAC filter	Pre-ingress
ift-statistics-in	Logical level interface statistics at ingress	Ingress
ift-statistics-out	Logical level interface statistics at egress	Egress
ing-out-iff	Ingress application on behalf of egress family filter for log and syslog	Ingress
ip-mac-val	IP MAC validation	Pre-ingress
ip-mac-val-bcast	IP MAC validation for broadcast	Pre-ingress
ipsec-reverse-fil	Reverse filters for IPsec service <i>NOTE:</i> This feature is not supported on ACX5048 and ACX5096 routers.	Ingress
irb-cos-rw	IRB CoS rewrite	Egress

Table 191: Features Using TCAM Resource (continued)

TCAM Apps/TCAM Users	Feature/Functionality	TCAM Stage
lfm-802.3ah-in	Link fault management (IEEE 802.3ah) at ingress NOTE: This feature is not supported on ACX5048 and ACX5096 routers.	Ingress
lfm-802.3ah-out	Link fault management (IEEE 802.3ah) at egress	Egress
lo0-inet-fil	Loopback interface inet filter	Ingress
lo0-inet6-fil	Loopback interface inet6 filter	Ingress
mac-drop-cnt	Statistics for drops by MAC validate and source MAC filters	Ingress
mrouter-port-in	Multicast router port for snooping	Ingress
napt-reverse-fil	Reverse filters for network address port translation (NAPT) service NOTE: This feature is not supported on ACX5048 and ACX5096 routers.	Ingress
no-local-switching	Bridge no-local-switching	Ingress
ptpoe	Point-to-Point-Over-the-Ethernet traps NOTE: This feature is not supported on ACX5048 and ACX5096 routers.	Ingress
ptpoe-cos-rw	CoS rewrite for PTPoE NOTE: This feature is not supported on ACX5048 and ACX5096 routers.	Egress
rfc2544-layer2-in	RFC2544 for Layer 2 service at ingress	Pre-ingress
rfc2544-layer2-out	RFC2544 for Layer 2 service at egress NOTE: This feature is not supported on ACX5048 and ACX5096 routers.	Egress
service-filter-in	Service filter at ingress NOTE: This feature is not supported on ACX5048 and ACX5096 routers.	Ingress

Monitoring TCAM Resource Usage

You can use the show and clear commands to monitor and troubleshoot dynamic TCAM resource usage.

Table 192 on page 1169 summarizes the command-line interface (CLI) commands you can use to monitor and troubleshoot dynamic TCAM resource usage.

Table 192: Show and Clear Commands to Monitor and Troubleshoot Dynamic TCAM

Task	Command
Display the shared and the related applications for a particular application	<code>show pfe tcam app</code>
Display the TCAM resource usage for an application and stages (egress, ingress, and pre-ingress)	<code>show pfe tcam usage</code>
Display the TCAM resource usage errors for applications and stages (egress, ingress, and pre-ingress)	<code>show pfe tcam errors</code>
Clears the TCAM resource usage error statistics for applications and stages (egress, ingress, and pre-ingress)	<code>clear pfe tcam-errors</code>

Example: Monitoring and Troubleshooting the TCAM Resource

This section describes a use case where you can monitor and troubleshoot TCAM resources using show commands. In this use case scenario, you have configured Layer 2 services and the Layer 2 service-related applications are using TCAM resources. The dynamic approach, as shown in this example, gives you the complete flexibility to manage TCAM resources on a need basis.

The service requirement is as follows:

- Each bridge domain has one UNI and one NNI interface
- Each UNI interface has:
 - One logical interface level policer to police the traffic at 10 Mbps.
 - Multifield classifier with four terms to assign forwarding class and loss-priority.
- Each UNI interface configures CFM UP MEP at the level 4.
- Each NNI interface configures CFM DOWN MEP at the level 2

Let us consider a scenario where there are 100 services configured on the router. With this scale, all the applications are configured successfully and the status shows **OK** state.

1. Viewing TCAM resource usage for all stages.

To view the TCAM resource usage for all stages (egress, ingress, and pre-ingress), use the **show pfe tcam usage all-tcam-stages detail** command.

```

user@host> show pfe tcam usage all-tcam-stages detail
Slot 0

Tcam Resource Stage: Pre-Ingress
-----
Free [hw-grps: 3 out of 3]
No dynamic tcam usage

```

Tcam Resource Stage: Ingress

Free [hw-grps: 2 out of 8]

Group: 11, Mode: SINGLE, Hw grps used: 3, Tcam apps: 2

	Used	Allocated	Available	Errors
Tcam-Entries	800	1024	224	0
Counters	800	1024	224	0
Policers	0	1024	1024	0

App tcam usage:

App-Name	Entries	Counters	Policers	Precedence	State
Related-App-Name ..					
cfm-filter	500	500	0	3	OK
cfm-bd-filter	300	300	0	2	OK

Group: 8, Mode: DOUBLE, Hw grps used: 2, Tcam apps: 1

	Used	Allocated	Available	Errors
Tcam-Entries	500	512	12	0
Counters	500	1024	524	0
Policers	0	1024	1024	0

App tcam usage:

App-Name	Entries	Counters	Policers	Precedence	State
Related-App-Name ..					
fw-l2-in	500	500	0	2	OK
fw-semantics	0	X	X	1	OK

Group: 14, Mode: SINGLE, Hw grps used: 1, Tcam apps: 1

	Used	Allocated	Available	Errors
Tcam-Entries	200	512	312	0
Counters	200	512	312	0
Policers	100	512	412	0

App tcam usage:

App-Name	Entries	Counters	Policers	Precedence	State
Related-App-Name ..					
fw-ifl-in	200	200	100	1	OK

Tcam Resource Stage: Egress

Free [hw-grps: 3 out of 3]

No dynamic tcam usage

2. Configure additional Layer 2 services on the router.

For example, add 20 more services on the router, thereby increasing the total number of services to 120. After adding more services, you can check the status of the configuration by verifying either the syslog message using the command **show log messages**, or by running the **show pfe tcam errors** command.

The following is a sample syslog message output showing the TCAM resource shortage for Ethernet-switching family filters for newer configurations by running the **show log messages** CLI command.

```
[Sat Jul 11 16:10:33.794 LOG: Err] ACX Error
(dfw):acx_dfw_check_phy_slice_availability :Insufficient phy slices to
accomodate grp:13/IN_IFF_BRIDGE mode:1/DOUBLE
[Sat Jul 11 16:10:33.794 LOG: Err] ACX Error
(dfw):acx_dfw_check_resource_availability :Could not write filter:
f-bridge-ge-0/0/0.103-i, insufficient TCAM resources
[Sat Jul 11 16:10:33.794 LOG: Err] ACX Error (dfw):acx_dfw_update_filter_in_hw
:acx_dfw_check_resource_availability failed for filter:f-bridge-ge-0/0/0.103-i
[Sat Jul 11 16:10:33.794 LOG: Err] ACX Error (dfw):acx_dfw_create_hw_instance
:Status:1005 Could not program dfw(f-bridge-ge-0/0/0.103-i)
type(IN_IFF_BRIDGE)! [1005]
[Sat Jul 11 16:10:33.794 LOG: Err] ACX Error (dfw):acx_dfw_bind_shim :[1005]
Could not create dfw(f-bridge-ge-0/0/0.103-i) type(IN_IFF_BRIDGE)
[Sat Jul 11 16:10:33.794 LOG: Err] ACX Error (dfw):acx_dfw_bind :[1000] bind
failed for filter f-bridge-ge-0/0/0.103-i
```

If you use the **show pfe tcam errors all-tcam-stages detail** CLI command to verify the status of the configuration, the output will be as shown below:

```
user@host> show pfe tcam errors all-tcam-stages detail
```

```
Slot 0
```

```
Tcam Resource Stage: Pre-Ingress
```

```
-----
Free [hw-grps: 3 out of 3]
No dynamic tcam usage
```

```
Tcam Resource Stage: Ingress
```

```
-----
Free [hw-grps: 2 out of 8]
```

```
Group: 11, Mode: SINGLE, Hw grps used: 3, Tcam apps: 2
```

	Used	Allocated	Available	Errors
Tcam-Entries	960	1024	64	0
Counters	960	1024	64	0
Policers	0	1024	1024	0

```
App tcam usage:
```

App-Name	Entries	Counters	Policers	Precedence	State
Related-App-Name ..					
cfm-filter	600	600	0	3	OK
cfm-bd-filter	360	360	0	2	OK

```
Group: 8, Mode: DOUBLE, Hw grps used: 2, Tcam apps: 1
```

	Used	Allocated	Available	Errors
Tcam-Entries	510	512	2	18
Counters	510	1024	514	0
Policers	0	1024	1024	0

```
App tcam usage:
```

App-Name	Entries	Counters	Policers	Precedence	State
Related-App-Name ..					

```
-----
fw-l2-in          510    510    0    2 FAILED
fw-semantics      0      X    X    1    OK

```

App error statistics:

```
-----
App-Name          Entries Counters Policers Precedence  State
Related-App-Name ..
-----
fw-l2-in          18      0      0      2 FAILED
fw-semantics      0      X    X      1    OK

```

Group: 14, Mode: SINGLE, Hw grps used: 1, Tcam apps: 1

	Used	Allocated	Available	Errors
Tcam-Entries	240	512	272	0
Counters	240	512	272	0
Policers	120	512	392	0

App tcam usage:

```
-----
App-Name          Entries Counters Policers Precedence  State
Related-App-Name ..
-----
fw-ifl-in         240    240    120      1    OK

```

Tcam Resource Stage: Egress

Free [hw-grps: 3 out of 3]

No dynamic tcam usage

The output indicates that the **fw-l2-in** application is running out of TCAM resources and moves into a FAILED state. Although there are two TCAM slices available at the ingress stage, the **fw-l2-in** application is not able to use the available TCAM space due to its mode (DOUBLE), resulting in resource shortage failure.

3. Fixing the applications that have failed due to the shortage of TCAM resources.

The **fw-l2-in** application failed because of adding more number of services on the routers, which resulted in shortage of TCAM resources. Although other applications seems to work fine, it is recommended to deactivate or remove the newly added services so that the **fw-l2-in** application moves to an OK state. After removing or deactivating the newly added services, you need to run the **show pfe tcam usage** and **show pfe tcam error** commands to verify that there are no more applications in failed state.

To view the TCAM resource usage for all stages (egress, ingress, and pre-ingress), use the **show pfe tcam usage all-tcam-stages detail** command.

```
user@host> show pfe tcam usage all-tcam-stages detail
```

```
Slot 0
```

Tcam Resource Stage: Pre-Ingress

Free [hw-grps: 3 out of 3]

No dynamic tcam usage

Tcam Resource Stage: Ingress

Free [hw-grps: 2 out of 8]

Group: 11, Mode: SINGLE, Hw grps used: 3, Tcam apps: 2

	Used	Allocated	Available	Errors
Tcam-Entries	800	1024	224	0
Counters	800	1024	224	0
Policers	0	1024	1024	0

App tcam usage:

App-Name	Entries	Counters	Policers	Precedence	State
Related-App-Name ..					
cfm-filter	500	500	0	3	OK
cfm-bd-filter	300	300	0	2	OK

Group: 8, Mode: DOUBLE, Hw grps used: 2, Tcam apps: 1

	Used	Allocated	Available	Errors
Tcam-Entries	500	512	12	18
Counters	500	1024	524	0
Policers	0	1024	1024	0

App tcam usage:

App-Name	Entries	Counters	Policers	Precedence	State
Related-App-Name ..					
fw-l2-in	500	500	0	2	OK
fw-semantics	0	X	X	1	OK

Group: 14, Mode: SINGLE, Hw grps used: 1, Tcam apps: 1

	Used	Allocated	Available	Errors
Tcam-Entries	200	512	312	0
Counters	200	512	312	0
Policers	100	512	412	0

App tcam usage:

App-Name	Entries	Counters	Policers	Precedence	State
Related-App-Name ..					
fw-ifl-in	200	200	100	1	OK

Tcam Resource Stage: Egress

Free [hw-grps: 3 out of 3]

No dynamic tcam usage

To view TCAM resource usage errors for all stages (egress, ingress, and pre-ingress), use the **show pfe tcam errors all-tcam-stages** command.

user@host> show pfe tcam errors all-tcam-stages detail

Slot 0

Tcam Resource Stage: Pre-Ingress

```

No tcam usage

Tcam Resource Stage: Ingress
-----
Group: 11, Mode: SINGLE, Hw grps used: 3, Tcam apps: 2
      Errors  Resource-Shortage
Tcam-Entries      0              0
Counters          0              0
Policers          0              0

Group: 8, Mode: DOUBLE, Hw grps used: 2, Tcam apps: 1
      Errors  Resource-Shortage
Tcam-Entries    18              0
Counters        0              0
Policers        0              0

Group: 14, Mode: SINGLE, Hw grps used: 1, Tcam apps: 1
      Errors  Resource-Shortage
Tcam-Entries      0              0
Counters          0              0
Policers          0              0

Tcam Resource Stage: Egress
-----
No tcam usage

```

You can see that all the applications using the TCAM resources are in **OK** state and indicates that the hardware has been successfully configured.



NOTE: As shown in the example, you will need to run the `show pfe tcam errors` and `show pfe tcam usage` commands at each step to ensure that your configurations are valid and that the applications using TCAM resource are in OK state.

Service Scaling on ACX5048 and ACX5096 Routers

In ACX5048 and ACX5096 routers, a typical service (such as ELINE, ELAN and IP VPN) that is deployed might require applications (such as policers, firewall filters, connectivity fault management IEEE 802.1ag, RFC2544) that uses the dynamic TCAM infrastructure.



NOTE: Service applications that uses TCAM resources is limited by the TCAM resource availability. Therefore, the scale of the service depends upon the consumption of the TCAM resource by such applications.

A sample use case for monitoring and troubleshooting service scale in ACX5048 and ACX5096 routers can be found at the [“Dynamic Ternary Content Addressable Memory Overview”](#) on page 1165 section.

Related
Documentation

Understanding and Configuring the Unified Forwarding Table

- [Using the Unified Forwarding Table to Optimize Address Storage on page 1175](#)
- [Configuring the Unified Forwarding Table to Optimize Address Storage Using Profiles on page 1176](#)

Using the Unified Forwarding Table to Optimize Address Storage

ACX5048 and ACX5096 routers support the use of a unified forwarding table to optimize address storage. This feature gives you the flexibility to configure your router to match the needs of your particular network environment. You can control the allocation of forwarding table memory available to store the following entries:

- MAC addresses
- Layer 3 host entries
- Longest prefix match (LPM) table entries

You can use five predefined profiles (**l2-profile-one**, **l2-profile-two**, **l2-profile-three**, **l3-profile**, **lpm-profile**) to allocate the table memory space differently for each of these entries. The sizes of the Layer 2 MAC address table, Layer 3 host entry table, and Layer 3 LPM table are decided based on the selected profile. You can configure and select the profiles that best suits your network environment needs.

[Table 193 on page 1175](#) illustrates the predefined profiles in the unified forwarding table and the respective table sizes.

Table 193: Unified Forwarding Table Profiles

Profile	Layer 2 MAC Address Table	Layer 3 Host Table	Layer 3 LPM Table
l2-profile-one	288 KB	16 KB	16 KB
l2-profile-two	224 KB	80 KB	16 KB
l2-profile-three (default)	160 KB	144 KB	16 KB
l3-profile	96 KB	208 KB	16 KB
lpm-profile	32 KB	16 KB	128 KB

IPv4 unicast, IPv6 unicast, IPv4 multicast, and IPv6 multicast route addresses share the Layer 3 host entry table. If the host table stores the maximum number of entries for any given type, the entire table is full and is unable to accommodate any entries of any other type. The IPv4 multicast and IPv6 unicast addresses occupy double the space as that occupied by IPv4 unicast entries, and IPv6 multicast addresses occupy four times the

space of the IPv4 unicast addresses. [Table 194 on page 1176](#) shows the Layer 3 host table size for each profile.

Table 194: Layer 3 Host Table

Profile	Layer 3 Host Table			
	IPv4 Unicast	IPv4 Multicast	IPv6 Unicast	IPv6 Multicast
l2-profile-one	16 KB	8 KB	8 KB	4 KB
l2-profile-two	80 KB	40 KB	40 KB	20 KB
l2-profile-three (default)	144 KB	72 KB	72 KB	36 KB
l3-profile	208 KB	104 KB	104 KB	52 KB
lpm-profile	16 KB	8 KB	8 KB	4 KB

The Layer 3 LPM table is shared between IPv4 route prefixes and IPv6 route prefixes. [Table 195 on page 1176](#) illustrates the size of the table for different profiles of the IPv4 and IPv6 addresses in the Layer 3 LPM table. When unicast reverse-path forwarding (unicast RPF) is enabled, the table size reduces to half.

Table 195: Layer 3 LPM Table

Profile	Layer 3 LPM Table		
	IPv4 Unicast	IPv6 Unicast (Prefix <= /64)	IPv6 Unicast (Prefix > /64)
l2-profile-one	16 KB	8 KB	4 KB
l2-profile-two	16 KB	8 KB	4 KB
l2-profile-three (default)	16 KB	8 KB	4 KB
l3-profile	16 KB	8 KB	4 KB
lpm-profile	128 KB	40 KB	8 KB

By default, there is no space allocated for IPv6 prefix address longer than /64 in the LPM table. Therefore, prefix address longer than /64 are not allowed in the table by default. The entire table is available for IPv4 addresses and for IPv6 addresses that have prefixes shorter than /64. You can provide space in the table for addresses with prefixes longer than /64 by using CLI configuration. The number of entries reserved for these prefixes is configured in multiples of 16.

Configuring the Unified Forwarding Table to Optimize Address Storage Using Profiles

You can use five predefined profiles (**l2-profile-one**, **l2-profile-two**, **l2-profile-three**, **l3-profile**, **lpm-profile**) to allocate the table memory space. The sizes of the Layer 2 MAC

address table, Layer 3 host entry table, and Layer 3 LPM table are decided based on the selected profile. You can configure and select the profiles that best suits your network environment needs.

To configure the profile that you want, enter and commit the following statement:

```
[edit]
user@host# set chassis forwarding-options profile-name profile-name
```



NOTE: When you configure and commit a profile, the Packet Forwarding Engine (PFE) process restarts and all the data interfaces on the router go down and come back up.

The settings for **l2-profile-three** are configured by default. That is, if you do not configure the **forwarding-options chassis profile-name** statement, the **l2-profile-three** profile settings are configured.

Troubleshooting and Monitoring TCAM Resource in ACX Series Routers

The dynamic allocation of Ternary Content Addressable Memory (TCAM) space in ACX Series efficiently allocates the available TCAM resources for various filter applications. In the dynamic TCAM model, various filter applications (such as inet-firewall, bridge-firewall, cfm-filters, etc.) can optimally utilize the available TCAM resources as and when required. Dynamic TCAM resource allocation is usage driven and is dynamically allocated for filter applications on a need basis. When a filter application no longer uses the TCAM space, the resource is freed and available for use by other applications. This dynamic TCAM model caters to higher scale of TCAM resource utilization based on application's demand. You can use the show and clear commands to monitor and troubleshoot dynamic TCAM resource usage in ACX Series routers.



NOTE: Applications using the TCAM resource is termed **tcam-app** in this document.

Table 196 on page 1177 shows the task and the commands to monitor and troubleshoot TCAM resources in ACX Series routers

Table 196: Commands to Monitor and Troubleshoot TCAM Resource in ACX Series

How to	Command
View the shared and the related applications for a particular application.	show pfe tcam app (<i>list-shared-apps</i> <i>list-related-apps</i>)
View the number of applications across all tcam stages.	show pfe tcam usage all-tcam-stages
View the number of applications using the TCAM resource at a specified stage.	show pfe tcam usage tcam-stage (<i>ingress</i> <i>egress</i> <i>pre-egress</i>)

Table 196: Commands to Monitor and Troubleshoot TCAM Resource in ACX Series (continued)

How to	Command
View the TCAM resource used by an application in detail.	show pfe tcam usage app <application-name> detail
View the TCAM resource used by an application at a specified stage.	show pfe tcam usage tcam-stage (ingress egress pre-egress) app <application-name>
Know the number of TCAM resource consumed by a tcam-app	show pfe tcam usage app <application-name>
View the TCAM resource usage errors for all stages.	show pfe tcam errors all-tcam-stages detail
View the TCAM resource usage errors for a stage	show pfe tcam errors tcam-stage (ingress egress pre-egress)
View the TCAM resource usage errors for an application.	show pfe tcam errors app <application-name>
View the TCAM resource usage errors for an application along with its other shared application.	show pfe tcam errors app <application-name> shared-usage
Clear the TCAM resource usage error statistics for all stages.	clear pfe tcam-errors all-tcam-stages
Clear the TCAM resource usage error statistics for a specified stage	clear pfe tcam-errors tcam-stage (ingress egress pre-egress)
Clear the TCAM resource usage error statistics for an application.	clear pfe tcam-errors app <application-name>

To know more about dynamic TCAM in ACX Series, see [“Dynamic Ternary Content Addressable Memory Overview” on page 1165](#).

Troubleshooting of System Performance with Resource Monitoring Methodology

- [Resource Monitoring Usage Computation Overview on page 1179](#)
- [Diagnosing and Debugging System Performance by Configuring Memory Resource Usage Monitoring on MX Series Routers on page 1182](#)
- [Troubleshooting the Mismatch of jnxNatObjects Values for MS-DPC and MS-MIC on page 1185](#)
- [Managed Objects for Ukernel Memory for a Packet Forwarding Engine in an FPC Slot on page 1186](#)
- [Managed Objects for Packet Forwarding Engine Memory Statistics Data on page 1186](#)
- [Managed Objects for Next-Hop, Jtree, and Firewall Filter Memory for a Packet Forwarding Engine in an FPC Slot on page 1186](#)
- [jnxPfeMemoryErrorsTable on page 1187](#)
- [pfeMemoryErrors on page 1187](#)

Resource Monitoring Usage Computation Overview

You can configure the resource monitoring capability using both the CLI and SNMP MIB queries. You can employ this utility to provision sufficient headroom (memory space limits that are set for the application or virtual router) for monitoring the health and operating efficiency of DPCs and MPCs. You can also analyze and view the usage or consumption of memory for the jtree memory type and for contiguous pages, double words, and free memory pages. The jtree memory on all MX Series router Packet Forwarding Engines has two segments: one segment primarily stores routing tables and related information, and the other segment primarily stores firewall-filter-related information. As the allocation of more memory for routing tables or firewall filters might disrupt the forwarding operations of a Packet Forwarding Engine, the Junos OS CLI displays a warning to restart all affected FPCs when you commit a configuration that includes the memory-enhanced route statement.

The following sections describe the computation equations and the interpretation of the different memory regions for I-chip-based and Trio-based line cards:

Resource Monitoring and Usage Computation For Trio-Based Line Cards

In Trio-based line cards, memory blocks for next-hop and firewall filters are allocated separately. Also, an expansion memory is present, which is used when the allocated memory for next-hop or firewall filter is fully consumed. Both next-hop and firewall filters can allocate memory from the expansion memory. The encapsulation memory region is specific to I-chip-based line cards and it is not applicable to Trio-based line cards. Therefore, for Trio-based line cards, the percentage of free memory space can be interpreted as follows:

$$\% \text{ Free (NH)} = (1 - (\text{Used NH memory} + \text{Used Expansion memory}) / (\text{Total NH memory} + \text{Total Expansion memory})) \times 100$$
$$\% \text{ Free (Firewall or Filter)} = (1 - (\text{Used FW memory} + \text{Used Expansion memory}) / (\text{Total FW memory} + \text{Total Expansion memory})) \times 100$$

Encapsulation memory is I-chip-specific and is not applicable for Trio-based line cards.

% Free (Encap memory) = Not applicable

Resource Monitoring and Usage Computation For I-Chip-Based Line Cards

I-chip-based line cards contain 32 MB of static RAM (SRAM) memory associated with the route lookup block and 16 MB of SRAM memory associated with the output WAN block.

The route-lookup memory is a single pool of 32 MB memory that is divided into two segments of 16 MB each. In a standard configuration, segment 0 is used for NH and prefixes, and segment 1 is used for firewall or filter. This allocation can be modified by using the route-memory-enhanced option at the [edit chassis] hierarchy level. In a general configuration, NH application can be allocated memory from any of the two segments. Therefore, the percentage of free memory for NH is calculated on 32 MB memory. Currently, firewall applications are allotted memory only from segment 1. As a result, the percentage of free memory to be monitored for firewall starts from the available 16 MB memory in segment 1 only.

For I-chip-based line cards, the percentage of free memory space can be interpreted as follows:

$$\% \text{ Free (NH)} = (32 - (\text{Used NH memory} + \text{Used FW memory} + \text{Used Other application})) / 32 \times 100$$
$$\% \text{ Free (Firewall or Filter)} = (16 - (\text{Used NH memory} + \text{Used FW memory} + \text{Used Other application})) / 16 \times 100$$

The memory size for Output WAN (lwo) SRAM is 16 MB and stores the Layer 2 descriptors that contain the encapsulation information. This entity is a critical resource and needs to be monitored. This memory space is displayed in the output of the show command as "Encap mem". The percentage of free memory for the encapsulation region is calculated as follows:

$\% \text{ Free (Encapsulation memory)} = (16 - (\text{two memory used (L2 descriptors + other applications)})) / 16 \times 100$

The watermark level configured for next-hop memory is also effective for encapsulation memory. Therefore, if the percentage of free memory for encapsulation region falls below the configured watermark, logs are generated.

If the free memory percentage is lower than the free memory watermark of a specific memory type, the following error message is recorded in the syslog:

“Resource Monitor: FPC <slot no> PFE <pfe inst> <“JNH memory” or “FW/ Filter memory”> is below set watermark <configured watermark>”.

You can configure resource-monitoring tracing operations by using the **traceoptions** file **<filename> flag flag level level size bytes** statement at the **[edit system services resource-monitor]** hierarchy level. By default, messages are written to **/var/log/rsmonlog**. The error logs associated with socket communication failure (between the Routing Engine and the Packet Forwarding Engine) are useful in diagnosing the problems in the communication between the Routing Engine and the Packet Forwarding Engine.

From the Ukern perspective, MPC5E contains only one Packet Forwarding Engine instance. The **show chassis fabric plane** command output displays the state of fabric plane connections to the Packet Forwarding Engine. Because two Packet Forwarding Engines exist, you notice PFE-0 and PFE-1 in the output.

```
user@host# run show chassis fabric plane
Fabric management PLANE state
Plane 0
  Plane state: ACTIVE
    FPC 0
      PFE 0 :Links ok
      PFE 1 :Links ok
```

Because only one Packet Forwarding Engine instance for MPC5E exists, the output of the **show system resource-monitor fpc** command displays only one row corresponding to Packet Forwarding Engine instance 0.

```
user@host# run show system resource-monitor fpc
FPC Resource Usage Summary

Free Heap Mem Watermark      : 20 %
Free NH Mem Watermark        : 20 %
Free Filter Mem Watermark    : 20 %

* - Watermark reached
```

mem		Heap		ENCAP mem	NH mem	FW
Slot #	% Free	PFE #	% Free	% Free	% Free	% Free
0	94	0		NA		83
99						

The configured watermark is retained across GRES and unified ISSU procedures.

Related •
Documentation

Diagnosing and Debugging System Performance by Configuring Memory Resource Usage Monitoring on MX Series Routers

Junos OS supports a resource monitoring capability using both the CLI and SNMP MIB queries. You can employ this utility to provision sufficient headroom (memory space limits that are set for the application or virtual router) for ensuring system stability, especially the health and operating efficiency of I-chip-based line cards and Trio-based FPCs on MX Series routers. When the memory utilization, either the ukernel memory or ASIC memory reaches a certain threshold, the system operations compromise on the health and traffic-handling stability of the line card and such a trade-off on the system performance can be detrimental for supporting live traffic and protocols.

To configure the properties of the memory resource-utilization functionality:

1. Specify that you want to configure the monitoring mechanism for utilization of different memory resource regions.

```
[edit]
user@host# edit system services resource-monitor
```

This feature is enabled by default and you cannot disable it manually.

2. Specify the high threshold value, exceeding which warnings or error logs are generated, for all the regions of memory, such as heap or ukernel, next-hop and encapsulation, and firewall filter memory.

```
[edit system services resource-monitor]
user@host# set high-threshold value
```

3. Specify the percentage of free memory space used for next-hops to be monitored with a watermark value.

```
[edit system services resource-monitor]
user@host# set free-nh-memory-watermark percentage
```

4. Specify the percentage of free memory space used for ukernel or heap memory to be monitored with a watermark value.

```
[edit system services resource-monitor]
user@host# set free-heap-memory- watermark percentage
```

5. Specify the percentage of free memory space used for firewall and filter memory to be monitored with a watermark value.

```
[edit system services resource-monitor]
user@host# set free-filter-memory-memory- watermark percentage
```



NOTE:

The default value and the configured value of the watermark value for the percentage of free next-hop memory also applies to encapsulation memory. The default watermark values for the percentage of free ukernel or heap memory, next-hop memory, and firewall filter memory are 20 percent.

6. Disable the generation of error log messages when the utilization of memory resources exceeds the threshold or checkpoint levels. By default, messages are written to /var/log/rsmonlog.

```
[edit system services resource-monitor]
user@host# set no-logging
```

7. Define the resource category that you want to monitor and analyze for ensuring system stability, especially the health and operating efficiency of I-chip-based line cards and Trio-based FPCs on MX Series routers. The resource category includes detailed CPU utilization, session rate, and session count statistics. You use the resource category statistics to understand the extent to which new attack objects or applications affect performance.

```
[edit system services resource-monitor]
user@host# edit resource-category jtree
```



NOTE: The jtree memory on all MX Series router Packet Forwarding Engines has two segments: one segment primarily stores routing tables and related information, and the other segment primarily stores firewall-filter-related information. The Junos OS provides the memory-enhanced statement to reallocate the jtree memory for routes, firewall filters, and Layer 3 VPNs.

8. Configure the type of resource as contiguous pages for which you want to enable the monitoring mechanism to provide sufficient headroom for ensuring effective system performance and traffic-handling capacity. Specify the high and low threshold value, exceeding which warnings or error logs are generated, for the specified type or region of memory, which is contiguous page in this case.

```
[edit system services resource-monitor resource-category jtree]
```

```
user@host# set resource-type contiguous-pages high-threshold percentage
user@host# set resource-type contiguous-pages low-threshold percentage
```

9. Configure the type of resource as free double words (dwords) for which you want to enable the monitoring mechanism to provide sufficient headroom for ensuring effective system performance and traffic-handling capacity. Specify the high and low threshold value, exceeding which warnings or error logs are generated, for the specified type or region of memory, which is free dwords in this case.

```
[edit system services resource-monitor resource-category jtree]
user@host# set resource-type free-dwords high-threshold percentage
user@host# set resource-type free-dwords low-threshold percentage
```

10. Configure the type of resource as free memory pages for which you want to enable the monitoring mechanism to provide sufficient headroom for ensuring effective system performance and traffic-handling capacity. Specify the high and low threshold value, exceeding which warnings or error logs are generated, for the specified type or region of memory, which is free memory pages in this case.

```
[edit system services resource-monitor resource-category jtree]
user@host# set resource-type free-pages high-threshold percentage
user@host# set resource-type free-pages low-threshold percentage
```

11. View the utilization of memory resources on the Packet Forwarding Engines of an FPC by using the **show system resource-monitor fpc** command. The filter memory denotes the filter counter memory used for firewall filter counters. The asterisk (*) displayed next to each of the memory regions denotes the ones for which the configured threshold is being currently exceeded.

```
user@host# run show system resource-monitor fpc
FPC Resource Usage Summary
```

```
Free Heap Mem Watermark      : 20 %
Free NH Mem Watermark        : 20 %
Free Filter Mem Watermark    : 20 %
```

```
* - Watermark reached
```

FW mem		Heap		ENCAP mem		NH mem
Slot #		% Free	PFE #	% Free	% Free	%
Free						
0		94	0		NA	83
99						

Related
Documentation

Troubleshooting the Mismatch of jnxNatObjects Values for MS-DPC and MS-MIC

Problem Description: When both MS-DPC and MS-MIC are deployed in a network and the Network Address Translation (NAT) type is configured as **napt-44**, the output of the **snmp mib walk** command for jnxNatObjects displays different values for MS-DPC and MS-MIC.

Resolution *Configure SNMP to Match jnxNatObjects Values for MS-DPC and MS-MIC*

To configure SNMP to match jnxNatObjects values for MS-DPC and MS-MIC:

1. Run the **set services service-set service-set-name nat-options snmp-value-match-msmic** configuration mode command. The following configuration example shows how to configure SNMP to match the values for MS-MIC-specific objects in the jnxNatObjects MIB table with the values for MS-DPC objects.

```
[edit]
user@host# set services service-set Mobile nat-options snmp-value-match-msmic
```

2. Issue the **commit** command to confirm the changes.

```
[edit]
user@host# commit
commit complete
```

3. (Optional) Run the **show snmp mib walk jnxNatObjects** command to verify that the values for MS-MIC-specific objects in the jnxNatObjects MIB table match the values for MS-DPC objects. For example, the following output shows that the values for MS-MIC-specific objects and MS-DPC objects match.

```
[edit]
user@host# run show snmp mib walk jnxNatObjects
jnxNatSrcXlatedAddrType.6.77.111.98.105.108.101 = 1
jnxNatSrcPoolType.6.77.111.98.105.108.101 = 13
jnxNatSrcNumPortAvail.6.77.111.98.105.108.101 = 64512
jnxNatSrcNumPortInuse.6.77.111.98.105.108.101 = 0
jnxNatSrcNumAddressAvail.6.77.111.98.105.108.101 = 1
jnxNatSrcNumAddressInUse.6.77.111.98.105.108.101 = 0
jnxNatSrcNumSessions.6.77.111.98.105.108.101 = 0
jnxNatRuleType.9.77.111.98.105.108.101.58.116.49 = 13
jnxNatRuleTransHits.9.77.111.98.105.108.101.58.116.49 = 0
jnxNatPoolType.6.77.111.98.105.108.101 = 13
jnxNatPoolTransHits.6.77.111.98.105.108.101 = 0
```



NOTE: You can use the **delete services service-set service-set-name nat-options snmp-value-match-msmic** configuration mode command to disable this feature.

- Related Documentation**
- [Configuring Service Rules](#)
 - [snmp-value-match-msmic on page 1632](#)

Managed Objects for Ukernel Memory for a Packet Forwarding Engine in an FPC Slot

The **jnxPfeMemoryUkernTable**, whose object identifier is **{jnxPfeMemory 1}**, contains the **JnxPfeMemoryUkernEntry** that retrieves the global ukernel or heap memory statistics for the specified Packet Forwarding Engine slot. Each **JnxPfeMemoryUkernEntry**, whose object identifier is **{jnxPfeMemoryUkernTable 1}**, contains the objects listed in the following table. The **jnxPfeMemoryUkernEntry** denotes the memory utilization, such as the total available memory and the percentage of memory used.

Table 197: *jnxPfeMemoryUkernTable*

Object	Object ID	Description
jnxPfeMemoryUkernFreePercent	jnxPfeMemoryUkernEntry 3	Denotes the percentage of free Packet Forwarding Engine memory within the ukern heap.

Managed Objects for Packet Forwarding Engine Memory Statistics Data

The **jnxPfeMemory** table, whose object identifier is **{jnxPfeMib 2}** contains the objects listed in [Table 198 on page 1186](#)

Table 198: *jnxPfeMemory Table*

Object	Object ID	Description
jnxPfeMemoryUkernTable	jnxPfeMemory 1	Provides global ukern memory statistics for the specified Packet Forwarding Engine slot.
jnxPfeMemoryForwardingTable	jnxPfeMemory 2	Provides global next-hop (for Trio-based line cards) or Jtree (for I-chip-based line cards) memory utilization and firewall filter memory utilization statistics for the specified Packet Forwarding Engine slot.

Managed Objects for Next-Hop, Jtree, and Firewall Filter Memory for a Packet Forwarding Engine in an FPC Slot

The **jnxPfeMemoryForwardingTable**, whose object identifier is **{jnxPfeMemory 2}**, contains **JnxPfeMemoryForwardingEntry** that retrieves the next-hop memory for Trio-based line cards, jtree memory for I-chip-based line cards, and firewall or filter memory statistics for the specified Packet Forwarding Engine slot for both I-chip and Trio-based line cards. Each **jnxPfeMemoryForwardingEntry**, whose object identifier is **{jnxPfeMemoryForwardingTable 1}**, contains the objects listed in the following table.

The **jnxPfeMemoryForwardingEntry** represents the ASIC instance, ASIC memory used, and ASIC free memory. The jtree memory on all MX Series router Packet Forwarding Engines has two segments: one segment primarily stores routing tables and related

information, and the other segment primarily stores firewall-filter-related information. As the allocation of more memory for routing tables or firewall filters might disrupt the forwarding operations of a Packet Forwarding Engine, the Junos OS CLI displays a warning to restart all affected FPCs when you commit a configuration that includes the memory-enhanced route statement. The configuration does not become effective until you restart the FPC or DPC (on MX Series routers).

Table 199: jnxPfeMemoryForwardingTable

Object	Object ID	Description
jnxPfeMemoryForwardingChipSlot	jnxPfeMemoryForwardingEntry 1	Indicates the ASIC instance number in the Packet Forwarding Engine complex.
jnxPfeMemoryType	jnxPfeMemoryForwardingEntry 2	Indicates the Packet Forwarding Engine memory type, where nh = 1, fw = 2, encap = 3.
jnxPfeMemoryForwardingPercentFree	jnxPfeMemoryForwardingEntry 3	Indicates the percentage of memory free for each memory type.

jnxPfeMemoryErrorsTable

The Juniper Networks enterprise-specific Packet Forwarding Engine MIB, whose object ID is {jnxPfeMibRoot 1}, supports a new MIB table, **jnxPfeMemoryErrorsTable**, to display Packet Forwarding Engine memory error counters. The **jnxPfeMemoryErrorsTable**, whose object identifier is **jnxPfeNotification 3**, contains the **JnxPfeMemoryErrorsEntry**. Each **JnxPfeMemoryErrorsEntry**, whose object identifier is {jnxPfeMemoryErrorsTable 1}, contains the objects listed in the following table.

Table 200: jnxPfeMemoryErrorsTable

Object	Object ID	Description
jnxPfeFpcSlot	jnxPfeMemoryErrorsEntry 1	Signifies the FPC slot number for this set of PFE notification
jnxPfeSlot	jnxPfeMemoryErrorsEntry 2	Signifies the PFE slot number for this set of errors
jnxPfeParityErrors	jnxPfeMemoryErrorsEntry 3	Signifies the parity error count
jnxPfeEccErrors	jnxPfeMemoryErrorsEntry 4	Signifies the error-checking code (ECC) error count

pfeMemoryErrors

The **pfeMemoryErrorsNotificationPrefix**, whose object identifier is {jnxPfeNotification 0}, contains the **pfeMemoryErrors** attribute. The **pfeMemoryErrors** object, whose identifier is {pfeMemoryErrorsNotificationPrefix 1} contains the **jnxPfeParityErrors** and **jnxPfeEccErrors** objects.

Table 201: pfeMemoryErrors

Object	Object ID	Description
pfeMemoryErrors	pfeMemoryErrorsNotificationPrefix 1	A pfeMemoryErrors notification is sent when the value of jnxPfeParityErrors or jnxPfeEccErrors increases.

Configuring Data Path Debugging and Trace Options

- [Understanding Data Path Debugging for SRX Series Devices on page 1189](#)
- [Understanding Security Debugging Using Trace Options on page 1190](#)
- [Understanding Flow Debugging Using Trace Options on page 1191](#)
- [Debugging the Data Path \(CLI Procedure\) on page 1191](#)
- [Setting Flow Debugging Trace Options \(CLI Procedure\) on page 1192](#)
- [Setting Security Trace Options \(CLI Procedure\) on page 1193](#)
- [Displaying Log and Trace Files on page 1194](#)
- [Displaying Output for Security Trace Options on page 1195](#)
- [Displaying Multicast Trace Operations on page 1195](#)
- [J-Web Traceroute Results and Output Summary on page 1196](#)
- [Displaying a List of Devices on page 1197](#)
- [Example: Configuring End-to-End Debugging on SRX Series Device on page 1199](#)

Understanding Data Path Debugging for SRX Series Devices

Data path debugging, or end-to-end debugging, support provides tracing and debugging at multiple processing units along the packet-processing path. The packet filter can be executed with minimal impact to the production system.

On an SRX Series device, a packet goes through series of events involving different components from ingress to egress processing.

With the data path debugging feature, you can trace and debug (capture packets) at different data points along the processing path. The events available in the packet-processing path are: NP ingress, load-balancing thread (LBT), jexec, packet-ordering thread (POT), and NP egress. You can also enable flow module trace if the security flow trace flag for a certain module is set.

At each event, you can specify any of the four actions (count, packet dump, packet summary, and trace). Data path debugging provides filters to define what packets to capture, and only the matched packets are traced. The packet filter can filter out packets

based on logical interface, protocol, source IP address prefix, source port, destination IP address prefix, and destination port.



NOTE: Data path debugging is supported on SRX1400, SRX3400, SRX3600, SRX5400, SRX5600, and SRX5800.

To enable end-to-end debugging, you must perform the following steps:

1. Define the capture file and specify the maximum capture size.
2. Define the packet filter to trace only a certain type of traffic based on the requirement.
3. Define the action profile specifying the location on the processing path from where to capture the packets (for example, LBT or NP ingress).
4. Enable the data path debugging.
5. Capture traffic.
6. Disable data path debugging.
7. View or analyze the report.



NOTE:

The packet-filtering behavior for the port and interface options is as follows:

- The packet filter traces both IPv4 and IPv6 traffic if only **port** is specified.
- The packet filter traces IPv4, IPV6, and non-IP traffic if only **interface** is specified.

**Related
Documentation**

- [Understanding Security Debugging Using Trace Options on page 1190](#)
- [Understanding Flow Debugging Using Trace Options on page 1191](#)
- [Debugging the Data Path \(CLI Procedure\) on page 1191](#)
- [Example: Configuring End-to-End Debugging on SRX Series Device on page 1199](#)

Understanding Security Debugging Using Trace Options

The Junos OS trace function allows applications to write security debugging information to a file. The information that appears in this file is based on criteria you set. You can use this information to analyze security application issues.

The trace function operates in a distributed manner, with each thread writing to its own trace buffer. These trace buffers are then collected at one point, sorted, and written to trace files. Trace messages are delivered using the InterProcess Communications (IPC) protocol. A trace message has a lower priority than that of control protocol packets such as BGP, OSPF, and IKE, and therefore delivery is not considered to be as reliable.

- Related Documentation**
- [Understanding Data Path Debugging for SRX Series Devices on page 1189](#)
 - [Understanding Flow Debugging Using Trace Options on page 1191](#)
 - [Setting Security Trace Options \(CLI Procedure\) on page 1193](#)
 - [Debugging the Data Path \(CLI Procedure\) on page 1191](#)
 - [Displaying Output for Security Trace Options on page 1195](#)

Understanding Flow Debugging Using Trace Options

For flow trace options, you can define a packet filter using combinations of **destination-port**, **destination-prefix**, **interface**, **protocol**, **source-port**, and **source-prefix**. If the security flow trace flag for a certain module is set, the packet matching the specific packet filter triggers flow tracing and writes debugging information to the trace file.

- Related Documentation**
- [Understanding Data Path Debugging for SRX Series Devices on page 1189](#)
 - [Understanding Security Debugging Using Trace Options on page 1190](#)
 - [Setting Flow Debugging Trace Options \(CLI Procedure\) on page 1192](#)
 - [Debugging the Data Path \(CLI Procedure\) on page 1191](#)

Debugging the Data Path (CLI Procedure)

Data path debugging is supported on SRX1400, SRX3400, SRX3600, SRX5400, SRX5600, and SRX5800.

To configure the device for data path debugging:

1. Specify the following request command to set the data path debugging for the multiple processing units along the packet-processing path:

```
[edit]
user@host# set security datapath-debug
```

2. Specify the trace options for data path-debug using the following command:

```
[edit]
user@host# set security datapath-debug traceoptions
```

3. Using the request security packet-filter command, you can set the packet filter to specify the related packets to perform data path-debug action. A maximum of four filters are supported at the same time. For example, the following command sets the first packet-filter:

```
[edit]
user@host# set security datapath-debug packet-filter name
```

4. Using the request security action-profile command, you can set the action for the packet match for a specified filter. Only the default action profile is supported, which is the trace option for network processor ezchip ingress, ezchip egress, spu.lbt, and spu.pot:

```
[edit]
user@host# set security datapath-debug packet-filter name action-profile
```

Related Documentation

- [Understanding Data Path Debugging for SRX Series Devices on page 1189](#)
- [Understanding Security Debugging Using Trace Options on page 1190](#)
- [Understanding Flow Debugging Using Trace Options on page 1191](#)
- [Setting Flow Debugging Trace Options \(CLI Procedure\) on page 1192](#)

Setting Flow Debugging Trace Options (CLI Procedure)

The following examples display the options you can set by using **security flow traceoptions**.

- To match the imap destination port for the filter1 packet filter, use the following statement:

```
[edit]
user@host# set security flow traceoptions packet-filter filter1 destination-port imap
```

- To set the 1.2.3.4 destination IPv4 prefix address for the filter1 packet filter, use the following statement:

```
[edit]
user@host# set security flow traceoptions packet-filter filter1 destination-prefix 1.2.3.4
```

- To set the fxp0 logical interface for the filter1 packet filter, use the following statement:

```
[edit]
user@host# set security flow traceoptions packet-filter filter1 interface fxp0
```

- To match the TCP IP protocol for the filter1 packet filter, use the following statement:

```
[edit]
user@host# set security flow traceoptions packet-filter filter1 protocol tcp
```

- To match the HTTP source port for the filter1 packet filter, use the following statement:

```
[edit]
user@host# set security flow traceoptions packet-filter filter1 source-port http
```

- To set the 5.6.7.8 IPv4 prefix address for the filter1 packet filter, use the following statement:

```
[edit]
user@host# set security flow traceoptions packet-filter filter1 source-prefix 5.6.7.8
```

**Related
Documentation**

- [Understanding Flow Debugging Using Trace Options on page 1191](#)

Setting Security Trace Options (CLI Procedure)

Use the following configuration statements to configure security trace options in the CLI configuration editor.

- To disable remote tracing, enter the following statement:

```
[edit]
user@host# set security traceoptions no-remote-trace
```

- To write trace messages to a local file, enter the following statement. The system saves the trace file in the `/var/log/` directory.

```
[edit]
user@host# set security traceoptions use-local-files
```

- To specify a name for the trace file, enter the following statement. Valid values range from 1 and 1024 characters. The name cannot include spaces, `/`, or `%` characters. The default filename is `security`.

```
[edit]
user@host# set security traceoptions file filename
```

- To specify the maximum number of trace files that can accumulate, enter the following statement. Valid values range from 2 to 1000. The default value is 3.

```
[edit]
user@host# set security traceoptions file files 3
```

- To specify the match criteria that you want the system to use when logging information to the file, enter the following statement. Enter a regular expression. Wildcard (`*`) characters are accepted.

```
[edit]
user@host# set security traceoptions file match *thread
```

- To allow any user to read the trace file, enter the **world-readable** statement. Otherwise, enter the **no-world-readable** statement.

```
[edit]
user@host# set security traceoptions file world-readable
user@host# set security traceoptions file no-world-readable
```

- To specify the maximum size to which the trace file can grow, enter the following statement. Once the file reaches the specified size, it is compressed and renamed *filename0.gz*, the next file is named *filename1.gz*, and so on. Valid values range from 10240 to 1,073,741,824.

```
[edit]
user@host# set security traceoptions file size 10240
```

- To turn on trace options and to perform more than one tracing operation, set the following flags.

```
[edit]
user@host# set security traceoptions flag all
user@host# set security traceoptions flag compilation
user@host# set security traceoptions flag configuration
user@host# set security traceoptions flag routing-socket
```

- To specify the groups that these trace option settings do or do not apply to, enter the following statements:

```
[edit]
user@host# set security traceoptions apply-groups value
user@host# set security traceoptions apply-groups-except value
```

Related Documentation

- [Understanding Security Debugging Using Trace Options on page 1190](#)
- [Displaying Output for Security Trace Options on page 1195](#)

Displaying Log and Trace Files

Enter the **monitor start** command to display real-time additions to system logs and trace files:

```
user@host> monitor start filename
```

When the device adds a record to the file specified by *filename*, the record displays on the screen. For example, if you have configured a system log file named **system-log** (by including the **syslog** statement at the [edit system] hierarchy level), you can enter the **monitor start system-log** command to display the records added to the system log.

To display a list of files that are being monitored, enter the **monitor list** command. To stop the display of records for a specified file, enter the **monitor stop filename** command.

- Related Documentation**
- [Displaying a List of Devices on page 1197](#)
 - [Displaying Real-Time Monitoring Information on page 617](#)

Displaying Output for Security Trace Options

Purpose Display output for security trace options.

Action Use the **show security traceoptions** command to display the output of your trace files. For example:

```
[edit]
user@host # show security traceoptions file usp_trace
user@host # show security traceoptions flag all
user@host # show security traceoptions rate-limit 888
```

The output for this example is as follows:

```
Apr 11 16:06:42 21:13:15.750395:CID-906489336:FPC-01:PIC-01:THREAD_ID-01:PFE:now
update 0x3607edf8df8in 0x3607e8d0
Apr 11 16:06:42 21:13:15.874058:CID-1529687608:FPC-01:PIC-01:THREAD_ID-01:CTRL:Enter
Function[util_ssam_handler]
Apr 11 16:06:42 21:13:15.874485:CID-00:FPC-01:PIC-01:THREAD_ID-01:CTRL:default1: Rate
limit changed to 888
Apr 11 16:06:42 21:13:15.874538:CID-00:FPC-01:PIC-01:THREAD_ID-01:CTRL:default1:
Destination ID set to 1
Apr 11 16:06:42 21:13:15.874651:CID-00:FPC-01:PIC-01:THREAD_ID-01:CTRL:default2: Rate
limit changed to 888
Apr 11 16:06:42 21:13:15.874832:CID-00:FPC-01:PIC-01:THREAD_ID-01:CTRL:default2:
Destination ID set to 1
Apr 11 16:06:42 21:13:15.874942:CID-00:FPC-01:PIC-01:THREAD_ID-01:CTRL:default3: Rate
limit changed to 888
Apr 11 16:06:42 21:13:15.874997:CID-00:FPC-01:PIC-01:THREAD_ID-01:CTRL:default3:
Destination ID set to 1
```

- Related Documentation**
- [Understanding Security Debugging Using Trace Options on page 1190](#)
 - [Setting Security Trace Options \(CLI Procedure\) on page 1193](#)

Displaying Multicast Trace Operations

To monitor and display multicast trace operations, enter the **mtrace monitor** command:

```
user@host> mtrace monitor
```

```
Mtrace query at Apr 21 16:00:54 by 192.1.30.2, resp to 224.0.1.32, qid 2a83aa
packet from 192.1.30.2 to 224.0.0.2 from 192.1.30.2 to 192.1.4.1 via group
224.1.1.1 (mxhop=60) Mtrace query at Apr 21 16:00:57 by 192.1.30.2, resp to
224.0.1.32, qid 25dc17 packet from 192.1.30.2 to 224.0.0.2 from 192.1.30.2 to
```

```
192.1.4.1 via group 224.1.1.1 (mxhop=60) Mtrace query at Apr 21 16:01:00 by
192.1.30.2, resp to same, qid 20e046 packet from 192.1.30.2 to 224.0.0.2 from
192.1.30.2 to 192.1.4.1 via group 224.1.1.1 (mxhop=60) Mtrace query at Apr 21
16:01:10 by 192.1.30.2, resp to same, qid 1d25ad packet from 192.1.30.2 to
224.0.0.2 from 192.1.30.2 to 192.1.4.1 via group 224.1.1.1 (mxhop=60)
```

This example displays only **mtrace** queries. However, when the device captures an **mtrace** response, the display is similar, but the complete **mtrace** response also appears (exactly as it is appears in the **mtrace from-source** command output).

Table 202 on page 1196 summarizes the output fields of the display.

Table 202: CLI mtrace monitor Command Output Summary

Field	Description
Mtrace operation-type at time-of-day	<ul style="list-style-type: none"> operation-type—Type of multicast trace operation: query or response. time-of-day—Date and time the multicast trace query or response was captured.
by	IP address of the host issuing the query.
resp to address	address —Response destination address.
qid qid	qid —Query ID number.
packet from source to destination	<ul style="list-style-type: none"> source—IP address of the source of the query or response. destination—IP address of the destination of the query or response.
from source to destination	<ul style="list-style-type: none"> source—IP address of the multicast source. destination—IP address of the multicast destination.
via group address	address —Group address being traced.
mxhop=number	number —Maximum hop setting.

- Related Documentation**
- [Using the J-Web Traceroute Tool](#)
 - [J-Web Traceroute Results and Output Summary on page 1196](#)

J-Web Traceroute Results and Output Summary

Table 203 on page 1196 summarizes the output in the traceroute display.

Table 203: J-Web Traceroute Results and Output Summary

Field	Description
hop-number	Number of the hop (device) along the path.

Table 203: J-Web Traceroute Results and Output Summary (continued)

Field	Description
<i>host</i>	Hostname, if available, or IP address of the device. If the Don't Resolve Addresses check box is selected, the hostname does not appear.
<i>ip-address</i>	IP address of the device.
<i>as-number</i>	AS number of the device.
<i>time1</i>	Round-trip time between the sending of the first traceroute packet and the receiving of the corresponding Time Exceeded packet from that particular device.
<i>time2</i>	Round-trip time between the sending of the second traceroute packet and the receiving of the corresponding Time Exceeded packet from that particular device.
<i>time3</i>	Round-trip time between the sending of the third traceroute packet and the receiving of the corresponding Time Exceeded packet from that particular device.

If the device does not display the complete path to the destination host, one of the following explanations might apply:

- The host is not operational.
- There are network connectivity problems between the device and the host.
- The host, or a router along the path, might be configured to ignore ICMP traceroute messages.
- The host, or a device along the path, might be configured with a firewall filter that blocks ICMP traceroute requests or ICMP time exceeded responses.
- The value you selected in the Time Exceeded box was less than the number of hops in the path to the host. In this case, the host might reply with an ICMP error message.

- Related Documentation**
- [Diagnostic Tools Overview on page 16](#)
 - *Using the J-Web Traceroute Tool*

Displaying a List of Devices

To display a list of devices between the device and a specified destination host, enter the **traceroute** command with the following syntax:

```
user@host> traceroute host <interface interface-name> <as-number-lookup>
<bypass-routing> <gateway address> <inet | inet6> <no-resolve>
<routing-instance routing-instance-name> <source source-address> <tos number>
<tll number> <wait seconds>
```

Table 204 on page 1198 describes the **traceroute** command options.

Table 204: CLI traceroute Command Options

Option	Description
host	Sends traceroute packets to the hostname or IP address you specify.
interface <i>interface-name</i>	(Optional) Sends the traceroute packets on the interface you specify. If you do not include this option, traceroute packets are sent on all interfaces.
as-number-lookup	(Optional) Displays the autonomous system (AS) number of each intermediate hop between the device and the destination host.
bypass-routing	(Optional) Bypasses the routing tables and sends the traceroute packets only to hosts on directly attached interfaces. If the host is not on a directly attached interface, an error message is returned. Use this option to display a route to a local system through an interface that has no route through it.
gateway <i>address</i>	(Optional) Uses the gateway you specify to route through.
inet	(Optional) Forces the traceroute packets to an IPv4 destination.
inet6	(Optional) Forces the traceroute packets to an IPv6 destination.
no-resolve	(Optional) Suppresses the display of the hostnames of the hops along the path.
routing-instance <i>routing-instance-name</i>	(Optional) Uses the routing instance you specify for the traceroute.
source <i>address</i>	(Optional) Uses the source address that you specify, in the traceroute packet.
tos <i>number</i>	(Optional) Sets the type-of-service (TOS) value in the IP header of the traceroute packet. Specify a value from 0 through 255.
ttl <i>number</i>	(Optional) Sets the time-to-live (TTL) value for the traceroute packet. Specify a hop count from 0 through 128.
wait <i>seconds</i>	(Optional) Sets the maximum time to wait for a response.

To quit the **traceroute** command, press Ctrl-C.

The following is sample output from a **traceroute** command:

```
user@host> traceroute host2
```

```
traceroute to 173.24.232.66 (172.24.230.41), 30 hops max, 40 byte packets 1
173.18.42.253 (173.18.42.253) 0.482 ms 0.346 ms 0.318 ms 2 host4.site1.net
(173.18.253.5) 0.401 ms 0.435 ms 0.359 ms 3 host5.site1.net (173.18.253.5)
0.401 ms 0.360 ms 0.357 ms 4 173.24.232.65 (173.24.232.65) 0.420 ms 0.456
ms 0.378 ms 5 173.24.232.66 (173.24.232.66) 0.830 ms 0.779 ms 0.834 ms
```

The fields in the display are the same as those displayed by the J-Web traceroute diagnostic tool.

- Related Documentation**
- [Displaying Log and Trace Files on page 1194](#)

Example: Configuring End-to-End Debugging on SRX Series Device

This example shows how to configure and enable end-to-end debugging on an SRX Series device with an SRX5K-MPC.

- [Requirements on page 1199](#)
- [Overview on page 1199](#)
- [Configuration on page 1200](#)
- [Enabling Data Path Debugging on page 1202](#)
- [Verification on page 1203](#)

Requirements

This example uses the following hardware and software components:

- SRX5600 device with an SRX5K-MPC installed with 100-Gigabit Ethernet CFP transceiver
- Junos OS Release 12.1X47-D15 or later for SRX Series devices

Before you begin:

- See *Understanding Data Path Debugging for SRX Series Devices*.

No special configuration beyond device initialization is required before configuring this feature.

Overview

Data path debugging enhances troubleshooting capabilities by providing tracing and debugging at multiple processing units along the packet-processing path. With the data path debugging feature, you can trace and debug (capture packets) at different data points along the processing path. At each event, you can specify an action (count, packet dump, packet summary, and trace) and you can set filters to define what packets to capture.

In this example, you define a traffic filter, and then you apply an action profile. The action profile specifies a variety of actions on the processing unit. The ingress and egress are specified as locations on the processing path to capture the data for incoming and outgoing traffic.

Next, you enable data path debugging in operational mode, and finally you view the data capture report.



NOTE: Data path debugging is supported on SRX1400, SRX3400, SRX3600, SRX5400, SRX5600, and SRX5800.

Configuration

CLI Quick Configuration

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

```
set security datapath-debug traceoptions file e2e.trace size 10m
set security datapath-debug capture-file e2e.pcap format pcap
set security datapath-debug maximum-capture-size 1500
set security datapath-debug capture-file files 10
set security datapath-debug action-profile profile-1 preserve-trace-order
set security datapath-debug action-profile profile-1 record-pic-history
set security datapath-debug action-profile profile-1 event np-ingress trace
set security datapath-debug action-profile profile-1 event np-ingress count
set security datapath-debug action-profile profile-1 event np-ingress packet-summary
set security datapath-debug action-profile profile-1 event np-ingress packet-count
set security datapath-debug action-profile profile-1 event np-egress trace
set security datapath-debug action-profile profile-1 event np-egress count
set security datapath-debug action-profile profile-1 event np-egress packet-summary
set security datapath-debug action-profile profile-1 event np-egress packet-count
set security datapath-debug packet-filter filter-1
set security datapath-debug packet-filter filter-1 action-profile profile-1
set security datapath-debug packet-filter filter-1 protocol tcp
set security datapath-debug packet-filter filter-1 source-prefix 203.0.113.1/24
set security datapath-debug packet-filter filter-1 destination-prefix 203.0.113.4/24
set security datapath-debug packet-filter filter-1 source-port 1000
set security datapath-debug packet-filter filter-1 destination-port 80
set security datapath-debug packet-filter filter-1 interface xe-2/2/0.0
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

To configure data path debugging:

1. Edit the security datapath debugging option for the multiple processing units along the packet-processing path:

```
[edit]
user@host# edit security datapath-debug
```

2. Enable the capture file, file format, file size, and the number of files.

```
[edit security datapath-debug]
user@host# set traceoptions file e2e.trace size 10m
```

```

user@host# set capture-file e2e.pcap format pcap;
user@host# set maximum-capture-size 1500
user@host# set capture-file files 10

```

3. Configure action profile, event type, and actions for the action profile.

```

[edit security datapath-debug]
user@host# set action-profile profile-1 preserve-trace-order
user@host# set action-profile profile-1 record-pic-history
user@host# set action-profile profile-1 event np-ingress trace
user@host# set action-profile profile-1 event np-ingress count
user@host# set action-profile profile-1 event np-ingress packet-summary
user@host# set action-profile profile-1 event np-ingress packet-count
user@host# set action-profile profile-1 event np-egress trace
user@host# set action-profile profile-1 event np-egress count
user@host# set action-profile profile-1 event np-egress packet-summary
user@host# set action-profile profile-1 event np-egress packet-count

```

4. Configure packet filter, action, and filter options.

```

[edit security datapath-debug]
user@host# set packet-filter filter-1
user@host# set packet-filter filter-1 action-profile profile-1
user@host# set packet-filter filter-1 protocol tcp
user@host# set packet-filter filter-1 source-prefix 203.0.113.1/24
user@host# set packet-filter filter-1 destination-prefix 203.0.113.4/24
user@host# set packet-filter filter-1 source-port 1000
user@host# set packet-filter filter-1 destination-port 80
user@host# set packet-filter filter-1 interface xe-2/2/0.0

```



NOTE: You must configure multiple packet-filter statements to capture the traffic, because one packet-filter captures only the traffic that is specified in it, and the same packet filter does not capture the traffic in the reverse direction. You must specify the source and destination address for each packet filter, else the SRX Series device might log the entire traffic and cause adverse impact to traffic.

Results From configuration mode, confirm your configuration by entering the **show security datapath-debug** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```

traceoptions {
  file e2e.trace size 10m;
}
capture-file e2e.pcap format pcap;
maximum-capture-size 1500;

```

```
capture-file files 10;
action-profile {
  profile-1 {
    preserve-trace-order;
    record-pic-history;
    event np-ingress {
      trace;
      count;
      packet-summary;
      packet-dump;
    }
    event np-egress {
      trace;
      count;
      packet-summary;
      packet-dump;
    }
  }
}
packet-filter filter-1 {
  action-profile profile-1;
  protocol tcp;
  source-prefix 203.0.113.1/24;
  destination-prefix 203.0.113.4/24;
  source-port 1000;
  destination-port 80;
  interface xe-2/2/0.0;
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Enabling Data Path Debugging

Step-by-Step Procedure After configuring data path debugging, you must start the process on the device from operational mode.

1. Enable data path debugging.

```
user@host> request security datapath-debug capture start
```

```
datapath-debug capture started on file datapcap
```

2. Before you verify the configuration and view the reports, you must disable data path debugging.

```
user@host> request security datapath-debug capture stop
```

```
datapath-debug capture succesfully stopped, use show security datapath-debug capture to view
```




NOTE: You must stop the debug process after you have finished capturing the data. If you attempt to open the captured files without stopping the debug process, the files obtained cannot be opened through any third-party software (for example, tcpdump and Wireshark).

Verification

Confirm that the configuration is working properly.

Verifying Data Path Debug Packet Capture Details

Purpose Verify the data captured by enabling the data path debugging configuration.

Action From operational mode, enter the **show security datapath-debug capture** command.

```
Packet 8, len 152: (C2/F2/P0/SEQ:57935:np-ingress)
00 10 db ff 10 02 00 30 48 83 8d 4f 08 00 45 00
00 54 00 00 40 00 40 01 9f c7 c8 07 05 69 c8 08
05 69 08 00 91 1f 8f 03 2a a2 ae 66 85 53 8c 7d
02 00 08 09 0a 0b 0c 0d 0e 0f 10 11 12 13 14 15
16 17 18 19 1a 1b 1c 1d 1e 1f 20 21 22 23 24 25
26 27 28 29 2a 2b 2c 2d 2e 2f 30 31 32 33 34 35
36 37
Packet 9, len 152: (C2/F2/P0/SEQ:57935:np-egress)
00 30 48 8d 1a bf 00 10 db ff 10 03 08 00 45 00
00 54 00 00 40 00 3f 01 a0 c7 c8 07 05 69 c8 08
05 69 08 00 91 1f 8f 03 2a a2 ae 66 85 53 8c 7d
02 00 08 09 0a 0b 0c 0d 0e 0f 10 11 12 13 14 15
16 17 18 19 1a 1b 1c 1d 1e 1f 20 21 22 23 24 25
26 27 28 29 2a 2b 2c 2d 2e 2f 30 31 32 33 34 35
36 37....
```

For brevity, the **show** command output is truncated to display only a few samples. Additional samples have been replaced with ellipses (...).

To view the results, from CLI operational mode, access the local UNIX shell and navigate to the directory `/var/log/<file-name>`. The result can be read by using the **tcpdump** utility.

```
user@host>start shell
%tcpdump -nr/var/log/e2e.pcap
```

```
21:50:04.288767 C0/F3 event:1(np-ingress) SEQ:1 IP 192.168.14.2 > 192.168.13.2:
ICMP echo request, id 57627, seq 0, length 64
21:50:04.292590 C0/F3 event:2(np-egress) SEQ:1 IP 192.168.14.2 > 192.168.13.2:
ICMP echo request, id 57627, seq 0, length 64
1:50:04.295164 C0/F3 event:1(np-ingress) SEQ:2 IP 192.168.13.2 > 192.168.14.2:
ICMP echo reply, id 57627, seq 0, length 64
```

```
21:50:04.295284 C0/F3 event:2(np-egress) SEQ:2 IP 192.168.13.2 > 192.168.14.2:  
ICMP echo reply, id 57627, seq 0, length 64
```



NOTE: If you are finished with troubleshooting the data path debugging, remove all traceoptions (not limited to flow traceoptions) and the complete data path debug configuration, including the data path debug configuration for packet capturing (packet-dump), which needs to be started/stopped manually. If any part of the debugging configuration remains active, it will continue to use the resources of the device (CPU/memory).

- Related Documentation**
- [Understanding Data Path Debugging for SRX Series Devices on page 1189](#)

Using MPLS to Diagnose LSPs, VPNs, and Layer 2 Circuits

- [MPLS Connection Checking Overview on page 1205](#)
- [Understanding Ping MPLS on page 1207](#)
- [Using the ping Command on page 1208](#)
- [Pinging Layer 2 Circuits on page 1210](#)
- [Pinging Layer 2 VPNs on page 1211](#)
- [Pinging Layer 3 VPNs on page 1213](#)
- [Pinging RSVP-Signaled LSPs and LDP-Signaled LSPs on page 1214](#)

MPLS Connection Checking Overview

Use either the J-Web ping MPLS diagnostic tool or the CLI commands **ping mpls**, **ping mpls l2circuit**, **ping mpls l2vpn**, and **ping mpls l3vpn** to diagnose the state of label-switched paths (LSPs), Layer 2 and Layer 3 virtual private networks (VPNs), and Layer 2 circuits.

Based on how the LSP or VPN outbound (egress) node at the remote endpoint of the connection replies to the probes, you can determine the connectivity of the LSP or VPN.

Each probe is an echo request sent to the LSP or VPN exit point as an MPLS packet with a UDP payload. If the outbound node receives the echo request, it checks the contents of the probe and returns a value in the UDP payload of the response packet. If the device receives the response packet, it reports a successful ping response.

Responses that take longer than 2 seconds are identified as failed probes.

[Table 205 on page 1206](#) summarizes the options for using either the J-Web ping MPLS diagnostic tool or the CLI **ping mpls** command to display information about MPLS connections in VPNs and LSPs.

Table 205: Options for Checking MPLS Connections

J-Web Ping MPLS Tool	ping mpls Command	Purpose	Additional Information
Ping RSVP-signaled LSP	ping mpls rsvp	Checks the operability of an LSP that has been set up by the Resource Reservation Protocol (RSVP). The device pings a particular LSP using the configured LSP name.	When an RSVP-signaled LSP has several paths, the device sends the ping requests on the path that is currently active.
Ping LDP-signaled LSP	ping mpls ldp	Checks the operability of an LSP that has been set up by the Label Distribution Protocol (LDP). The device pings a particular LSP using the forwarding equivalence class (FEC) prefix and length.	When an LDP-signaled LSP has several gateways, the device sends the ping requests through the first gateway. Ping requests sent to LDP-signaled LSPs use only the master routing instance.
Ping LSP to Layer 3 VPN prefix	ping mpls l3vpn	Checks the operability of the connections related to a Layer 3 VPN. The device tests whether a prefix is present in a provider edge (PE) device's VPN routing and forwarding (VRF) table, by means of a Layer 3 VPN destination prefix.	The device does not test the connection between a PE device and a customer edge (CE) router.
Locate LSP using interface name	ping mpls l2vpn interface	Checks the operability of the connections related to a Layer 2 VPN. The device directs outgoing request probes out the specified interface.	—
Instance to which this connection belongs	ping mpls l2vpn instance	Checks the operability of the connections related to a Layer 2 VPN. The device pings on a combination of the Layer 2 VPN routing instance name, the local site identifier, and the remote site identifier, to test the integrity of the Layer 2 VPN circuit (specified by the identifiers) between the inbound and outbound PE routers.	—
Locate LSP from interface name	ping mpls l2circuit interface	Checks the operability of the Layer 2 circuit connections. The device directs outgoing request probes out the specified interface.	—
Locate LSP from virtual circuit information	ping mpls l2circuit virtual-circuit	Checks the operability of the Layer 2 circuit connections. The device pings on a combination of the IPv4 prefix and the virtual circuit identifier on the outbound PE router, testing the integrity of the Layer 2 circuit between the inbound and outbound PE routers.	—

Table 205: Options for Checking MPLS Connections (continued)

J-Web Ping MPLS Tool	ping mpls Command	Purpose	Additional Information
Ping end point of LSP	ping mpls lsp-end-point	Checks the operability of an LSP endpoint. The device pings an LSP endpoint using either an LDP FEC prefix or an RSVP LSP endpoint address.	—

- Related Documentation**
- [Diagnostic Tools Overview on page 16](#)
 - [Understanding Ping MPLS on page 1207](#)
 - [Using the J-Web Ping Host Tool](#)
 - [Using the ping Command on page 1208](#)

Understanding Ping MPLS

Before using the ping MPLS feature, make sure that the receiving interface on the VPN or LSP remote endpoint has MPLS enabled, and that the loopback interface on the outbound node is configured as **127.0.0.1**. The source address for MPLS probes must be a valid address on the J Series device.

This section includes the following topics:

- [MPLS Enabled on page 1207](#)
- [Loopback Address on page 1207](#)
- [Source Address for Probes on page 1207](#)

MPLS Enabled

To process ping MPLS requests, the remote endpoint of the VPN or LSP must be configured appropriately. You must enable MPLS on the receiving interface of the outbound node for the VPN or LSP. If MPLS is not enabled, the remote endpoint drops the incoming request packets and returns an “ICMP host unreachable” message to the J Series device.

Loopback Address

The loopback address (**lo0**) on the outbound node must be configured as **127.0.0.1**. If this interface address is not configured correctly, the outbound node does not have this forwarding entry. It drops the incoming request packets and returns a “host unreachable” message to the J Series device.

Source Address for Probes

The source IP address you specify for a set of probes must be an address configured on one of the J Series device interfaces. If it is not a valid J Series device address, the ping request fails with the error message “Can't assign requested address.”

- Related Documentation**
- [Diagnostic Tools Overview on page 16](#)
 - [MPLS Connection Checking Overview on page 1205](#)
 - [Using the J-Web Ping Host Tool](#)
 - [Using the J-Web Ping MPLS Tool](#)
 - [Using the ping Command on page 1208](#)
 - [Junos OS Interfaces Configuration Guide for Security Devices](#)
 - [Junos OS Feature Support Reference for SRX Series and J Series Devices](#)

Using the ping Command

You can perform certain tasks only through the CLI. Use the CLI **ping** command to verify that a host can be reached over the network. This command is useful for diagnosing host and network connectivity problems. The device sends a series of ICMP echo (ping) requests to a specified host and receives ICMP echo responses.

Enter the **ping** command with the following syntax:

```
user@host> ping host <interface source-interface> <bypass-routing> <count number>
<do-not-fragment> <inet | inet6> <interval seconds> <loose-source [hosts]>
<no-resolve> <pattern string> <rapid> <record-route>
<routing-instance routing-instance-name> <size bytes> <source source-address> <strict>
<strict-source [hosts]> <tos number> <ttl number> <wait seconds> <detail> <verbose>
```

[Table 206 on page 1208](#) describes the **ping** command options.

To quit the **ping** command, press Ctrl-C.

Table 206: CLI ping Command Options

Option	Description
<i>host</i>	Pings the hostname or IP address you specify.
<i>interface source-interface</i>	(Optional) Sends the ping requests on the interface you specify. If you do not include this option, ping requests are sent on all interfaces.
<i>bypass-routing</i>	(Optional) Bypasses the routing tables and sends the ping requests only to hosts on directly attached interfaces. If the host is not on a directly attached interface, an error message is returned. Use this option to ping a local system through an interface that has no route through it.
<i>countnumber</i>	(Optional) Limits the number of ping requests to send. Specify a count from 1 through 2,000,000,000. If you do not specify a count, ping requests are continuously sent until you press Ctrl-C.
<i>do-not-fragment</i>	(Optional) Sets the Don't Fragment (DF) bit in the IP header of the ping request packet.
<i>inet</i>	(Optional) Forces the ping requests to an IPv4 destination.

Table 206: CLI ping Command Options (continued)

Option	Description
inet6	(Optional) Forces the ping requests to an IPv6 destination.
interval <i>seconds</i>	(Optional) Sets the interval between ping requests, in seconds. Specify an interval from 0.1 through 10,000 . The default value is 1 second.
loose-source [<i>hosts</i>]	(Optional) For IPv4, sets the loose source routing option in the IP header of the ping request packet.
no-resolve	(Optional) Suppresses the display of the hostnames of the hops along the path.
pattern <i>string</i>	(Optional) Includes the hexadecimal string you specify, in the ping request packet.
rapid	(Optional) Sends ping requests rapidly. The results are reported in a single message, not in individual messages for each ping request. By default, five ping requests are sent before the results are reported. To change the number of requests, include the count option.
record-route	(Optional) For IPv4, sets the record route option in the IP header of the ping request packet. The path of the ping request packet is recorded within the packet and displayed on the screen.
routing-instance <i>routing-instance-name</i>	(Optional) Uses the routing instance you specify for the ping request.
size <i>bytes</i>	(Optional) Sets the size of the ping request packet. Specify a size from 0 through 65,468 . The default value is 56 bytes, which is effectively 64 bytes because 8 bytes of ICMP header data are added to the packet.
source <i>source-address</i>	(Optional) Uses the source address that you specify, in the ping request packet.
strict	(Optional) For IPv4, sets the strict source routing option in the IP header of the ping request packet.
strict-source [<i>hosts</i>]	(Optional) For IPv4, sets the strict source routing option in the IP header of the ping request packet, and uses the list of hosts you specify for routing the packet.
tos <i>number</i>	(Optional) Sets the type-of-service (TOS) value in the IP header of the ping request packet. Specify a value from 0 through 255 .
ttl <i>number</i>	(Optional) Sets the time-to-live (TTL) value for the ping request packet. Specify a value from 0 through 255 .
wait <i>seconds</i>	(Optional) Sets the maximum time to wait after sending the last ping request packet. If you do not specify this option, the default delay is 10 seconds. If you use this option without the count option, the device uses a default count of 5 packets.
detail	(Optional) Displays the interface on which the ping response was received.
verbose	(Optional) Displays detailed output.

The following is sample output from a **ping** command:

```
user@host> ping host3 count 4
```

```
PING host3.site.net (176.26.232.111): 56 data bytes 64 bytes from 176.26.232.111:
icmp_seq=0 ttl=122 time=0.661 ms 64 bytes from 176.26.232.111: icmp_seq=1 ttl=122
time=0.619 ms 64 bytes from 176.26.232.111: icmp_seq=2 ttl=122 time=0.621 ms 64
bytes from 176.26.232.111: icmp_seq=3 ttl=122 time=0.634 ms --- host3.site.net
ping statistics --- 4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max/stddev = 0.619/0.634/0.661/0.017 ms
```

The fields in the display are the same as those displayed by the J-Web ping host diagnostic tool.

Related Documentation

- [Diagnostic Tools Overview on page 16](#)
- [Understanding Ping MPLS on page 1207](#)
- [Pinging Layer 2 Circuits on page 1210](#)
- [Pinging Layer 2 VPNs on page 1211](#)
- [Pinging Layer 3 VPNs on page 1213](#)
- [Pinging RSVP-Signaled LSPs and LDP-Signaled LSPs on page 1214](#)
- [Interfaces Feature Guide for Security Devices](#)

Pinging Layer 2 Circuits

Enter the **ping mpls l2circuit** command with the following syntax:

```
user@host> ping mpls l2circuit (interface interface-name | virtual-circuit neighbor
prefix-name virtual-circuit-id) <exp forwarding-class> <count number>
<source source-address> <detail>
```

[Table 207 on page 1210](#) describes the **ping mpls l2circuit** command options.

Table 207: CLI ping mpls l2circuit Command Options

Option	Description
l2circuit interface <i>interface-name</i>	Sends ping requests out the specified interface configured for the Layer 2 circuit on the outbound PE device.
l2circuit virtual-circuit neighbor <i>prefix-name virtual-circuit-id</i>	Pings on a combination of the IPv4 prefix and the virtual circuit identifier on the outbound PE device, testing the integrity of the Layer 2 circuit between the inbound and outbound PE devices.
exp forwarding-class	(Optional) Specifies the value of the forwarding class to be used in the MPLS ping packets.
countnumber	(Optional) Limits the number of ping requests to send. Specify a count from 0 through 1,000,000. The default value is 5. If you do not specify a count, ping requests are continuously sent until you press Ctrl-C.

Table 207: CLI ping mpls l2circuit Command Options (continued)

Option	Description
source <i>source-address</i>	(Optional) Uses the source address that you specify, in the ping request packet.
detail	(Optional) Displays detailed output about the echo requests sent and received. Detailed output includes the MPLS labels used for each request and the return codes for each request.

To quit the **ping mpls l2circuit** command, press Ctrl-C.

The following is sample output from a **ping mpls l2circuit** command:

```
user@host> ping mpls l2circuit interface fe-1/0/0.0
```

```
Request for seq 1, to interface 69, labels <100000, 100208>
Reply for seq 1, return code: Egress-ok, time: 0.439 ms
```

The fields in the display are the same as those displayed by the J-Web ping MPLS diagnostic tool.

Related Documentation

- [Using the ping Command on page 1208](#)
- [Understanding Ping MPLS on page 1207](#)
- [Pinging Layer 2 VPNs on page 1211](#)
- [Pinging Layer 3 VPNs on page 1213](#)
- [Pinging RSVP-Signaled LSPs and LDP-Signaled LSPs on page 1214](#)
- [Using the J-Web Ping Host Tool](#)

Pinging Layer 2 VPNs

Enter the **ping mpls l2vpn** command with the following syntax:

```
user@host> ping mpls l2vpn interface interface-name | instance l2vpn-instance-name
local-site-id local-site-id-number remote-site-id remote-site-id-number
<bottom-label-ttl> <exp forwarding-class> <count number> <source source-address>
<detail>
```

Table 208 on page 1211 describes the **ping mpls l2vpn** command options.

Table 208: CLI ping mpls l2vpn Command Options

Option	Description
l2vpn interface <i>interface-name</i>	Sends ping requests out the specified interface configured for the Layer 2 VPN on the outbound (egress) PE device.

Table 208: CLI ping mpls l2vpn Command Options (continued)

Option	Description
l2vpn instance <i>l2vpn-instance-name</i> local-site-id <i>local-site-id-number</i> remote-site-id <i>remote-site-id-number</i>	Pings on a combination of the Layer 2 VPN routing instance name, the local site identifier, and the remote site identifier, testing the integrity of the Layer 2 VPN circuit (specified by the identifiers) between the inbound (ingress) and outbound PE devices.
bottom-label-ttl	(Optional) Displays the time-to-live (TTL) value for the bottom label in the MPLS label stack.
exp forwarding-class	(Optional) Specifies the value of the forwarding class to be used in the MPLS ping packets.
countnumber	(Optional) Limits the number of ping requests to send. Specify a count from 0 through 1,000,000. The default value is 5. If you do not specify a count, ping requests are continuously sent until you press Ctrl-C.
source source-address	(Optional) Uses the source address that you specify, in the ping request packet.
detail	(Optional) Displays detailed output about the echo requests sent and received. Detailed output includes the MPLS labels used for each request and the return codes for each request.

To quit the **ping mpls l2vpn** command, press Ctrl-C.

The following is sample output from a **ping mpls l2vpn** command:

```
user@host> ping mpls l2vpn instance vpn1 remote-site-id 1 local-site-id 2 detail
```

```
Request for seq 1, to interface 68, labels <800001, 100176>
Reply for seq 1, return code: Egress-ok
Request for seq 2, to interface 68, labels <800001, 100176>
Reply for seq 2, return code: Egress-ok
Request for seq 3, to interface 68, labels <800001, 100176>
Reply for seq 3, return code: Egress-ok
Request for seq 4, to interface 68, labels <800001, 100176>
Reply for seq 4, return code: Egress-ok
Request for seq 5, to interface 68, labels <800001, 100176>
Reply for seq 5, return code: Egress-ok
```

```
--- lsping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
```

The fields in the display are the same as those displayed by the J-Web ping MPLS diagnostic tool.

Related Documentation

- [Using the ping Command on page 1208](#)
- [Understanding Ping MPLS on page 1207](#)
- [Pinging Layer 2 Circuits on page 1210](#)
- [Pinging Layer 3 VPNs on page 1213](#)

- [Pinging RSVP-Signaled LSPs and LDP-Signaled LSPs on page 1214](#)
- [Using the J-Web Ping Host Tool](#)

Pinging Layer 3 VPNs

Enter the **ping mpls l3vpn** command with the following syntax:

```
user@host> ping mpls l3vpn prefix prefix-name <l3vpn-name> <bottom-label-ttl>
<exp forwarding-class> <count number> <source source-address> <detail>
```

[Table 209 on page 1213](#) describes the **ping mpls l3vpn** command options.

Table 209: CLI ping mpls l3vpn Command Options

Option	Description
l3vpn prefix <i>prefix-name</i>	Pings the remote host specified by the prefix to verify that the prefix is present in the PE device's VPN routing and forwarding (VRF) table. This option does not test the connectivity between a PE device and a CE device.
<i>l3vpn-name</i>	(Optional) Layer 3 VPN name.
bottom-label-ttl	(Optional) Displays the time-to-live (TTL) value for the bottom label in the MPLS label stack.
exp <i>forwarding-class</i>	(Optional) Specifies the value of the forwarding class to be used in the MPLS ping packets.
count<i>number</i>	(Optional) Limits the number of ping requests to send. Specify a count from 0 through 1,000,000. The default value is 5. If you do not specify a count, ping requests are continuously sent until you press Ctrl-C.
source <i>source-address</i>	(Optional) Uses the source address that you specify, in the ping request packet.
detail	(Optional) Displays detailed output about the echo requests sent and received. Detailed output includes the MPLS labels used for each request and the return codes for each request.

To quit the **ping mpls l3vpn** command, press Ctrl-C.

The following is sample output from a **ping mpls l3vpn** command:

```
user@host> ping mpls l3vpn vpn1 prefix 10.255.245.122/32
```

```
!!!!
--- 1sping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
```

The fields in the display are the same as those displayed by the J-Web ping MPLS diagnostic tool.

Related Documentation

- [Using the ping Command on page 1208](#)
- [Understanding Ping MPLS on page 1207](#)
- [Pinging Layer 2 Circuits on page 1210](#)
- [Pinging Layer 2 VPNs on page 1211](#)
- [Pinging RSVP-Signaled LSPs and LDP-Signaled LSPs on page 1214](#)
- [Using the J-Web Ping Host Tool](#)

Pinging RSVP-Signaled LSPs and LDP-Signaled LSPs

Enter the **ping mpls** command with the following syntax:

```
user@host> ping mpls (ldp fec | lsp-end-point prefix-name | rsvp lsp-name)
<exp forwarding-class> <count number> <source source-address> <detail>
```

[Table 210 on page 1214](#) describes the **ping mpls** command options.

Table 210: CLI ping mpls ldp and ping mpls lsp-end-point Command Options

Option	Description
ldp fec	Pings an LDP-signaled LSP identified by the forwarding equivalence class (FEC) prefix and length.
lsp-end-point prefix-name	Pings an LSP endpoint using either an LDP FEC or a RSVP LSP endpoint address.
rsvp lsp-name	Pings an RSVP-signaled LSP identified by the specified LSP name.
exp forwarding-class	(Optional) Specifies the value of the forwarding class to be used in the MPLS ping packets.
countnumber	(Optional) Limits the number of ping requests to send. Specify a count from 0 through 1,000,000. The default value is 5. If you do not specify a count, ping requests are continuously sent until you press Ctrl-C.
source source-address	(Optional) Uses the source address that you specify, in the ping request packet.
detail	(Optional) Displays detailed output about the echo requests sent and received. Detailed output includes the MPLS labels used for each request and the return codes for each request.

To quit the **ping mpls** command, press Ctrl-C.

The following is sample output from a **ping mpls** command:

```
user@host> ping mpls rsvp count 5
```

```
!!xxx
--- lsping statistics ---
5 packets transmitted, 2 packets received, 60% packet loss
3 packets received with error status, not counted as received.
```

The fields in the display are the same as those displayed by the J-Web ping MPLS diagnostic tool.

**Related
Documentation**

- [Using the ping Command on page 1208](#)
- [Understanding Ping MPLS on page 1207](#)
- [Pinging Layer 2 Circuits on page 1210](#)
- [Pinging Layer 2 VPNs on page 1211](#)
- [Pinging Layer 3 VPNs on page 1213](#)
- *Using the J-Web Ping Host Tool*

Using Packet Capture to Analyze Network Traffic

- [Packet Capture Overview on page 1217](#)
- [Example: Enabling Packet Capture on a Device on page 1220](#)
- [Example: Configuring Packet Capture on an Interface on page 1224](#)
- [Example: Configuring a Firewall Filter for Packet Capture on page 1225](#)
- [Example: Configuring Packet Capture for Datapath Debugging on page 1228](#)
- [Disabling Packet Capture on page 1231](#)
- [Deleting Packet Capture Files on page 1231](#)
- [Changing Encapsulation on Interfaces with Packet Capture Configured on page 1232](#)
- [Displaying Packet Headers on page 1234](#)

Packet Capture Overview

Packet capture is a tool that helps you to analyze network traffic and troubleshoot network problems. The packet capture tool captures real-time data packets traveling over the network for monitoring and logging.



NOTE: Packet capture is supported on physical interfaces, reth interfaces, and tunnel interfaces, such as gr, ip, st0, and lsq-/ls.

Packets are captured as binary data, without modification. You can read the packet information offline with a packet analyzer such as Ethereal or tcpdump. If you need to quickly capture packets destined for, or originating from, the Routing Engine and analyze them online, you can use the J-Web packet capture diagnostic tool.



NOTE: The packet capture tool does not support IPv6 packet capture.

You can use either the J-Web configuration editor or CLI configuration editor to configure packet capture.

Network administrators and security engineers use packet capture to perform the following tasks:

- Monitor network traffic and analyze traffic patterns.
- Identify and troubleshoot network problems.
- Detect security breaches in the network, such as unauthorized intrusions, spyware activity, or ping scans.

Packet capture operates like traffic sampling on the device, except that it captures entire packets including the Layer 2 header and saves the contents to a file in libpcap format. Packet capture also captures IP fragments. You cannot enable packet capture and traffic sampling on the device at the same time. Unlike traffic sampling, there are no tracing operations for packet capture.



NOTE: You can enable packet capture and port mirroring simultaneously on a device.

This section contains the following topics:

- [Packet Capture on Device Interfaces on page 1218](#)
- [Firewall Filters for Packet Capture on page 1219](#)
- [Packet Capture Files on page 1219](#)
- [Analysis of Packet Capture Files on page 1219](#)

Packet Capture on Device Interfaces

Packet capture is supported on the T1, T3, E1, E3, serial, Fast Ethernet, ADSL, G.SHDSL, PPPoE, and ISDN interfaces.

To capture packets on an ISDN interface, configure packet capture on the dialer interface. To capture packets on a PPPoE interface, configure packet capture on the PPPoE logical interface.

Packet capture supports PPP, Cisco HDLC, Frame Relay, and other ATM encapsulations. Packet capture also supports Multilink PPP (MLPPP), Multilink Frame Relay end-to-end (MLFR), and Multilink Frame Relay UNI/NNI (MFR) encapsulations.

You can capture all IPv4 packets flowing on an interface in the inbound or outbound direction. However, on traffic that bypasses the flow software module (protocol packets such as ARP, OSPF, and PIM), packets generated by the Routing Engine are not captured unless you have configured and applied a firewall filter on the interface in the outbound direction.

Tunnel interfaces can support packet capture in the outbound direction only.

Use the J-Web configuration editor or CLI configuration editor to specify the maximum packet size, the filename to be used for storing the captured packets, the maximum file size, the maximum number of packet capture files, and the file permissions.



NOTE: For packets captured on T1, T3, E1, E3, serial, and ISDN interfaces in the outbound (egress) direction, the size of the packet captured might be 1 byte less than the maximum packet size configured because of the packet loss priority (PLP) bit.

To modify encapsulation on an interface that has packet capture configured, you must first disable packet capture.

Firewall Filters for Packet Capture

When you enable packet capture on a device, all packets flowing in the direction specified in packet capture configuration (inbound, outbound, or both) are captured and stored. Configuring an interface to capture all packets might degrade the performance of the device. You can control the number of packets captured on an interface with firewall filters and specify various criteria to capture packets for specific traffic flows.

You must also configure and apply appropriate firewall filters on the interface if you need to capture packets generated by the host device, because interface sampling does not capture packets originating from the host device.

Packet Capture Files

When packet capture is enabled on an interface, the entire packet including the Layer 2 header is captured and stored in a file. You can specify the maximum size of the packet to be captured, up to 1500 bytes. Packet capture creates one file for each physical interface. You can specify the target filename, the maximum size of the file, and the maximum number of files.

File creation and storage take place in the following way. Suppose you name the packet capture file **pcap-file**. Packet capture creates multiple files (one per physical interface), suffixing each file with the name of the physical interface; for example, **pcap-file.fe-0.0.1** for the Fast Ethernet interface **fe-0.0.1**. When the file named **pcap-file.fe-0.0.1** reaches the maximum size, the file is renamed **pcap-file.fe-0.0.1.0**. When the file named **pcap-file.fe-0.0.1** reaches the maximum size again, the file named **pcap-file.fe-0.0.1.0** is renamed **pcap-file.fe-0.0.1.1** and **pcap-file.fe-0.0.1** is renamed **pcap-file.fe-0.0.1.0**. This process continues until the maximum number of files is exceeded and the oldest file is overwritten. The **pcap-file.fe-0.0.1** file is always the latest file.

Packet capture files are not removed even after you disable packet capture on an interface.

Analysis of Packet Capture Files

Packet capture files are stored in libpcap format in the **/var/tmp** directory. You can specify user or administrator privileges for the files.

Packet capture files can be opened and analyzed offline with tcpdump or any packet analyzer that recognizes the libpcap format. You can also use FTP or the Session Control Protocol (SCP) to transfer the packet capture files to an external device.



NOTE: Disable packet capture before opening the file for analysis or transferring the file to an external device with FTP or SCP. Disabling packet capture ensures that the internal file buffer is flushed and all the captured packets are written to the file.

Related Documentation

- [Example: Enabling Packet Capture on a Device on page 1220](#)
- [Example: Configuring Packet Capture on an Interface on page 1224](#)
- [Example: Configuring a Firewall Filter for Packet Capture on page 1225](#)
- [Using the J-Web Packet Capture Tool](#)

Example: Enabling Packet Capture on a Device

This example shows how to enable packet capture on a device, allowing you to analyze network traffic and troubleshoot network problems

- [Requirements on page 1220](#)
- [Overview on page 1220](#)
- [Configuration on page 1220](#)
- [Verification on page 1222](#)

Requirements

Before you begin:

- Establish basic connectivity.
- Configure network interfaces. See [Interfaces Feature Guide for Security Devices](#).

Overview

In this example, you set the maximum packet capture size in each file as 500 bytes. The range is from 68 through 1500, and the default is 68 bytes. You specify the target filename for the packet capture file as pcap-file. You then specify the maximum number of files to capture as 100. The range is from 2 through 10,000, and the default is 10 files. You set the maximum size of each file to 1024 bytes. The range is from 1,024 through 104,857,600, and the default is 512,000 bytes. Finally, you specify that all users have permission to read the packet capture files.

Configuration

CLI Quick Configuration

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

```
set forwarding-options packet-capture maximum-capture-size 500
set forwarding-options packet-capture file filename pcap-file files 100 size 1024
world-readable
```

Step-by-Step Procedure The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode*.

To enable packet capture on a device:

1. Set the maximum packet capture size.

```
[edit]
user@host# edit forwarding-options
user@host# set packet-capture maximum-capture-size 500
```

2. Specify the target filename.

```
[edit forwarding-options]
user@host# set packet-capture file filename pcap-file
```

3. Specify the maximum number of files to capture.

```
[edit forwarding-options]
user@host# set packet-capture file files 100
```

4. Specify the maximum size of each file.

```
[edit forwarding-options]
user@host# set packet-capture file size 1024
```

5. Specify that all users have permission to read the file.

```
[edit forwarding-options]
user@host# set packet-capture file world-readable
```

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

```
[edit]
user@host# show forwarding-options
packet-capture {
  file filename pcap-file files 100 size 1k world-readable;
  maximum-capture-size 500;
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

- [Verifying the Packet Capture Configuration on page 1222](#)
- [Verifying Captured Packets on page 1222](#)

Verifying the Packet Capture Configuration

Purpose Verify that the packet capture is configured on the device.

Action From configuration mode, enter the **show forwarding-options** command. Verify that the output shows the intended file configuration for capturing packets.

Verifying Captured Packets

Purpose Verify that the packet capture file is stored under the **/var/tmp** directory and the packets can be analyzed offline.

Action 1. Disable packet capture.

Using FTP, transfer a packet capture file (for example, **126b.fe-0.0.1**), to a server where you have installed packet analyzer tools (for example, **tools-server**).

a. From configuration mode, connect to **tools-server** using FTP.

```
[edit]
user@host# run ftp tools-server
Connected to tools-server.mydomain.net
220 tools-server.mydomain.net FTP server (Version 6.00LS) ready
Name (tools-server:user):remoteuser
331 Password required for remoteuser.
Password:
230 User remoteuser logged in.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp>
```

b. Navigate to the directory where packet capture files are stored on the device.

```
ftp> lcd /var/tmp
Local directory now /cf/var/tmp
```

c. Copy the packet capture file that you want to analyze to the server, for example **126b.fe-0.0.1**.

```
ftp> put 126b.fe-0.0.1
local: 126b.fe-0.0.1 remote: 126b.fe-0.0.1
200 PORT command successful.
150 Opening BINARY mode data connection for '126b.fe-0.0.1'.
100% 1476 00:00 ETA
226 Transfer complete.
1476 bytes sent in 0.01 seconds (142.42 KB/s)
```

d. Return to configuration mode.

```
ftp> bye
221 Goodbye.
[edit]
user@host#
```

2. Open the packet capture file on the server with tcpdump or any packet analyzer that supports libpcap format and review the output.

```
root@server% tcpdump -r 126b.fe-0.0.1 -xvvvv
```

```
01:12:36.279769 Out 0:5:85:c4:e3:d1 > 0:5:85:c8:f6:d1, ethertype IPv4 (0x0800),
length 98: (tos 0x0, ttl 64, id 33133, offset 0, flags [none], proto: ICMP (1),
length: 84) 14.1.1.1 > 15.1.1.1: ICMP echo request seq 0, length 64
    0005 85c8 f6d1 0005 85c4 e3d1 0800 4500
    0054 816d 0000 4001 da38 0e01 0101 0f01
    0101 0800 3c5a 981e 0000 8b5d 4543 51e6
    0100 aaaa aaaa aaaa aaaa aaaa aaaa aaaa
    aaaa aaaa 0000 0000 0000 0000 0000 0000
    0000 0000 0000 0000 0000 0000 0000 0000
    0000
01:12:36.279793 Out 0:5:85:c8:f6:d1 > 0:5:85:c4:e3:d1, ethertype IPv4 (0x0800),
length 98: (tos 0x0, ttl 63, id 41227, offset 0, flags [none], proto: ICMP (1),
length: 84) 15.1.1.1 > 14.1.1.1: ICMP echo reply seq 0, length 64
    0005 85c4 e3d1 0005 85c8 f6d1 0800 4500
    0054 a10b 0000 3f01 bb9a 0f01 0101 0e01
    0101 0000 445a 981e 0000 8b5d 4543 51e6
    0100 aaaa aaaa aaaa aaaa aaaa aaaa aaaa
    aaaa aaaa 0000 0000 0000 0000 0000 0000
    0000 0000 0000 0000 0000 0000 0000 0000
    0000
root@server%
```

Related Documentation

- [Packet Capture Overview on page 1217](#)
- [Example: Configuring Packet Capture on an Interface on page 1224](#)
- [Example: Configuring a Firewall Filter for Packet Capture on page 1225](#)
- [Disabling Packet Capture on page 1231](#)
- [Deleting Packet Capture Files on page 1231](#)

- [Disabling Packet Capture on page 1231](#)

Example: Configuring Packet Capture on an Interface

This example shows how to configure packet capture on an interface to analyze traffic.

- [Requirements on page 1224](#)
- [Overview on page 1224](#)
- [Configuration on page 1224](#)
- [Verification on page 1225](#)

Requirements

Before you begin:

- Establish basic connectivity.
- Configure network interfaces. See [Interfaces Feature Guide for Security Devices](#).

Overview

In this example, you create an interface called fe-0/0/1. You then configure the direction of the traffic for which you are enabling packet capture on the logical interface as inbound and outbound.



NOTE: On traffic that bypasses the flow software module (protocol packets such as ARP, OSPF, and PIM), packets generated by the Routing Engine are not captured unless you have configured and applied a firewall filter on the interface in the output direction.

Configuration

CLI Quick Configuration

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

```
edit interfaces fe-0/0/1
set unit 0 family inet sampling input output
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode*.

To configure packet capture on an interface:

1. Create an interface.

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

2. Configure the direction of the traffic.

```
[edit interfaces fe-0/0/1]
user@host# set unit 0 family inet sampling input output
```

3. If you are done configuring the device, commit the configuration.

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

Verification

Verifying the Packet Capture Configuration

Purpose Confirm that the configuration is working properly.
Verify that packet capture is configured on the interface.

Action From configuration mode, enter the **show interfaces fe-0/0/1** command.

Related Documentation

- [Packet Capture Overview on page 1217](#)
- [Changing Encapsulation on Interfaces with Packet Capture Configured on page 1232](#)
- [Example: Configuring a Firewall Filter for Packet Capture on page 1225](#)
- [Example: Enabling Packet Capture on a Device on page 1220](#)
- [Deleting Packet Capture Files on page 1231](#)
- [Disabling Packet Capture on page 1231](#)

Example: Configuring a Firewall Filter for Packet Capture

This example shows how to configure a firewall filter for packet capture and apply it to a logical interface.

- [Requirements on page 1226](#)
- [Overview on page 1226](#)
- [Configuration on page 1226](#)
- [Verification on page 1227](#)

Requirements

Before you begin:

- Establish basic connectivity.
- Configure network interfaces. See [Interfaces Feature Guide for Security Devices](#).

Overview

In this example, you set a firewall filter called `dest-all` and a term name called `dest-term` to capture packets from a specific destination address, which is `192.168.1.1/32`. You define the match condition to accept the sampled packets. Finally, you apply the `dest-all` filter to all of the outgoing packets on interface `fe-0/0/1`.



NOTE: If you apply a firewall filter on the loopback interface, it affects all traffic to and from the Routing Engine. If the firewall filter has a `sample` action, packets to and from the Routing Engine are sampled. If packet capture is enabled, then packets to and from the Routing Engine are captured in the files created for the input and output interfaces.

Configuration

CLI Quick Configuration

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

```
set firewall filter dest-all term dest-term from destination-address 192.168.1.1/32
set firewall filter dest-all term dest-term then sample accept
edit interfaces
set interfaces fe-0/0/1 unit 0 family inet filter output dest-all
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

To configure a firewall filter for packet capture and apply it to a logical interface:

1. Specify the firewall filter and its destination address.

```
[edit]
user@host# edit firewall
user@host# set filter dest-all term dest-term from destination-address 192.168.1.1/32
```

2. Define the match condition and its action.

```
[edit firewall]
```



```
user@host# set filter dest-all term dest-term then sample accept
```

3. Apply the filter to all the outgoing packets.

```
[edit interfaces]
user@host# set interfaces fe-0/0/1 unit 0 family inet filter output dest-all
```

Results From configuration mode, confirm your configuration by entering the **show firewall filter dest-all** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show firewall filter dest-all
term dest-term {
  from {
    destination-address 192.168.1.1/32;
  }
  then {
    sample;
    accept;
  }
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Verifying the Firewall Filter for Packet Capture Configuration

Purpose Confirm that the configuration is working properly.

Verify that the firewall filter for packet capture is configured.

Action From configuration mode, enter the **show firewall filter dest-all** command. Verify that the output shows the intended configuration of the firewall filter for capturing packets sent to the destination address.

- Related Documentation**
- [Packet Capture Overview on page 1217](#)
 - [Example: Configuring Packet Capture on an Interface on page 1224](#)
 - [Example: Enabling Packet Capture on a Device on page 1220](#)
 - [Deleting Packet Capture Files on page 1231](#)
 - [Disabling Packet Capture on page 1231](#)

Example: Configuring Packet Capture for Datapath Debugging

This example shows how to configure packet capture to monitor traffic that passes through the device. Packet capture then dumps the packets into a PCAP file format that can be later examined by the tcpdump utility.

- [Requirements on page 1228](#)
- [Overview on page 1228](#)
- [Configuration on page 1228](#)
- [Verification on page 1230](#)

Requirements

Before you begin, see “[Debugging the Data Path \(CLI Procedure\)](#)” on page 1191.

Overview

A filter is defined to filter traffic; then an action profile is applied to the filtered traffic. The action profile specifies a variety of actions on the processing unit. One of the supported actions is packet dump, which sends the packet to the Routing Engine and stores it in proprietary form to be read using the **show security datapath-debug capture** command.



NOTE: Data path debugging is supported on SRX1400, SRX3400, SRX3600, SRX5400, SRX5600, and SRX5800.

Configuration

CLI Quick Configuration

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

```
set security datapath-debug capture-file my-capture
set security datapath-debug capture-file format pcap
set security datapath-debug capture-file size 1m
set security datapath-debug capture-file files 5
set security datapath-debug maximum-capture-size 400
set security datapath-debug action-profile do-capture event np-ingress packet-dump
set security datapath-debug packet-filter my-filter action-profile do-capture
set security datapath-debug packet-filter my-filter source-prefix 1.2.3.4/32
```

Step-by-Step Procedure The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

To configure packet capture:

1. Edit the security datapath-debug option for the multiple processing units along the packet-processing path:

```
[edit]
user@host# edit security datapath-debug
```

2. Enable the capture file, the file format, the file size, and the number of files. Size number limits the size of the capture file. After the limit size is reached, if the file number is specified, then the capture file will be rotated to filename x, where x is auto-incremented until it reaches the specified index and then returns to zero. If no files index is specified, the packets will be discarded after the size limit is reached. The default size is 512 kilobytes.

```
[edit security datapath-debug]
user@host# set capture-file my-capture format pcap size 1m files 5
[edit security datapath-debug]
user@host# set maximum-capture-size 400
```

3. Enable action profile and set the event. Set the action profile as do-capture and the event type as np-ingress:

```
[edit security datapath-debug]
user@host# edit action-profile do-capture
[edit security datapath-debug action-profile do-capture]
user@host# edit event np-ingress
```

4. Enable packet dump for the action profile:

```
[edit security datapath-debug action-profile do-capture event np-ingress]
user@host# set packet-dump
```

5. Enable packet filter, action, and filter options. The packet filter is set to my-filter, the action profile is set to do-capture, and filter option is set to source-prefix 1.2.3.4/32.

```
[edit security datapath-debug]
user@host# set security datapath-debug packet-filter my-filter action-profile
do-capture
```

```
[edit security datapath-debug]
user@host# set security datapath-debug packet-filter my-filter source-prefix
1.2.3.4/32
```

Results From configuration mode, confirm your configuration by entering the **show security datapath-debug** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it. The following is **show security datapath-debug** output from the **show security datapath-debug** command:

```
security {
  datapath-debug {
    capture-file {
      my-capture
      format pcap
      size 1m
      files 5;
    }
  }
  maximum-capture-size 100;
  action-profile do-capture {
    event np-ingress {
      packet-dump
    }
  }
  packet-filter my-filter {
    source-prefix 1.2.3.4/32
    action-profile do-capture
  }
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

- [Verifying Packet Capture on page 1230](#)
- [Verifying Data Path Debugging Capture on page 1230](#)
- [Verifying Data Path Debugging Counter on page 1231](#)

Verifying Packet Capture

Purpose Verify if the packet capture is working.

Action From operational mode, enter the **request security datapath-debug capture start** command to start packet capture and enter the **request security datapath-debug capture stop** command to stop packet capture.

To view the results, from CLI operational mode, access the local UNIX shell and navigate to the directory `/var/log/my-capture`. The result can be read by using the `tcpdump` utility.

Verifying Data Path Debugging Capture

Purpose Verify the details of data path debugging capture file.

Action From operational mode, enter the `show security datapath-debug capture` command.

```
user@host>show security datapath-debug capture
```



WARNING: When you are done troubleshooting, make sure to remove or deactivate all the traceoptions configurations (not limited to flow traceoptions) and the complete security datapath-debug configuration stanza. If any debugging configurations remain active, they will continue to use the device's CPU and memory resources.

Verifying Data Path Debugging Counter

Purpose Verify the details of the data path debugging counter.

Action From operational mode, enter the `show security datapath-debug counter` command.

Disabling Packet Capture

You must disable packet capture before opening the packet capture file for analysis or transferring the file to an external device. Disabling packet capture ensures that the internal file buffer is flushed and all the captured packets are written to the file.

To disable packet capture, enter from configuration mode:

```
[edit forwarding-options]
user@host# set packet-capture disable
```

If you are done configuring the device, enter `commit` from configuration mode.

Related Documentation

- [Packet Capture Overview on page 1217](#)
- [Example: Configuring Packet Capture on an Interface on page 1224](#)
- [Example: Configuring a Firewall Filter for Packet Capture on page 1225](#)
- [Example: Enabling Packet Capture on a Device on page 1220](#)
- [Deleting Packet Capture Files on page 1231](#)

Deleting Packet Capture Files

Deleting packet capture files from the `/var/tmp` directory only temporarily removes the packet capture files. Packet capture files for the interface are automatically created again the next time a packet capture configuration change is committed or as part of a packet capture file rotation.

To delete a packet capture file:

1. Disable packet capture (see [“Disabling Packet Capture” on page 1231](#)).
2. Delete the packet capture file for the interface.
 - a. From operational mode, access the local UNIX shell.

```
user@host> start shell
%
```

- b. Navigate to the directory where packet capture files are stored.

```
% cd /var/tmp
%
```

- c. Delete the packet capture file for the interface; for example **pcap-file.fe.0.0.0**.

```
% rm pcap-file.fe.0.0.0
%
```

- d. Return to operational mode.

```
% exit
user@host>
```

3. Reenable packet capture (see [“Example: Enabling Packet Capture on a Device” on page 1220](#)).
4. If you are done configuring the device, enter **commit** from configuration mode.

Related Documentation

- [Packet Capture Overview on page 1217](#)
- [Example: Configuring Packet Capture on an Interface on page 1224](#)
- [Example: Configuring a Firewall Filter for Packet Capture on page 1225](#)
- [Example: Enabling Packet Capture on a Device on page 1220](#)
- [Changing Encapsulation on Interfaces with Packet Capture Configured on page 1232](#)
- [Disabling Packet Capture on page 1231](#)

Changing Encapsulation on Interfaces with Packet Capture Configured

Before modifying the encapsulation on a device interface that is configured for packet capture, you must disable packet capture and rename the latest packet capture file. Otherwise, packet capture saves the packets with different encapsulations in the same

packet capture file. Packet files containing packets with different encapsulations are not useful, because packet analyzer tools like tcpdump cannot analyze such files.

After modifying the encapsulation, you can safely reenabling packet capture on the device.

To change the encapsulation on interfaces with packet capture configured:

1. Disable packet capture (see [“Disabling Packet Capture” on page 1231](#)).
2. Enter **commit** from configuration mode.
3. Rename the latest packet capture file on which you are changing the encapsulation with the **.chdsl** extension.
 - a. From operational mode, access the local UNIX shell.

```
user@host> start shell
%
```

- b. Navigate to the directory where packet capture files are stored.

```
% cd /var/tmp
%
```

- c. Rename the latest packet capture file for the interface on which you are changing the encapsulation; for example **fe.0.0.0**.

```
% mv pcap-file.fe.0.0.0 pcap-file.fe.0.0.0.chdsl
%
```

- d. Return to operational mode.

```
% exit
user@host>
```

4. Change the encapsulation on the interface using the J-Web user interface or CLI configuration editor.
5. If you are done configuring the device, enter **commit** from configuration mode.
6. Reenable packet capture (see [“Example: Enabling Packet Capture on a Device” on page 1220](#)).
7. If you are done configuring the device, enter **commit** from configuration mode.

- Related Documentation**
- [Packet Capture Overview on page 1217](#)
 - [Example: Configuring Packet Capture on an Interface on page 1224](#)
 - [Example: Configuring a Firewall Filter for Packet Capture on page 1225](#)
 - [Example: Enabling Packet Capture on a Device on page 1220](#)

Displaying Packet Headers

Enter the **monitor traffic** command to display packet headers transmitted through network interfaces with the following syntax:



NOTE: Using the **monitor traffic** command can degrade system performance. We recommend that you use filtering options—such as **count** and **matching**—to minimize the impact to packet throughput on the system.

```
user@host> monitor traffic <absolute-sequence> <count number>
<interface interface-name> <layer2-headers> <matching "expression">
<no-domain-names> <no-promiscuous> <no-resolve> <no-timestamp> <print-ascii>
<print-hex> <size bytes> <brief | detail | extensive>
```

[Table 211 on page 1234](#) describes the **monitor traffic** command options.

Table 211: CLI monitor traffic Command Options

Option	Description
absolute-sequence	(Optional) Displays the absolute TCP sequence numbers.
count number	(Optional) Displays the specified number of packet headers. Specify a value from 0 through 100,000. The command quits and exits to the command prompt after this number is reached.
interface interface-name	(Optional) Displays packet headers for traffic on the specified interface. If an interface is not specified, the lowest numbered interface is monitored.
layer2-headers	(Optional) Displays the link-layer packet header on each line.
matching "expression"	(Optional) Displays packet headers that match an expression enclosed in quotation marks (" "). Table 212 on page 1236 through Table 214 on page 1237 list match conditions, logical operators, and arithmetic, binary, and relational operators you can use in the expression.
no-domain-names	(Optional) Suppresses the display of the domain name portion of the hostname.

Table 211: CLI `monitor traffic` Command Options (continued)

Option	Description
no-promiscuous	(Optional) Specifies <i>not</i> to place the monitored interface in promiscuous mode. In promiscuous mode, the interface reads every packet that reaches it. In nonpromiscuous mode, the interface reads only the packets addressed to it.
no-resolve	(Optional) Suppresses the display of hostnames.
no-timestamp	(Optional) Suppresses the display of packet header timestamps.
print-ascii	(Optional) Displays each packet header in ASCII format.
print-hex	(Optional) Displays each packet header, except link-layer headers, in hexadecimal format.
size bytes	(Optional) Displays the number of bytes for each packet that you specify. If a packet header exceeds this size, the displayed packet header is truncated. The default value is 96 .
brief	(Optional) Displays minimum packet header information. This is the default.
detail	(Optional) Displays packet header information in moderate detail. For some protocols, you must also use the size option to see detailed information.
extensive	(Optional) Displays the most extensive level of packet header information. For some protocols, you must also use the size option to see extensive information.

To quit the **monitor traffic** command and return to the command prompt, press Ctrl-C.

To limit the packet header information displayed by the **monitor traffic** command, include the **matching "expression"** option. An expression consists of one or more match conditions listed in [Table 212 on page 1236](#), enclosed in quotation marks (" "). You can combine match conditions by using the logical operators listed in [Table 213 on page 1237](#) (shown in order of highest to lowest precedence).

For example, to display TCP or UDP packet headers, enter:

```
user@host> monitor traffic matching "tcp || udp"
```

To compare the following types of expressions, use the relational operators listed in [Table 214 on page 1237](#) (listed from highest to lowest precedence):

- Arithmetic—Expressions that use the arithmetic operators listed in [Table 214 on page 1237](#).
- Binary—Expressions that use the binary operators listed in [Table 214 on page 1237](#).

- Packet data accessor—Expressions that use the following syntax:

```
protocol [byte-offset <size>]
```

Replace ***protocol*** with any protocol in [Table 212 on page 1236](#). Replace ***byte-offset*** with the byte offset, from the beginning of the packet header, to use for the comparison. The optional ***size*** parameter represents the number of bytes examined in the packet header—1, 2, or 4 bytes.

For example, the following command displays all multicast traffic:

```
user@host> monitor traffic matching "ether[0] & 1 !=0"
```

Table 212: CLI monitor traffic Match Conditions

Match Condition	Description
Entity Type	
host [<i>address</i> <i>hostname</i>]	Matches packet headers that contain the specified address or hostname. You can prepend any of the following protocol match conditions, followed by a space, to host : arp , ip , rarp , or any of the Directional match conditions.
network address	Matches packet headers with source or destination addresses containing the specified network address.
network address mask <i>mask</i>	Matches packet headers containing the specified network address and subnet mask.
port [<i>port-number</i> <i>port-name</i>]	Matches packet headers containing the specified source or destination TCP or UDP port number or port name.
Directional	
destination	Matches packet headers containing the specified destination. Directional match conditions can be prepended to any Entity Type match conditions, followed by a space.
source	Matches packet headers containing the specified source.
source and destination	Matches packet headers containing the specified source <i>and</i> destination.
source or destination	Matches packet headers containing the specified source <i>or</i> destination.
Packet Length	
less bytes	Matches packets with lengths less than or equal to the specified value, in bytes.
greater bytes	Matches packets with lengths greater than or equal to the specified value, in bytes.
Protocol	
arp	Matches all ARP packets.
ether	Matches all Ethernet frames.

Table 212: CLI monitor traffic Match Conditions (continued)

Match Condition	Description
ether [broadcast multicast]	Matches broadcast or multicast Ethernet frames. This match condition can be prepended with source or destination .
ether protocol [address (\arp \ip \rarp)]	Matches Ethernet frames with the specified address or protocol type. The arguments arp , ip , and rarp are also independent match conditions, so they must be preceded with a backslash (\) when used in the ether protocol match condition.
icmp	Matches all ICMP packets.
ip	Matches all IP packets.
ip [broadcast multicast]	Matches broadcast or multicast IP packets.
ip protocol [address (\icmp igmp \tcp \udp)]	Matches IP packets with the specified address or protocol type. The arguments icmp , tcp , and udp are also independent match conditions, so they must be preceded with a backslash (\) when used in the ip protocol match condition.
isis	Matches all IS-IS routing messages.
rarp	Matches all RARP packets.
tcp	Matches all TCP packets.
udp	Matches all UDP packets.

Table 213: CLI monitor traffic Logical Operators

Logical Operator	Description
!	Logical NOT. If the first condition does not match, the next condition is evaluated.
&&	Logical AND. If the first condition matches, the next condition is evaluated. If the first condition does not match, the next condition is skipped.
 	Logical OR. If the first condition matches, the next condition is skipped. If the first condition does not match, the next condition is evaluated.
()	Group operators to override default precedence order. Parentheses are special characters, each of which must be preceded by a backslash (\).

Table 214: CLI monitor traffic Arithmetic, Binary, and Relational Operators

Operator	Description
Arithmetic Operator	
+	Addition operator.

Table 214: CLI monitor traffic Arithmetic, Binary, and Relational Operators (continued)

Operator	Description
–	Subtraction operator.
/	Division operator.
Binary Operator	
&	Bitwise AND.
*	Bitwise exclusive OR.
	Bitwise inclusive OR.
Relational Operator	
<=	A match occurs if the first expression is less than or equal to the second.
>=	A match occurs if the first expression is greater than or equal to the second.
<	A match occurs if the first expression is less than the second.
>	A match occurs if the first expression is greater than the second.
=	A match occurs if the first expression is equal to the second.
!=	A match occurs if the first expression is not equal to the second.

The following is sample output from the **monitor traffic** command:

```
user@host> monitor traffic count 4 matching "arp" detail
```

```
Listening on fe-0/0/0, capture size 96 bytes 15:04:16.276780 In arp who-has
193.1.1.1 tell host1.site2.net 15:04:16.376848 In arp who-has host2.site2.net
tell host1.site2.net 15:04:16.376887 In arp who-has 193.1.1.2 tell host1.site2.net
15:04:16.601923 In arp who-has 193.1.1.3 tell host1.site2.net
```

- Related Documentation**
- [Packet Capture Overview on page 1217](#)
 - [Using the J-Web Packet Capture Tool](#)
 - [Changing Encapsulation on Interfaces with Packet Capture Configured on page 1232](#)
 - [Example: Configuring Packet Capture on an Interface on page 1224](#)

Troubleshooting Security Devices

- [Recovering the Root Password for SRX Series Devices on page 1239](#)
- [Troubleshooting DNS Name Resolution in Logical System Security Policies \(Master Administrators Only\) on page 1241](#)
- [Troubleshooting the Link Services Interface on page 1242](#)
- [Troubleshooting Security Policies on page 1252](#)
- [Understanding Log Error Messages for Troubleshooting ISSU-Related Problems on page 1253](#)

Recovering the Root Password for SRX Series Devices

If you forget the root password for an SRX Series device, you can use the password recovery procedure to reset the root password. This procedure also involves disabling the watchdog functionality to allow the system to properly boot into single-user mode (KB article 17565).



NOTE: You need console access to recover the root password

To recover the root password for an SRX Series device:

1. Power on the device by pressing the power button on the front panel. Verify that the **POWER** LED on the front panel turns green.

The device's boot sequence on your management device appears on the terminal emulation screen.
2. When the autoboot completes, press the Spacebar a few times to access the bootstrap loader prompt.
3. In operational mode, disable the watchdog functionality and enter **boot -s** to start up the system in single-user mode.

```
loader>boot -s
```



.....

NOTE: For SRX1500 Series device, the following prompt appears instead of loader prompt.

OK boot -s.

.....

The SRX Series device will start up in single-user mode.

4. Enter **recovery** to start the root password recovery procedure.

```
System watchdog timer disabled.  
Enter full pathname of shell or 'recovery' for root password recovery or RETURN for  
/bin/sh: recovery
```

5. Enter configuration mode in the CLI.

6. Set the root password.

```
[edit]  
user@host# set system root-authentication plain-text-password
```

7. Enter the new root password.

```
New password: juniper1  
Retype new password:
```

8. At the second prompt, reenter the new root password.

9. If you are finished configuring the network, commit the configuration.

```
root@host# commit  
commit complete
```

10. Exit from configuration mode.

11. Exit from operational mode.

12. Enter **y** to reboot the device.

```
Reboot the system? [y/n] y
```

The start up messages display on the screen.

13. Once again, press the Spacebar a few times to access the bootstrap loader prompt.

14. In operational mode, enable the watchdog functionality and enter **boot** to start up the system.

```
loader>watchdog enable
loader>boot
```

15. The SRX Series device starts up again and prompts you to enter a user name and password. Enter the newly configured password:

```
Wed Jul 12 14:20:21 UTC 2011
Deviceabc (ttyu0)
login: root
Password: juniper1
```

Related Documentation • [System Log Messages](#)

Troubleshooting DNS Name Resolution in Logical System Security Policies (Master Administrators Only)

Problem **Description:** The address of a hostname in an address book entry that is used in a security policy might fail to resolve correctly.

Cause Normally, address book entries that contain dynamic hostnames refresh automatically for SRX Series devices. The TTL field associated with a DNS entry indicates the time after which the entry should be refreshed in the policy cache. Once the TTL value expires, the SRX Series device automatically refreshes the DNS entry for an address book entry.

However, if the SRX Series device is unable to obtain a response from the DNS server (for example, the DNS request or response packet is lost in the network or the DNS server cannot send a response), the address of a hostname in an address book entry might fail to resolve correctly. This can cause traffic to drop as no security policy or session match is found.

Solution The master administrator can use the **show security dns-cache** command to display DNS cache information on the SRX Series device. If the DNS cache information needs to be refreshed, the master administrator can use the **clear security dns-cache** command.



NOTE: These commands are only available to the master administrator on devices that are configured for logical systems. This command is not available in user logical systems or on devices that are not configured for logical systems.

Related Documentation

- [Understanding Logical Systems Security Policies](#)

Troubleshooting the Link Services Interface

To solve configuration problems on a link services interface:

- [Determine Which CoS Components Are Applied to the Constituent Links on page 1242](#)
- [Determine What Causes Jitter and Latency on the Multilink Bundle on page 1244](#)
- [Determine If LFI and Load Balancing Are Working Correctly on page 1244](#)
- [Determine Why Packets Are Dropped on a PVC Between a Juniper Networks Device and a Third-Party Device on page 1251](#)

Determine Which CoS Components Are Applied to the Constituent Links

Problem **Description:** You are configuring a multilink bundle, but you also have traffic without MLPPP encapsulation passing through constituent links of the multilink bundle. Do you apply all CoS components to the constituent links, or is applying them to the multilink bundle enough?

Solution You can apply a scheduler map to the multilink bundle and its constituent links. Although you can apply several CoS components with the scheduler map, configure only the ones that are required. We recommend that you keep the configuration on the constituent links simple to avoid unnecessary delay in transmission.

[Table 215 on page 1242](#) shows the CoS components to be applied on a multilink bundle and its constituent links.

Table 215: CoS Components Applied on Multilink Bundles and Constituent Links

Cos Component	Multilink Bundle	Constituent Links	Explanation
Classifier	Yes	No	CoS classification takes place on the incoming side of the interface, not on the transmitting side, so no classifiers are needed on constituent links.
Forwarding class	Yes	No	Forwarding class is associated with a queue, and the queue is applied to the interface by a scheduler map. The queue assignment is predetermined on the constituent links. All packets from Q2 of the multilink bundle are assigned to Q2 of the constituent link, and packets from all the other queues are queued to Q0 of the constituent link.

Table 215: CoS Components Applied on Multilink Bundles and Constituent Links (continued)

Cos Component	Multilink Bundle	Constituent Links	Explanation
Scheduler map	Yes	Yes	<p>Apply scheduler maps on the multilink bundle and the constituent link as follows:</p> <ul style="list-style-type: none"> • Transmit rate—Make sure that the relative order of the transmit rate configured on Q0 and Q2 is the same on the constituent links as on the multilink bundle. • Scheduler priority—Make sure that the relative order of the scheduler priority configured on Q0 and Q2 is the same on the constituent links as on the multilink bundle. • Buffer size—Because all non-LFI packets from the multilink bundle transit on Q0 of the constituent links, make sure that the buffer size on Q0 of the constituent links is large enough. • RED drop profile—Configure a RED drop profile on the multilink bundle only. Configuring the RED drop profile on the constituent links applies a back pressure mechanism that changes the buffer size and introduces variation. Because this behavior might cause fragment drops on the constituent links, make sure to leave the RED drop profile at the default settings on the constituent links.
Shaping rate for a per-unit scheduler or an interface-level scheduler	No	Yes	Because per-unit scheduling is applied only at the end point, apply this shaping rate to the constituent links only. Any configuration applied earlier is overwritten by the constituent link configuration.
Transmit-rate exact or queue-level shaping	Yes	No	The interface-level shaping applied on the constituent links overrides any shaping on the queue. Thus apply transmit-rate exact shaping on the multilink bundle only.
Rewrite rules	Yes	No	Rewrite bits are copied from the packet into the fragments automatically during fragmentation. Thus what you configure on the multilink bundle is carried on the fragments to the constituent links.
Virtual channel group	Yes	No	Virtual channel groups are identified through firewall filter rules that are applied on packets only before the multilink bundle. Thus you do not need to apply the virtual channel group configuration to the constituent links.

- See Also**
- [Link Services Interfaces Overview](#)
 - [Troubleshooting the Link Services Interface on page 1242](#)
 - [See the Junos OS Class of Service Configuration Guide for Security Devices](#)

Determine What Causes Jitter and Latency on the Multilink Bundle

Problem **Description:** To test jitter and latency, you send three streams of IP packets. All packets have the same IP precedence settings. After configuring LFI and CRTP, the latency increased even over a noncongested link. How can you reduce jitter and latency?

Solution To reduce jitter and latency, do the following:

1. Make sure that you have configured a shaping rate on each constituent link.
2. Make sure that you have not configured a shaping rate on the link services interface.
3. Make sure that the configured shaping rate value is equal to the physical interface bandwidth.
4. If shaping rates are configured correctly, and jitter still persists, contact the Juniper Networks Technical Assistance Center (JTAC).

See Also • [RPM Overview on page 483](#)

Determine If LFI and Load Balancing Are Working Correctly

Problem **Description:** In this case, you have a single network that supports multiple services. The network transmits data and delay-sensitive voice traffic. After configuring MLPPP and LFI, make sure that voice packets are transmitted across the network with very little delay and jitter. How can you find out if voice packets are being treated as LFI packets and load balancing is performed correctly?

Solution When LFI is enabled, data (non-LFI) packets are encapsulated with an MLPPP header and fragmented to packets of a specified size. The delay-sensitive, voice (LFI) packets are PPP-encapsulated and interleaved between data packet fragments. Queuing and load balancing are performed differently for LFI and non-LFI packets.

To verify that LFI is performed correctly, determine that packets are fragmented and encapsulated as configured. After you know whether a packet is treated as an LFI packet or a non-LFI packet, you can confirm whether the load balancing is performed correctly.

Solution Scenario—Suppose two Juniper Networks devices, R0 and R1, are connected by a multilink bundle `lsq-0/0/0.0` that aggregates two serial links, `se-1/0/0` and `se-1/0/1`. On R0 and R1, MLPPP and LFI are enabled on the link services interface and the fragmentation threshold is set to 128 bytes.

In this example, we used a packet generator to generate voice and data streams. You can use the packet capture feature to capture and analyze the packets on the incoming interface.

The following two data streams were sent on the multilink bundle:

- 100 data packets of 200 bytes (larger than the fragmentation threshold)
- 500 data packets of 60 bytes (smaller than the fragmentation threshold)

The following two voice streams were sent on the multilink bundle:

- 100 voice packets of 200 bytes from source port 100
- 300 voice packets of 200 bytes from source port 200

To confirm that LFI and load balancing are performed correctly:



NOTE: Only the significant portions of command output are displayed and described in this example.

1. Verify packet fragmentation. From operational mode, enter the **show interfaces lsq-0/0/0** command to check that large packets are fragmented correctly.

```
user@R0#> show interfaces lsq-0/0/0
```

```
Physical interface: lsq-0/0/0, Enabled, Physical link is Up
  Interface index: 136, SNMP ifIndex: 29
  Link-level type: LinkService, MTU: 1504
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Last flapped   : 2006-08-01 10:45:13 PDT (2w0d 06:06 ago)
  Input rate      : 0 bps (0 pps)
  Output rate     : 0 bps (0 pps)

Logical interface lsq-0/0/0.0 (Index 69) (SNMP ifIndex 42)
  Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: Multilink-PPP
  Bandwidth: 16mbps
  Statistics          Frames      fps      Bytes      bps
  Bundle:
    Fragments:
      Input  :           0          0           0          0
      Output :        1100          0       118800          0
    Packets:
      Input  :           0          0           0          0
      Output :        1000          0       112000          0
  ...
  Protocol inet, MTU: 1500
  Flags: None
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 9.9.9/24, Local: 9.9.9.10
```

Meaning—The output shows a summary of packets transiting the device on the multilink bundle. Verify the following information on the multilink bundle:

- The total number of transiting packets = 1000
- The total number of transiting fragments=1100
- The number of data packets that were fragmented =100

The total number of packets sent (600 + 400) on the multilink bundle match the number of transiting packets (1000), indicating that no packets were dropped.

The number of transiting fragments exceeds the number of transiting packets by 100, indicating that 100 large data packets were correctly fragmented.

Corrective Action—If the packets are not fragmented correctly, check your fragmentation threshold configuration. Packets smaller than the specified fragmentation threshold are not fragmented.

2. Verify packet encapsulation. To find out whether a packet is treated as an LFI or non-LFI packet, determine its encapsulation type. LFI packets are PPP encapsulated, and non-LFI packets are encapsulated with both PPP and MLPPP. PPP and MLPPP encapsulations have different overheads resulting in different-sized packets. You can compare packet sizes to determine the encapsulation type.

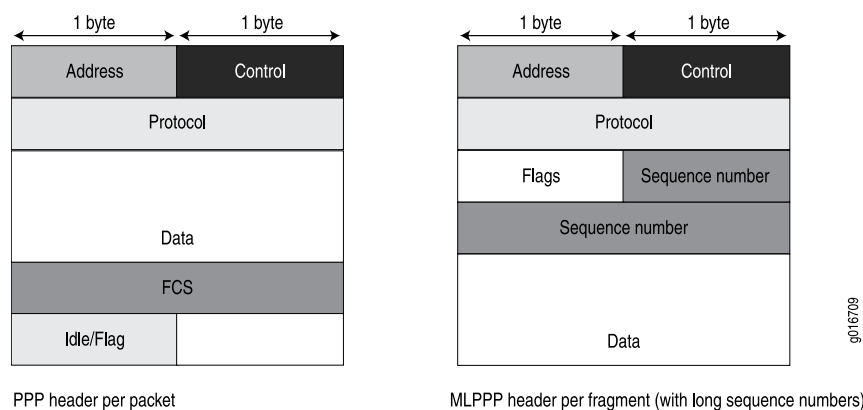
A small unfragmented data packet contains a PPP header and a single MLPPP header. In a large fragmented data packet, the first fragment contains a PPP header and an MLPPP header, but the consecutive fragments contain only an MLPPP header.

PPP and MLPPP encapsulations add the following number of bytes to a packet:

- PPP encapsulation adds 7 bytes:
4 bytes of header+2 bytes of frame check sequence (FCS)+1 byte that is idle or contains a flag
- MLPPP encapsulation adds between 6 and 8 bytes:
4 bytes of PPP header+2 to 4 bytes of multilink header

Figure 34 on page 1247 shows the overhead added to PPP and MLPPP headers.

Figure 34: PPP and MLPPP Headers



For CRTP packets, the encapsulation overhead and packet size are even smaller than for an LFI packet. For more information, see [Example: Configuring the Compressed Real-Time Transport Protocol](#).

Table 216 on page 1247 shows the encapsulation overhead for a data packet and a voice packet of 70 bytes each. After encapsulation, the size of the data packet is larger than the size of the voice packet.

Table 216: PPP and MLPPP Encapsulation Overhead

Packet Type	Encapsulation	Initial Packet Size	Encapsulation Overhead	Packet Size after Encapsulation
Voice packet (LFI)	PPP	70 bytes	4 + 2 + 1 = 7 bytes	77 bytes
Data fragment (non-LFI) with short sequence	MLPPP	70 bytes	4 + 2 + 1 + 4 + 2 = 13 bytes	83 bytes

Table 216: PPP and MLPPP Encapsulation Overhead (continued)

Packet Type	Encapsulation	Initial Packet Size	Encapsulation Overhead	Packet Size after Encapsulation
Data fragment (non-LFI) with long sequence	MLPPP	70 bytes	4 + 2 + 1 + 4 + 4 = 15 bytes	85 bytes

From operational mode, enter the **show interfaces queue** command to display the size of transmitted packet on each queue. Divide the number of bytes transmitted by the number of packets to obtain the size of the packets and determine the encapsulation type.

3. Verify load balancing. From operational mode, enter the **show interfaces queue** command on the multilink bundle and its constituent links to confirm whether load balancing is performed accordingly on the packets.

```
user@R0> show interfaces queue lsq-0/0/0
```

```
Physical interface: lsq-0/0/0, Enabled, Physical link is Up
Interface index: 136, SNMP ifIndex: 29
Forwarding classes: 8 supported, 8 in use
Egress queues: 8 supported, 8 in use
Queue: 0, Forwarding classes: DATA
  Queued:
    Packets      :           600      0 pps
    Bytes        :          44800      0 bps
  Transmitted:
    Packets      :           600      0 pps
    Bytes        :          44800      0 bps
    Tail-dropped packets :           0      0 pps
    RED-dropped packets  :           0      0 pps
  ...
Queue: 1, Forwarding classes: expedited-forwarding
  Queued:
    Packets      :              0      0 pps
    Bytes        :              0      0 bps
  ...
Queue: 2, Forwarding classes: VOICE
  Queued:
    Packets      :           400      0 pps
    Bytes        :          61344      0 bps
  Transmitted:
    Packets      :           400      0 pps
    Bytes        :          61344      0 bps
  ...
Queue: 3, Forwarding classes: NC
  Queued:
    Packets      :              0      0 pps
    Bytes        :              0      0 bps
  ...
```

```
user@R0> show interfaces queue se-1/0/0
```

```
Physical interface: se-1/0/0, Enabled, Physical link is Up
Interface index: 141, SNMP ifIndex: 35
```

```

Forwarding classes: 8 supported, 8 in use
Egress queues: 8 supported, 8 in use
Queue: 0, Forwarding classes: DATA
  Queued:
    Packets      :           350      0 pps
    Bytes        :        24350      0 bps
  Transmitted:
    Packets      :           350      0 pps
    Bytes        :        24350      0 bps
  ...
Queue: 1, Forwarding classes: expedited-forwarding
  Queued:
    Packets      :              0      0 pps
    Bytes        :              0      0 bps
  ...
Queue: 2, Forwarding classes: VOICE
  Queued:
    Packets      :           100      0 pps
    Bytes        :        15272      0 bps
  Transmitted:
    Packets      :           100      0 pps
    Bytes        :        15272      0 bps
  ...
Queue: 3, Forwarding classes: NC
  Queued:
    Packets      :             19      0 pps
    Bytes        :           247      0 bps
  Transmitted:
    Packets      :             19      0 pps
    Bytes        :           247      0 bps
  ...

```

```

user@R0> show interfaces queue se-1/0/1

```

```

Physical interface: se-1/0/1, Enabled, Physical link is Up
  Interface index: 142, SNMP ifIndex: 38
Forwarding classes: 8 supported, 8 in use
Egress queues: 8 supported, 8 in use
Queue: 0, Forwarding classes: DATA
  Queued:
    Packets      :           350      0 pps
    Bytes        :        24350      0 bps
  Transmitted:
    Packets      :           350      0 pps
    Bytes        :        24350      0 bps
  ...
Queue: 1, Forwarding classes: expedited-forwarding
  Queued:
    Packets      :              0      0 pps
    Bytes        :              0      0 bps
  ...
Queue: 2, Forwarding classes: VOICE
  Queued:
    Packets      :           300      0 pps
    Bytes        :        45672      0 bps
  Transmitted:
    Packets      :           300      0 pps
    Bytes        :        45672      0 bps
  ...
Queue: 3, Forwarding classes: NC

```

```

Queued:
  Packets      :          18          0 pps
  Bytes       :          234          0 bps
Transmitted:
  Packets      :          18          0 pps
  Bytes       :          234          0 bps

```

Meaning—The output from these commands shows the packets transmitted and queued on each queue of the link services interface and its constituent links.

[Table 217 on page 1250](#) shows a summary of these values. (Because the number of transmitted packets equaled the number of queued packets on all the links, this table shows only the queued packets.)

Table 217: Number of Packets Transmitted on a Queue

Packets Queued	Bundle lsq-0/0/0.0	Constituent Link se-1/0/0	Constituent Link se-1/0/1	Explanation
Packets on Q0	600	350	350	The total number of packets transiting the constituent links (350+350 = 700) exceeded the number of packets queued (600) on the multilink bundle.
Packets on Q2	400	100	300	The total number of packets transiting the constituent links equaled the number of packets on the bundle.
Packets on Q3	0	19	18	The packets transiting Q3 of the constituent links are for keepalive messages exchanged between constituent links. Thus no packets were counted on Q3 of the bundle.

On the multilink bundle, verify the following:

- The number of packets queued matches the number transmitted. If the numbers match, no packets were dropped. If more packets were queued than were transmitted, packets were dropped because the buffer was too small. The buffer size on the constituent links controls congestion at the output stage. To correct this problem, increase the buffer size on the constituent links.
- The number of packets transiting Q0 (600) matches the number of large and small data packets received (100+500) on the multilink bundle. If the numbers match, all data packets correctly transited Q0.
- The number of packets transiting Q2 on the multilink bundle (400) matches the number of voice packets received on the multilink bundle. If the numbers match, all voice LFI packets correctly transited Q2.

On the constituent links, verify the following:

- The total number of packets transiting Q0 (350+350) matches the number of data packets and data fragments (500+200). If the numbers match, all the data packets after fragmentation correctly transited Q0 of the constituent links.

Packets transited both constituent links, indicating that load balancing was correctly performed on non-LFI packets.

- The total number of packets transiting Q2 (300+100) on constituent links matches the number of voice packets received (400) on the multilink bundle. If the numbers match, all voice LFI packets correctly transited Q2.

LFI packets from source port **100** transited **se-1/0/0**, and LFI packets from source port **200** transited **se-1/0/1**. Thus all LFI (Q2) packets were hashed based on the source port and correctly transited both constituent links.

Corrective Action—If the packets transited only one link, take the following steps to resolve the problem:

- Determine whether the physical link is **up** (operational) or **down** (unavailable). An unavailable link indicates a problem with the PIM, interface port, or physical connection (link-layer errors). If the link is operational, move to the next step.
 - Verify that the classifiers are correctly defined for non-LFI packets. Make sure that non-LFI packets are not configured to be queued to Q2. All packets queued to Q2 are treated as LFI packets.
 - Verify that at least one of the following values is different in the LFI packets: source address, destination address, IP protocol, source port, or destination port. If the same values are configured for all LFI packets, the packets are all hashed to the same flow and transit the same link.
- Use the results to verify load balancing.

- See Also**
- [Link Services Interfaces Overview](#)
 - [Troubleshooting the Link Services Interface on page 1242](#)

Determine Why Packets Are Dropped on a PVC Between a Juniper Networks Device and a Third-Party Device

Problem **Description:** You are configuring a permanent virtual circuit (PVC) between T1, E1, T3, or E3 interfaces on a Juniper Networks device and a third-party device, and packets are being dropped and ping fails.

Solution If the third-party device does not have the same FRF.12 support as the Juniper Networks device or supports FRF.12 in a different way, the Juniper Networks device interface on the PVC might discard a fragmented packet containing FRF.12 headers and count it as a "Policed Discard."

As a workaround, configure multilink bundles on both peers, and configure fragmentation thresholds on the multilink bundles.

- See Also**
- [Link Services Interfaces Overview](#)
 - [Troubleshooting the Link Services Interface on page 1242](#)

Troubleshooting Security Policies

- [Synchronizing Policies Between Routing Engine and Packet Forwarding Engine on page 1252](#)
- [Checking a Security Policy Commit Failure on page 1252](#)
- [Verifying a Security Policy Commit on page 1253](#)
- [Debugging Policy Lookup on page 1253](#)

Synchronizing Policies Between Routing Engine and Packet Forwarding Engine

Problem **Description:** Security policies are stored in both the Routing Engine and the Packet Forwarding Engine. After you modify a policy, you commit the configuration on the Routing Engine, and it is synchronized to the Packet Forwarding Engine.

Environment: The policies in the Routing Engine and Packet Forwarding Engine must be in sync for the configuration to be committed. However, under certain circumstances, policies in the Routing Engine and the Packet Forwarding Engine might be out of sync, which causes the commit to fail.

Symptoms: The following error message appears if you attempt to commit a configuration when the policies in the Routing Engine and Packet Forwarding Engine are out of sync:
Policy is out of sync between RE and PFE <SPU-name(s)> Please resync before commit.

Solution Synchronize the policies as follows:

- Reboot the device (standalone)
- Reboot the devices (chassis cluster)

Checking a Security Policy Commit Failure

Problem **Description:** Most policy configuration failures occur during a commit or runtime. Commit failures are reported directly on the CLI when you execute the CLI command **commit-check** in configuration mode. These errors are configuration errors, and you cannot commit the configuration without fixing these errors.

Solution To fix these errors, do the following:

1. Review your configuration data.
2. Open the file `/var/log/nsd_chk_only`. This file is overwritten each time you perform a commit check and contains detailed failure information.

Verifying a Security Policy Commit

Problem **Description:** Upon performing a policy configuration commit, if you notice that the system behavior is incorrect, use the following steps to troubleshoot this problem:

Solution

1. Operational **show** Commands—Execute the operational commands for security policies and verify that the information shown in the output is consistent with what you expected. If not, the configuration needs to be changed appropriately.
2. Traceoptions—Set the **traceoptions** command in your policy configuration. The flags under this hierarchy can be selected as per user analysis of the **show** command output. If you cannot determine what flag to use, the flag option **all** can be used to capture all trace logs.

```
user@host# set security policies traceoptions <flag all>
```

You can also configure an optional filename to capture the logs.

```
user@host# set security policies traceoptions <filename>
```

If you specified a filename in the trace options, you can look in the `/var/log/<filename>` for the log file to ascertain if any errors were reported in the file. (If you did not specify a filename, the default filename is `eventd`.) The error messages indicate the place of failure and the appropriate reason.

After configuring the trace options, you must recommit the configuration change that caused the incorrect system behavior.

Debugging Policy Lookup

Problem **Description:** When you have the correct configuration, but some traffic was incorrectly dropped or permitted, you can enable the **lookup** flag in the security policies traceoptions. The **lookup** flag logs the lookup related traces in the trace file.

Solution

```
user@host# set security policies traceoptions <flag lookup>
```

Understanding Log Error Messages for Troubleshooting ISSU-Related Problems

The following problems might occur during an ISSU upgrade. You can identify the errors by using the details in the logs. For detailed information about specific system log messages, see [System Log Explorer](#).

- [Chassisd Process Errors on page 1254](#)
- [Understanding Common Error Handling for ISSU on page 1254](#)
- [ISSU Support-Related Errors on page 1257](#)

- [Initial Validation Checks Failure on page 1257](#)
- [Installation-Related Errors on page 1258](#)
- [Redundancy Group Failover Errors on page 1259](#)
- [Kernel State Synchronization Errors on page 1259](#)

Chassisd Process Errors

Problem **Description:** Errors related to chassisd.

Solution Use the error messages to understand the issues related to chassisd.

When ISSU starts, a request is sent to chassisd to check whether there are any problems related to the ISSU from a chassis perspective. If there is a problem, a log message is created.

Understanding Common Error Handling for ISSU

Problem **Description:** You might encounter some problems in the course of an ISSU. This section provides details on how to handle them.

Solution Any errors encountered during an ISSU result in the creation of log messages, and ISSU continues to function without impact to traffic. If reverting to previous versions is required, the event is either logged or the ISSU is halted, so as not to create any mismatched versions on both nodes of the chassis cluster. [Table 218 on page 1254](#) provides some of the common error conditions and the workarounds for them. The sample messages used in the [Table 218 on page 1254](#) are from the SRX1500 device and are also applicable to all supported SRX Series devices.

Table 218: ISSU-Related Errors and Solutions

Error Conditions	Solutions
Attempt to initiate an ISSU when previous instance of an ISSU is already in progress	<p>The following message is displayed:</p> <p>warning: ISSU in progress</p> <p>You can abort the current ISSU process, and initiate the ISSU again using the request chassis cluster in-service-upgrade abort command.</p>

Table 218: ISSU-Related Errors and Solutions (continued)

Error Conditions	Solutions
Reboot failure on the secondary node	<p>No service downtime occurs, because the primary node continues to provide required services. Detailed console messages are displayed requesting that you manually clear existing ISSU states and restore the chassis cluster.</p> <pre>error: [Oct 6 12:30:16]: Reboot secondary node failed (error-code: 4.1)</pre> <pre>error: [Oct 6 12:30:16]: ISSU Aborted! Backup node maybe in inconsistent state, Please restore backup node [Oct 6 12:30:16]: ISSU aborted. But, both nodes are in ISSU window. Please do the following: 1. Rollback the node with the newer image using rollback command Note: use the 'node' option in the rollback command otherwise, images on both nodes will be rolled back 2. Make sure that both nodes (will) have the same image 3. Ensure the node with older image is primary for all RGs 4. Abort ISSU on both nodes 5. Reboot the rolled back node</pre> <p>Starting with Junos OS Release 17.4R1, the hold timer for the initial reboot of the secondary node during the ISSU process is extended from 15 minutes (900 seconds) to 45 minutes (2700 seconds) in chassis clusters on SRX1500, SRX4100, SRX4200, and SRX4600 devices.</p>

Table 218: ISSU-Related Errors and Solutions (continued)

Error Conditions	Solutions
Secondary node failed to complete the cold synchronization	<p>The primary node times out if the secondary node fails to complete the cold synchronization. Detailed console messages are displayed that you manually clear existing ISSU states and restore the chassis cluster. No service downtime occurs in this scenario.</p> <pre>[Oct 3 14:00:46]: timeout waiting for secondary node node1 to sync(error-code: 6.1) Chassis control process started, pid 36707 error: [Oct 3 14:00:46]: ISSU Aborted! Backup node has been upgraded, Please restore backup node [Oct 3 14:00:46]: ISSU aborted. But, both nodes are in ISSU window. Please do the following: 1. Rollback the node with the newer image using rollback command Note: use the 'node' option in the rollback command otherwise, images on both nodes will be rolled back 2. Make sure that both nodes (will) have the same image 3. Ensure the node with older image is primary for all RGs 4. Abort ISSU on both nodes 5. Reboot the rolled back node</pre>
Failover of newly upgraded secondary failed	<p>No service downtime occurs, because the primary node continues to provide required services. Detailed console messages are displayed requesting that you manually clear existing ISSU states and restore the chassis cluster.</p> <pre>[Aug 27 15:28:17]: Secondary node0 ready for failover. [Aug 27 15:28:17]: Failing over all redundancy-groups to node0 ISSU: Preparing for Switchover error: remote rg1 priority zero, abort failover. [Aug 27 15:28:17]: failover all RGs to node node0 failed (error-code: 7.1) error: [Aug 27 15:28:17]: ISSU Aborted! [Aug 27 15:28:17]: ISSU aborted. But, both nodes are in ISSU window. Please do the following: 1. Rollback the node with the newer image using rollback command Note: use the 'node' option in the rollback command otherwise, images on both nodes will be rolled back 2. Make sure that both nodes (will) have the same image 3. Ensure the node with older image is primary for all RGs 4. Abort ISSU on both nodes 5. Reboot the rolled back node {primary:node1}</pre>

Table 218: ISSU-Related Errors and Solutions (continued)

Error Conditions	Solutions
Upgrade failure on primary	No service downtime occurs, because the secondary node fails over as primary and continues to provide required services.
Reboot failure on primary node	<p>Before the reboot of the primary node, devices being out of the ISSU setup, no ISSU-related error messages are displayed. The following reboot error message is displayed if any other failure is detected:</p> <p>Reboot failure on Primary node Before the reboot of primary node, devices will be out of ISSU setup and no primary node error messages will be displayed.</p>

ISSU Support-Related Errors

Problem **Description:** Installation failure occurs because of unsupported software and unsupported feature configuration.

Solution Use the following error messages to understand the compatibility-related problems:

```
WARNING: Current configuration not compatible with
/var/tmp/junos-srx5000-11.4X3.2-domestic.tgz
Exiting in-service-upgrade window
Exiting in-service-upgrade window
```

Initial Validation Checks Failure

Problem **Description:** The initial validation checks fail.

Solution The validation checks fail if the image is not present or if the image file is corrupt. The following error messages are displayed when initial validation checks fail when the image is not present and the ISSU is aborted:

When Image Is Not Present

```
user@host> ...0120914_srx_12q1_major2.2-539764-domestic.tgz reboot
Chassis ISSU Started
Chassis ISSU Started
ISSU: Validating Image
Initiating in-service-upgrade
Initiating in-service-upgrade
Fetching package...
error: File does not exist:
/var/tmp/junos-srx1k3k-12.1I20120914_srx_12q1_major2.2-539764-domestic.tgz
error: Couldn't retrieve package
```

```
/var/tmp/junos-srx1k3k-12.1I20120914_srx_12q1_major2.2-539764-domestic.tgz
Exiting in-service-upgrade window
Exiting in-service-upgrade window
Chassis ISSU Aborted
Chassis ISSU Aborted
Chassis ISSU Aborted
ISSU: IDLE
ISSU aborted; exiting ISSU window.
```

When Image File Is Corrupted

If the image file is corrupted, the following output displays:

```
user@host> ...junos-srx1k3k-11.4X9-domestic.tgz_1 reboot
Chassis ISSU Started
node1:
-----
Chassis ISSU Started
ISSU: Validating Image
Initiating in-service-upgrade

node1:
-----
Initiating in-service-upgrade
ERROR: Cannot use /var/tmp/junos-srx1k3k-11.4X9-domestic.tgz_1:
gzip: stdin: invalid compressed data--format violated
tar: Child returned status 1
tar: Error exit delayed from previous errors
ERROR: It may have been corrupted during download.
ERROR: Please try again, making sure to use a binary transfer.
Exiting in-service-upgrade window

node1:
-----
Exiting in-service-upgrade window
Chassis ISSU Aborted
Chassis ISSU Aborted

node1:
-----
Chassis ISSU Aborted
ISSU: IDLE
ISSU aborted; exiting ISSU window.

{primary:node0}
```

The primary node validates the device configuration to ensure that it can be committed using the new software version. If anything goes wrong, the ISSU aborts and error messages are displayed.

Installation-Related Errors

Problem	Description: The install image file does not exist or the remote site is inaccessible.
----------------	---

Solution Use the following error messages to understand the installation-related problems:

```
error: File does not exist: /var/tmp/junos-srx5000-11.4X3.2-domest
error: Couldn't retrieve package /var/tmp/junos-srx5000-11.4X3.2-domest
```

ISSU downloads the install image as specified in the ISSU command as an argument. The image file can be a local file or located at a remote site. If the file does not exist or the remote site is inaccessible, an error is reported.

Redundancy Group Failover Errors

Problem **Description:** Problem with automatic redundancy group (RG) failure.

Solution Use the following error messages to understand the problem:

```
failover all RG 1+ groups to node 0
error: Command failed. None of the redundancy-groups has been failed over.
      Some redundancy-groups on node1 are already in manual failover mode.
      Please execute 'failover reset all' first..
```

Kernel State Synchronization Errors

Problem **Description:** Errors related to ksyncd.

Solution Use the following error messages to understand the issues related to ksyncd:

```
Failed to get kernel-replication error information from Standby Routing Engine.
```

```
mgd_slave_peer_has_errors() returns error at line 4414 in mgd_package_issu.
```

ISSU checks whether there are any ksyncd errors on the secondary node (node 1) and displays the error message if there are any problems and aborts the upgrade.

Release History Table

Release	Description
17.4R1	Starting with Junos OS Release 17.4R1, the hold timer for the initial reboot of the secondary node during the ISSU process is extended from 15 minutes (900 seconds) to 45 minutes (2700 seconds) in chassis clusters on SRX1500, SRX4100, SRX4200, and SRX4600 devices.

PART 13

Configuration Statements

- [Configuration Statements: Real-Time Performance Monitoring on page 1263](#)
- [Configuration Statements: Ethernet OAM Link Fault Management on page 1297](#)
- [Configuration Statements: sFlow Technology on page 1359](#)
- [Configuration Statements: Accounting Options, Source Class Usage and Destination Class Usage Options on page 1385](#)
- [Configuration Statements: Chassis Cluster on page 1433](#)
- [Configuration Statements: Datapath Debug on page 1443](#)
- [Configuration Statements: Health Monitoring on page 1455](#)
- [Configuration Statements: Resource Monitoring for Memory Regions on page 1463](#)
- [Configuration Statements: Security Alarms on page 1477](#)
- [Configuration Statements: Network Analytics on page 1479](#)
- [Configuration Statements: SNMP on page 1523](#)
- [Configuration Statements: SNMPv3 on page 1665](#)
- [Configuration Statements: Uplink Failure Detection on page 1721](#)
- [Configuration Statements: Port Mirroring and Analyzers on page 1727](#)
- [Configuration Statements: TWAMP on page 1789](#)
- [Configuration Statements: System Logging on page 1795](#)
- [Configuration Statement: App-Engine on page 1853](#)

CHAPTER 58


Configuration Statements: Real-Time Performance Monitoring

- [data-fill](#) on page 1264
- [data-size](#) on page 1265
- [destination-port](#) on page 1266
- [dscp-code-point \(Services\)](#) on page 1267
- [hardware-timestamp](#) on page 1268
- [history-size](#) on page 1269
- [moving-average-size](#) on page 1270
- [one-way-hardware-timestamp](#) on page 1271
- [port \(RPM\)](#) on page 1272
- [probe](#) on page 1273
- [probe-count](#) on page 1275
- [probe-interval](#) on page 1276
- [probe-limit](#) on page 1277
- [probe-server](#) on page 1278
- [probe-type](#) on page 1279
- [routing-instance](#) on page 1280
- [routing-instances](#) on page 1281
- [rpm \(Interfaces\)](#) on page 1282
- [rpm \(Services\)](#) on page 1283
- [source-address \(Services\)](#) on page 1286
- [tcp](#) on page 1287
- [test](#) on page 1288
- [test-interval](#) on page 1290
- [thresholds](#) on page 1291
- [traps](#) on page 1293
- [udp](#) on page 1295


data-fill

Syntax	<code>data-fill <i>data</i>;</code> <code>data-fill-with-zeros <i>data</i>;</code>
Hierarchy Level	<code>[edit services rpm bgp],</code> <code>[edit services rpm <i>probe</i> owner <i>test</i> <i>test-name</i>],</code> <code>[edit services rpm twamp client control-connection <i>control-client-name</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.3 for EX Series switches. Statement introduced in Junos OS Release 9.3 for PTX Series Packet Transport routers. Statement at the <code>[edit services rpm twamp client control-connection <i>control-client-name</i>]</code> hierarchy level introduced in Junos OS Release 15.1 for MX Series routers. Statement introduced in Junos OS Release 18.1 for QFX Series switches.
Description	Specify the contents of the data portion of Internet Control Message Protocol (ICMP) probes. The data-fill statement is not valid with the http-get or http-metadata-get probe types. For TWAMP client, if this knob is set, then fill the test packet with zeros, if the knob is not set then the data content is random value as indicated in RFC.
Options	data —A hexadecimal value; for example, 0-9 , A-F .
Required Privilege Level	system —To view this statement in the configuration. interface-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"><i>Configuring BGP Neighbor Discovery on MX, M, T and PTX Series Routers Through RPM</i><i>Configuring RPM Probes on M, MX and T Series Routers and EX Series Switches</i>

data-size

Syntax	<code>data-size size;</code>
Hierarchy Level	<code>[edit services rpm bgp],</code> <code>[edit services rpm probe owner test test-name],</code> <code>[edit services rpm twamp client control-connection <i>control-client-name</i> test-session session-name]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers.</p> <p>Support at the <code>[edit services rpm twamp client control-connection <i>control-client-name</i>]</code> hierarchy level introduced in Junos OS Release 15.1 for MX Series routers.</p> <p>Statement introduced in Junos OS Release 18.1 for QFX Series switches.</p>
Description	Specify the size of the data portion of ICMP probes. The data-size statement is not valid with the http-get or http-metadata-get probe type.
Options	<p>size—0 through 65400 for RPM, for TWAMP the value is from 60 through 1400.</p> <p>Default: 0 for RPM and 60 for TWAMP.</p>
<div>  <p>NOTE: If you configure the hardware timestamp feature (see <i>Configuring RPM Timestamping on MX, M and T Series Routers and EX Series Switches</i>):</p> <ul style="list-style-type: none"> The default value of data-size is 32 bytes and 32 is the minimum value for explicit configuration. The UDP timestamp probe type is an exception; it requires a minimum data size of 52 bytes. The data size must be at least 100 bytes smaller than the default MTU of the interface of the RPM client interface. </div>	
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> <i>Configuring BGP Neighbor Discovery on MX, M, T and PTX Series Routers Through RPM</i>

destination-port

Syntax	<code>destination-port port;</code>
Hierarchy Level	<code>[edit services rpm bgp],</code> <code>[edit services rpm probe owner test test-name],</code> <code>[edit services rpm twamp client control-connection control-client-name]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport Routers.</p> <p>Support at the <code>[edit services rpm twamp client control-connection control-client-name]</code> hierarchy level introduced in Junos OS Release 15.1 for MX Series routers.</p> <p>Statement introduced in Junos OS Release 18.1 for QFX Series switches.</p>
Description	<p>Specify the User Datagram Protocol (UDP) or Transmission Control Protocol (TCP) port to which a probe is sent. This statement is used only for TCP or UDP probe types.</p> <p>The value for the destination-port can be only 7 when you configure the destination port along with hardware timestamping. A constraint check prevents you for configuring any other value for the destination port in this case.</p> <p>This constraint does not apply when you are using one-way hardware timestamping along with destination-port and either probe-type udp-ping or probe-type udp-ping-timestamp.</p>
Options	<p>Default: The default value for the port is 862 to which the TWAMP client establishes control connection.</p> <p>port—Port number 7 or from 49,160 through 65,535.</p>
<div>  NOTE: The specified port numbers are recommended for RPM only. </div>	
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> <i>Configuring BGP Neighbor Discovery on MX, M, T and PTX Series Routers Through RPM</i> <i>Configuring RPM Probes on M, MX and T Series Routers and EX Series Switches</i>

dscp-code-point (Services)

Syntax	<code>dscp-code-point <i>dscp-bits</i>;</code>
Hierarchy Level	<code>[edit services rpm probe owner test test-name],</code> <code>[edit services rpm twamp client control-connection <i>control-client-name</i> test-session</code> <code>session-name]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Statement introduced in Junos OS Release for PTX Series Packet Transport routers.</p> <p>Support at the <code>[edit services rpm twamp client control-connection <i>control-client-name</i>]</code> hierarchy level introduced in Junos OS Release 15.1 for MX Series routers.</p> <p>Statement introduced in Junos OS Release 18.1 for QFX Series switches.</p> <p>Support for also setting the IEEE 802.1p code point on EX2300, EX3400, and EX4300 switches introduced in Junos OS Release 18.2R1.</p>
Description	<p>Specify the value of the Differentiated Services (DiffServ) field within the IP header of host-generated RPM packets. The DiffServ code point (DSCP) bits value must be set to a valid 6-bit pattern.</p> <p>Starting in Junos 18.2R1 for EX2300, EX3400, and EX4300 switches, the first three bits of the 6-bit pattern also set the IEEE 802.1p code point of host-generated RPM packets.</p>
Options	<p><i>dscp-bits</i>—A valid 6-bit pattern; for example, 001111, or one of the following configured DSCP aliases:</p> <ul style="list-style-type: none"> • af11—Default: 001010 • af12—Default: 001100 • af13—Default: 001110 • af21—Default: 010010 • af22—Default: 010100 • af23 —Default: 010110 • af31 —Default: 011010 • af32 —Default: 011100 • af33 —Default: 011110 • af41 —Default: 100010 • af42 —Default:100100 • af43 —Default:100110 • be—Default: 000000

- **cs1**—Default: 001000
- **cs2**—Default: 010000
- **cs3**—Default: 011000
- **cs4**—Default: 100000
- **cs5**—Default: 101000
- **cs6**—Default: 110000
- **cs7**—Default: 111000
- **ef**—Default: 101110
- **nc1**—Default: 110000
- **nc2**—Default: 111000

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

Related Documentation

- *Configuring RPM Probes on M, MX and T Series Routers and EX Series Switches*
- *Understanding Two-Way Active Measurement Protocol on Routers*

hardware-timestamp

Syntax hardware-timestamp;

Hierarchy Level [edit services rpm probe *owner* test *test-name*]

Release Information Statement introduced in Junos OS Release 8.1.
Statement applied to MX Series routers in Junos OS Release 10.0.
Statement introduced in Junos OS Release 10.3 for EX Series switches.

Description Enable timestamping of RPM probe messages in the Packet Forwarding Engine host processor. This feature is supported only with **icmp-ping**, **icmp-ping-timestamp**, **udp-ping**, and **udp-ping-timestamp** probe types.

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

history-size

Syntax	<code>history-size size;</code>
Hierarchy Level	[edit services rpm bgp], [edit services rpm probe owner test test-name], [edit services rpm twamp client control-connection control-client-name]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.3 for EX Series switches. Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers. Statement at the [edit services rpm twamp client control-connection control-client-name] hierarchy level introduced in Junos OS Release 15.1 for MX Series routers. Statement introduced in Junos OS Release 18.1 for QFX Series switches.
Description	Specify the number of stored history entries.
Options	size —Value from 0 to 255. Default: 50
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"> Configuring BGP Neighbor Discovery on MX, M, T and PTX Series Routers Through RPM Configuring RPM Probes on M, MX and T Series Routers and EX Series Switches

moving-average-size

Syntax	<code>moving-average-size <i>number</i>;</code>
Hierarchy Level	<code>[edit services rpm bgp],</code> <code>[edit services rpm <i>probe owner test test-name</i>],</code> <code>[edit services rpm twamp client control-connection <i>control-client-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 8.5. Statement introduced in Junos OS Release 9.3 for EX Series switches. Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers. Statement at the <code>[edit services rpm twamp client control-connection <i>control-client-name</i>]</code> hierarchy level introduced in Junos OS Release 15.1 for MX Series routers. Statement introduced in Junos OS Release 18.1 for QFX Series switches.
Description	Enable statistical calculation operations to be performed across a configurable number of the most recent samples.
Options	<i>number</i> —Number of samples to be used in calculations. Range: 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"><i>Configuring RPM Probes on M, MX and T Series Routers and EX Series Switches</i>

one-way-hardware-timestamp

Syntax	one-way-hardware-timestamp;
Hierarchy Level	[edit services rpm probe owner test test-name]
Release Information	Statement introduced in Junos OS Release 8.5. Statement introduced in Junos OS Release 9.3 for EX Series switches.
Description	Enable timestamping of RPM probe messages for one-way delay and jitter measurements. You must configure this statement along with the destination-interface statement to invoke timestamping. This feature is supported only with icmp-ping , icmp-ping-timestamp , udp-ping , and udp-ping-timestamp probe types.
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">• <i>Configuring RPM Timestamping on MX, M and T Series Routers and EX Series Switches</i>• <i>destination-interface</i>• hardware-timestamp on page 1268

port (RPM)

Syntax	<code>port <i>number</i>;</code>
Hierarchy Level	<code>[edit services rpm probe-server (tcp udp)]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.3 for EX Series switches. Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers. Statement introduced in Junos OS Release 18.1 for QFX Series switches.
Description	Specify the port number for the probe server.
Options	<i>number</i> —Port number for the probe server. The value can be 7 or 49,160 through 65,535.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"><i>Configuring RPM Receiver Servers on M, MX, T and PTX Series Routers and EX Series Switches</i>

probe

```
Syntax  probe owner {
    test test-name {
        data-fill data;
        data-size size;
        delegate-probes probes;
        destination-interface interface-name;
        destination-port port;
        dscp-code-point dscp-bits;
        hardware-timestamp;
        history-size size;
        inet6-options source-address ipv6-address;
        moving-average-size number;
        next-hop next-hop;
        one-way-hardware-timestamp;
        probe-count count;
        probe-interval seconds;
        probe-type type;
        routing-instance instance-name;
        rpm-scale {
            destination {
                interface interface-name.logical-unit-number;
                subunit-cnt subunit-cnt;
            }
            source {
                address-base ipv4-address-base;
                count ipv4-count;
                step ipv4-step;
            }
            source-inet6 {
                address-base ipv6-address-base;
                count ipv6-count;
                step ipv6-step;
            }
            target {
                address-base ipv4-address-base;
                count ipv4-count;
                step ipv4-step;
            }
            target-inet6 {
                address-base ipv6-address-base;
                count ipv6-count;
                step ipv6-step;
            }
            tests-count tests-count;
        }
        source-address address;
        target (url url | address ipv4-address | inet6-url url | inet6-address ipv6-address);
        test-interval interval;
        thresholds
        {
            egress-time microseconds;
        }
    }
}
```

```
    ingress-time microseconds;  
    jitter-egress microseconds;  
    jitter-ingress microseconds;  
    jitter-rtt microseconds;  
    rtt microseconds;  
    std-dev-egress microseconds;  
    std-dev-ingress microseconds;  
    std-dev-rtt microseconds;  
    successive-loss count;  
    total-loss count;  
  }  
  traps [trap-names];  
  ttl [hop-count];  
}  
}
```

Hierarchy Level [edit services rpm]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.3 for EX Series switches.
Statement introduced in Junos OS Release 18.1 for QFX Series switches.

Description Specify an owner name. The owner name combined with the test name represent a single RPM configuration instance.

Options *owner*—Owner name up to 32 characters in length.

The remaining statements are explained separately. See [CLI Explorer](#).

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

probe-count

Syntax	<code>probe-count count;</code>
Hierarchy Level	<code>[edit services rpm bgp],</code> <code>[edit services rpm probe owner test test-name],</code> <code>[edit services rpm twamp client control-connection <i>control-client-name</i> test-session session-name]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers.</p> <p>Support at the <code>[edit services rpm twamp client control-connection <i>control-client-name</i>]</code> hierarchy level introduced in Junos OS Release 15.1 for MX Series routers.</p> <p>Statement introduced in Junos OS Release 18.1 for QFX Series switches.</p>
Description	Specify the number of probes within a test.
Options	count —1 through 15 for RPM, for TWAMP 1 through 4,294,967,290.
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> <i>Configuring BGP Neighbor Discovery on MX, M, T and PTX Series Routers Through RPM</i> <i>Configuring RPM Probes on M, MX and T Series Routers and EX Series Switches</i>


probe-interval

Syntax	<code>probe-interval <i>interval</i>;</code>
Hierarchy Level	<code>[edit services rpm bgp],</code> <code>[edit services rpm probe owner test <i>test-name</i>],</code> <code>[edit services rpm twamp client control-connection <i>control-client-name</i> test-session <i>session-name</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.3 for EX Series switches. Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers. Support at the <code>[edit services rpm twamp client control-connection <i>control-client-name</i>]</code> hierarchy level introduced in Junos OS Release 15.1 for MX Series routers. Statement introduced in Junos OS Release 18.1 for QFX Series switches.
Description	Specify the time to wait between sending packets, in seconds.
Options	<i>interval</i> —Number of seconds, from 1 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">• <i>Configuring BGP Neighbor Discovery on MX, M, T and PTX Series Routers Through RPM</i>• <i>Configuring RPM Probes on M, MX and T Series Routers and EX Series Switches</i>• <i>Understanding Two-Way Active Measurement Protocol on Routers</i>

probe-limit

Syntax	<code>probe-limit <i>limit</i>;</code>
Hierarchy Level	[edit services rpm]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers.</p> <p>Statement introduced in Junos OS Release 18.1 for QFX Series switches.</p>
Description	Configure the maximum number of concurrent probes allowed.
Options	<p>limit—Maximum number of concurrent probes allowed.</p> <p>Range: (MX Series routers only) Starting in Junos OS Release 17.2R2 and 17.3R1, 1 through 2000. In Junos releases earlier than 17.2R1, the range is 1 through 500.</p> <p>Range: (PTX Series Packet Transport routers only) 1 through 200</p> <p>Range: (Other platforms) 1 through 500</p> <p>Default: 100</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> <i>Limiting the Number of Concurrent RPM Probes on M, MX, T and PTX Routers and EX Series Switches</i>


probe-server

Syntax	<pre> probe-server { tcp { destination-interface <i>interface-name</i>; port <i>number</i>; } udp { destination-interface <i>interface-name</i>; port <i>number</i>; } } </pre>
Hierarchy Level	[edit services rpm]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers.</p> <p>Statement introduced in Junos OS Release 18.1 for QFX Series switches.</p>
Description	<p>Specify the server to act as a receiver for the probes.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
	<div>  <p>NOTE: The <code>destination-interface</code> statement is not supported on PTX Series routers.</p> </div>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> <i>Configuring RPM Receiver Servers on M, MX, T and PTX Series Routers and EX Series Switches</i>

probe-type

Syntax	<code>probe-type type;</code>
Hierarchy Level	<code>[edit services rpm bgp],</code> <code>[edit services rpm probe owner test test-name]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.3 for EX Series switches. Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers. Statement introduced in Junos OS Release 18.1 for QFX Series switches.
Description	Specify the packet and protocol contents of a real-time performance monitoring (RPM) probe.
Options	<p>type—One of the following probe type values:</p> <ul style="list-style-type: none"> • http-get—(Not available at the <code>[edit services rpm bgp]</code> hierarchy level.) Sends a Hypertext Transfer Protocol (HTTP) get request to a target URL. • http-metadata-get—(Not available at the <code>[edit services rpm bgp]</code> hierarchy level.) Sends an HTTP get request for metadata to a target URL. • icmp-ping—Sends ICMP echo requests to a target address. • icmp-ping-timestamp—Sends ICMP timestamp requests to a target address. • icmp6-ping—Sends ICMP IPv6 echo requests to a target address. This option is supported only when you configure the generation of RPM probes on an MS-MPC or MS-MIC. • tcp-ping—Sends TCP packets to a target. • udp-ping—Sends UDP packets to a target. • udp-ping-timestamp—Sends UDP timestamp requests to a target address. <p>If you are configuring the generation of RPM probes on an MS-MPC or MS-MIC, the type can be icmp-ping or icmp-ping-timestamp starting in Junos OS Release 17.3R1, and icmp6-ping starting in Junos OS Release 18.1R1.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • <i>Configuring BGP Neighbor Discovery on MX, M, T and PTX Series Routers Through RPM</i>


routing-instance

Syntax	<code>routing-instance <i>instance-name</i>;</code>
Hierarchy Level	<code>[edit services rpm probe owner test <i>test-name</i>]</code> <code>[edit services rpm twamp client control-connection <i>control-client-name</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.3 for EX Series switches. Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers. Support at the <code>[edit services rpm twamp client control-connection <i>control-client-name</i>]</code> hierarchy level introduced in Junos OS Release 15.1 for MX Series routers. Statement introduced in Junos OS Release 18.1 for QFX Series switches.
Description	Specify the routing instance used by the probes. The routing instance is also applicable for control connection.
	<div>  <p>NOTE: The media interface from where the TWAMP control and test or data packets arrive and exit the <code>si-</code> logical interface must be a part of the same routing instance.</p> </div>
Options	<i>instance-name</i> —Routing instance configured at the <code>[edit routing-instance]</code> hierarchy level. Default: Internet (IPv4) routing table <code>inet.0</code> .
Required Privilege Level	<code>interface</code> —To view this statement in the configuration. <code>interface-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> <i>Configuring RPM Probes on M, MX and T Series Routers and EX Series Switches</i> <i>Understanding Two-Way Active Measurement Protocol on Routers</i>

routing-instances

Syntax	<code>routing-instances <i>instance-name</i>;</code>
Hierarchy Level	<code>[edit services rpm bgp],</code> <code>[edit services rpm bgp logical-system <i>logical-system-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 7.6. Statement introduced in Junos OS Release 9.3 for EX Series switches. Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers. Statement introduced in Junos OS Release 18.1 for QFX Series switches.
Description	Specify the routing instance used by the probes.
Options	<i>instance-name</i> —A routing instance configured at the <code>[edit routing-instances]</code> hierarchy level. Default: Internet routing table <code>inet.0</code> .
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"> <i>Configuring BGP Neighbor Discovery on MX, M, T and PTX Series Routers Through RPM</i>

rpm (Interfaces)

Syntax	<code>rpm (client <i>client</i> server <i>server</i> twamp-client <i>twamp-client</i> twamp-server <i>twamp-server</i>);</code>
Hierarchy Level	<code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>]</code>
Release Information	<p>Statement introduced in Junos OS Release 8.1.</p> <p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 15.1 for MX Series routers.</p> <p>Statement introduced in Junos OS Release 18.1 for QFX Series switches.</p>
Description	Associate an RPM or TWAMP client (router or switch that originates RPM or TWAMP probes) or RPM or TWAMP server with a specified interface.
<div>  <p>NOTE: The TWAMP client is applicable only for si- interfaces.</p> </div>	
Options	<p><i>client</i>—Identifier for RPM client router or switch.</p> <p><i>server</i>—Identifier for RPM server.</p> <p><i>twamp-client</i>—Identifier for RPM TWAMP client router.</p> <p><i>twamp-server</i>—Identifier for RPM TWAMP server.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • <i>Configuring RPM Timestamping on MX, M and T Series Routers and EX Series Switches</i>

rpm (Services)

```

Syntax rpm {
    bgp {
        data-fill data;
        data-size size;
        destination-port port;
        history-size size;
        logical-system logical-system-name [routing-instances routing-instance-name];
        moving-average-size number;
        probe-count count;
        probe-interval seconds;
        probe-type type;
        routing-instances instance-name;
        test-interval interval;
    }
    probe owner {
        test test-name {
            data-fill data;
            data-size size;
            destination-interface interface-name;
            destination-port port;
            dscp-code-point (Services) dscp-bits;
            hardware-timestamp;
            history-size size;
            moving-average-size number;
            one-way-hardware-timestamp;
            probe-count count;
            probe-interval seconds;
            probe-type type;
            routing-instance instance-name;
            source-address address;
            target (url url | address address);
            test-interval interval;
            thresholds thresholds;
            traps traps;
        }
    }
    probe-server {
        tcp {
            destination-interface interface-name;
            port number;
        }
        udp {
            destination-interface interface-name;
            port number;
        }
    }
    probe-limit limit;
    rfc2544-benchmarking {
        profiles {
            test-profile profile-name {
                test-type (throughput | latency | frame-loss | back-back-frames);
            }
        }
    }
}

```

```

        packet-size bytes;
        step-percent percent;
        bandwidth-kbps kpbs;
    }
}
tests{
    test-name test-name {
        test-interface interface-name;
        mode reflect;
        family (bridge| inet | ccc);
        destination-ipv4-address address;
        destination-udp-port port-number;
        source-ipv4-address address;
        source-udp-port port-number;
        direction (egress | ingress);
    }
}
}
traceoptions {
    file filename <files number> <match regular-expression > <size maximum-file-size>
    <world-readable | no-world-readable>;
    flag flag;
}
twamp {
    server {
        authentication-mode (authenticated | encrypted | none);
        authentication-key-chain identifier {
            key-id identifier {
                secret password-string;
            }
        }
        client-list list-name {
            [ address address ];
        }
        inactivity-timeout seconds;
        maximum-connections-duration hours;
        maximum-connections count;
        maximum-connections-per-client count;
        maximum-sessions count;
        maximum-sessions-per-connection count;
        port number;
        server-inactivity-timeout minutes;
    }
}
rfc2544-benchmarking {
    tests{
        test-name test-name {
            test-interface interface-name;
            mode reflect;
            family (inet | ccc);
            destination-ipv4-address address;
            destination-udp-port port-number;
            source-ipv4-address address;
            source-udp-port port-number;
            direction (egress | ingress);
        }
    }
}

```

```
}  
}  
}  
}
```

Hierarchy Level [edit services]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure BGP neighbor discovery through RPM.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- *Configuring BGP Neighbor Discovery on MX, M, T and PTX Series Routers Through RPM*

source-address (Services)

Syntax	<code>source-address <i>address</i>;</code>
Hierarchy Level	<code>[edit services rpm <i>probe</i> owner <i>test</i> test-name]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers.</p> <p>Statement introduced in Junos OS Release 18.1 for QFX Series switches.</p>
Description	<p>Specify the source IP address used for probes. If the source IP address is not one of the router's or switch's assigned addresses, the packet use the outgoing interface's address as its source.</p> <p>The following addresses cannot be used for the source IP address used for probes:</p> <ul style="list-style-type: none">• 0.0.0.0• 127.0.0.0/8 (loopback)• 224.0.0.0/4 (multicast)• 255.255.255.255 (broadcast)
Options	<i>address</i> —Valid IP address.
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• <i>Configuring RPM Probes on M, MX and T Series Routers and EX Series Switches</i>

tcp

Syntax	<pre>tcp { destination-interface <i>interface-name</i>; port <i>port</i>; }</pre>
Hierarchy Level	[edit services rpm probe-server]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers.</p> <p>Statement introduced in Junos OS Release 18.1 for QFX Series switches.</p>
Description	<p>Specify the port information for the TCP server.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• <i>Configuring RPM Receiver Servers on M, MX, T and PTX Series Routers and EX Series Switches</i>

test

```

Syntax  test test-name {
        data-fill data;
        data-size size;
        destination-interface interface-name;
        destination-port port;
        dscp-code-point (Services) dscp-bits;
        hardware-timestamp;
        history-size size;
        moving-average-size number;
        inet6-options;
        one-way-hardware-timestamp;
        probe-count count;
        probe-interval seconds;
        probe-type type;
        routing-instance instance-name;
        rpm-scale {
            destination {
                interface interface-name.logical-unit-number;
                subunit-cnt subunit-cnt;
            }
            source {
                address-base ipv4-address-base;
                count ipv4-count;
                step ipv4-step;
            }
            source-inet6 {
                address-base ipv6-address-base;
                count ipv6-count;
                step ipv6-step;
            }
            target {
                address-base ipv4-address-base;
                count ipv4-count;
                step ipv4-step;
            }
            target-inet6 {
                address-base ipv6-address-base;
                count ipv6-count;
                step ipv6-step;
            }
            tests-count tests-count;
        }
        source-address address;
        target (url url | address address);
        test-interval interval;
        thresholds thresholds;
        traps traps;
        ttl hop-count
    }

```

Hierarchy Level	[edit services rpm probe owner]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers.</p> <p>inet6-options option added in Junos OS Release 14.1R4 for MX Series routers.</p> <p>Statement introduced in Junos OS Release 18.1 for QFX Series switches.</p>
Description	Specify the range of probes over which the standard deviation, average, and jitter are calculated. The test name combined with the owner name represent a single RPM configuration instance.
Options	<p>test-name—Test name. The name can be up to 32 characters in length.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • <i>Configuring RPM Probes on M, MX and T Series Routers and EX Series Switches</i>

test-interval

Syntax	<code>test-interval seconds;</code>
Hierarchy Level	<code>[edit services rpm bgp],</code> <code>[edit services rpm probe owner test test-name],</code> <code>[edit services rpm twamp client control-connection <i>control-client-name</i>]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers.</p> <p>Support at the <code>[edit services rpm twamp client control-connection <i>control-client-name</i>]</code> hierarchy level introduced in Junos OS Release 15.1 for MX Series routers.</p> <p>Statement introduced in Junos OS Release 18.1 for QFX Series switches.</p>
Description	Specify the time to wait between tests, in seconds. A test interval of 0 seconds causes the RPM test to stop after one iteration.
Options	<p>seconds—Number of seconds to wait between tests.</p> <p>Range: <code>[edit services rpm bgp]</code> and <code>[edit services rpm probe owner test <i>test-name</i>]</code> hierarchy levels: 0 through 86,400</p> <p>Range: <code>[edit services rpm twamp client control-connection <i>control-client-name</i>]</code> hierarchy level: 1 through 255</p> <p>Default: 1</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • <i>Configuring BGP Neighbor Discovery on MX, M, T and PTX Series Routers Through RPM</i> • <i>Configuring RPM Probes on M, MX and T Series Routers and EX Series Switches</i> • <i>Understanding Two-Way Active Measurement Protocol on Routers</i>

thresholds

Syntax	<code>thresholds thresholds;</code>
Hierarchy Level	<code>[edit services rpm probe owner test test-name],</code> <code>[edit services rpm twamp client control-connection control-client-name]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.3 for EX Series switches. Statement introduced in Junos OS Release 13.2 for PTX Packet Series Transport routers. Support at the <code>[edit services rpm twamp client control-connection control-client-name]</code> hierarchy level introduced in Junos OS Release 15.1 for MX Series routers. Statement introduced in Junos OS Release 18.1 for QFX Series switches.
Description	Specify thresholds used for the probes. A system log message is generated when the configured threshold is exceeded. Likewise, an SNMP trap (if configured) is generated when a threshold is exceeded.



NOTE: If you configure a value of zero using the *thresholds* option for a certain probe parameter, the generation of SNMP traps is disabled for the corresponding probe attribute. For example, if you specify the `set thresholds jitter-egress 0` statement, it denotes that traps are not triggered when the jitter in egress time threshold is met or exceeded.

Options	<p><i>thresholds</i>—Specify one or more threshold measurements. The following options are supported:</p> <ul style="list-style-type: none"> • egress-time—Measures maximum source-to-destination time per probe. • ingress-time—Measures maximum destination-to-source time per probe. • jitter-egress—Measures maximum source-to-destination jitter per test. • jitter-ingress—Measures maximum destination-to- source jitter per test. • jitter-rtt—Measures maximum jitter per test, from 0 through 60,000,000 microseconds. • rtt—Measures maximum round-trip time per probe, in microseconds. • std-dev-egress—Measures maximum source-to-destination standard deviation per test. • std-dev-ingress—Measures maximum destination-to-source standard deviation per test. • std-dev-rtt—Measures maximum standard deviation per test, in microseconds. • successive-loss—Measures successive probe loss count, indicating probe failure.
---------	---

- **total-loss**—Measures total probe loss count indicating test failure, from 0 through 15.

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

Related Documentation	<ul style="list-style-type: none">• <i>Configuring RPM Probes on M, MX and T Series Routers and EX Series Switches</i>• <i>Understanding Two-Way Active Measurement Protocol on Routers</i>
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traps

Syntax	<code>traps traps;</code>
Hierarchy Level	[edit services rpm probe owner test test-name], [edit services rpm twamp client control-connection control-client-name]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.3 for EX Series switches. Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers. Support at the [edit services rpm twamp client control-connection control-client-name] hierarchy level introduced in Junos OS Release 15.1 for MX Series routers. Statement introduced in Junos OS Release 18.1 for QFX Series switches.
Description	Set the trap bit to generate traps for probes. Traps are sent if the configured threshold is met or exceeded.
Options	<p>traps—Specify one or more traps. The following options are supported:</p> <ul style="list-style-type: none"> • control-connection-closed—Generate traps when the control connection is closed. • egress-jitter-exceeded—Generate traps when the jitter in egress time threshold is met or exceeded. • egress-std-dev-exceeded—Generate traps when the egress time standard deviation threshold is met or exceeded. • egress-time-exceeded—Generate traps when the maximum egress time threshold is met or exceeded. • ingress-jitter-exceeded—Generate traps when the jitter in ingress time threshold is met or exceeded. • ingress-std-dev-exceeded—Generate traps when the ingress time standard deviation threshold is met or exceeded. • ingress-time-exceeded—Generate traps when the maximum ingress time threshold is met or exceeded. • jitter-exceeded—Generate traps when the jitter in round-trip time threshold is met or exceeded. • probe-failure—Generate traps when successive probe loss thresholds are crossed. • rtt-exceeded—Generate traps when the maximum round-trip time threshold is met or exceeded. • std-dev-exceeded—Generate traps when the round-trip time standard deviation threshold is met or exceeded. • test-completion—Generate traps when a test is completed.

- **test-failure**—Generate traps when the total probe loss threshold is met or exceeded.
- **test-iteration-done**—Generate traps when all test sessions under control connections complete one test iteration.



NOTE: For RPM traps to be generated, you must configure the remote-operations SNMP trap category by including the [categories](#) statement at the [edit snmp trap-group *trap-group-name*] hierarchy level.

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

Related Documentation	<ul style="list-style-type: none">• <i>Configuring RPM Probes on M, MX and T Series Routers and EX Series Switches</i>• <i>Understanding Two-Way Active Measurement Protocol on Routers</i>
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udp

Syntax

```
udp {
  destination-interface interface-name;
  port port;
}
```

Hierarchy Level [edit services rpm [probe-server](#)]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.3 for EX Series switches.
Statement introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers.
Statement introduced in Junos OS Release 18.1 for QFX Series switches.

Description Specify the port information for the UDP server.

The remaining statements are explained separately. See [CLI Explorer](#).



NOTE: The `destination-interface` statement is not supported on PTX Series routers.

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

Related Documentation

- *Configuring RPM Receiver Servers on M, MX, T and PTX Series Routers and EX Series Switches*

CHAPTER 59

Configuration Statements: Ethernet OAM Link Fault Management

- [action \(OAM LFM\) on page 1299](#)
- [action \(OAM\) on page 1299](#)
- [action-profile \(Applying to OAM CFM, for EX Series Switch Only\) on page 1300](#)
- [action-profile on page 1301](#)
- [age on page 1302](#)
- [allow-remote-loopback on page 1303](#)
- [apply-action-profile on page 1303](#)
- [auto-discovery \(EX Series Switch Only\) on page 1304](#)
- [calculation-weight on page 1305](#)
- [connectivity-fault-management \(EX Series Switch Only\) on page 1306](#)
- [continuity-check \(EX Series Switch Only\) on page 1308](#)
- [cycle-time on page 1309](#)
- [delay on page 1310](#)
- [delay-variation on page 1311](#)
- [ethernet \(Protocols OAM\) on page 1312](#)
- [event \(LFM\) on page 1318](#)
- [event-thresholds on page 1319](#)
- [event-thresholds on page 1320](#)
- [fast-aps-switch on page 1321](#)
- [frame-error on page 1322](#)
- [frame-period on page 1323](#)
- [frame-period on page 1324](#)
- [frame-period-summary on page 1325](#)
- [frame-period-summary on page 1326](#)
- [hold-interval \(OAM CFM, for EX Series Switch Only\) on page 1327](#)
- [hold-interval \(OAM\) on page 1328](#)

- [interface \(OAM CFM, for EX Series Switch Only\) on page 1329](#)
- [interface \(OAM Link-Fault Management\) on page 1330](#)
- [interval \(EX Series Switch Only\) on page 1332](#)
- [iteration-period on page 1333](#)
- [level \(EX Series Switch Only\) on page 1334](#)
- [link-adjacency-loss on page 1334](#)
- [link-discovery on page 1335](#)
- [link-down on page 1335](#)
- [link-event-rate on page 1336](#)
- [link-fault-management on page 1337](#)
- [negotiation-options on page 1338](#)
- [no-allow-link-events on page 1338](#)
- [oam on page 1339](#)
- [path-database-size \(EX Series Switch Only\) on page 1341](#)
- [pdu-interval on page 1342](#)
- [pdu-threshold on page 1343](#)
- [performance-monitoring \(OAM LFM\) on page 1344](#)
- [protocol-down on page 1345](#)
- [protocol-down on page 1345](#)
- [remote-loopback on page 1346](#)
- [remote-mep \(EX Series Switch Only\) on page 1347](#)
- [send-critical-event on page 1347](#)
- [sla-iterator-profiles \(OAM LFM\) on page 1348](#)
- [symbol-period on page 1349](#)
- [syslog \(OAM Action\) on page 1350](#)
- [traceoptions \(Individual Interfaces\) on page 1351](#)
- [version-ipfix \(Services\) on page 1358](#)

action (OAM LFM)

Syntax	<pre>action { syslog; link-down; }</pre>
Hierarchy Level	[edit protocols oam ethernet link-fault-management]
Release Information	Statement introduced in Junos OS Release 9.4 for EX Series switches.
Description	<p>Define the action or actions to be taken when the OAM link fault management (LFM) fault event occurs.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Ethernet OAM Link Fault Management on page 48

action (OAM)

Syntax	<pre>action { link-down; send-critical-event; syslog; }</pre>
Hierarchy Level	[edit protocols oam ethernet link-fault-management action-profile]
Release Information	Statement introduced in Junos OS Release 8.5.
Description	Define the action or actions to be taken when the OAM fault event occurs.
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Specifying the Actions to Be Taken for Link-Fault Management Events on page 41

action-profile (Applying to OAM CFM, for EX Series Switch Only)

Syntax	<pre> action-profile <i>profile-name</i> { action { interface-down; } default-actions { interface-down; } event { adjacency-loss; } } </pre>
Hierarchy Level	<p>[edit protocols oam ethernet connectivity-fault-management]</p> <p>[edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> mep <i>mep-id</i> remote-mep mep-id]</p>
Release Information	Statement introduced in Junos OS Release 10.2 for EX Series switches.
Description	Configure a name and default action for an action profile.
Options	<p><i>profile-name</i>—Name of the action profile.</p> <p><i>action</i>—Defines the action to be taken when connectivity to the remote MEP is lost.</p> <p><i>interface-down</i>—Brings the interface down when a remote MEP connectivity failure is detected.</p> <p><i>default-actions</i>—Defines the default action to be taken when connectivity to the remote MEP is lost.</p> <p><i>interface-down</i>—Brings the interface down when a remote MEP connectivity failure is detected.</p> <p><i>event</i>—Defines the event to be monitored when a remote MEP connectivity failure is detected.</p> <p><i>adjacency-loss</i>—Defines the connectivity loss to the remote MEP.</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Configuring Ethernet OAM Connectivity Fault Management (CLI Procedure) on page 57 Junos OS Network Interfaces Configuration Guide

action-profile

List of Syntax	<p>Syntax: T, M, MX and ACX Series Routers, SRX Series Firewalls and EX Series Switches on page 1301</p> <p>Syntax: EX Series Switches and NFX Series Devices on page 1301</p>
<p>Syntax: T, M, MX and ACX Series Routers, SRX Series Firewalls and EX Series Switches</p>	<pre> action-profile <i>profile-name</i> { action { link-down; send-critical-event; syslog; } event { link-adjacency-loss; link-event-rate { frame-error <i>count</i>; frame-period <i>count</i>; frame-period-summary <i>count</i>; symbol-period <i>count</i>; } protocol-down; } } </pre>
<p>Syntax: EX Series Switches and NFX Series Devices</p>	<pre> action-profile <i>profile-name</i>; action { syslog; link-down; } event { link-adjacency-loss; link-event-rate { frame-error <i>count</i>; frame-period <i>count</i>; frame-period-summary <i>count</i>; symbol-period <i>count</i>; } } } </pre>
Hierarchy Level	[edit protocols oam ethernet link-fault-management]
Release Information	<p>Statement introduced in Junos OS Release 8.5 for T, M, MX and ACX Series Routers, SRX Series Firewalls, and EX Series Switches, .</p> <p>Statement introduced in Junos OS Release 9.4 for EX Series switches and NFX Series devices.</p>
Description	Configure an Ethernet OAM link fault management (LFM) action profile by specifying a profile name.

The remaining statements are explained separately. See [CLI Explorer](#).

Options *profile-name*—Name of the action profile.

The remaining statements are explained separately. See [CLI Explorer](#).

Required Privilege Level

interface	—To view this statement in the configuration.
interface-control	—To add this statement to the configuration.
routing	—To view this statement in the configuration.
routing-control	—To add this statement to the configuration.

Related Documentation

- [Configuring an OAM Action Profile on page 30](#)
- [Configuring Ethernet OAM Link Fault Management on page 48](#)

age

Syntax age (30m | 10m | 1m | 30s | 10s);

Hierarchy Level [edit protocols oam **ethernet** connectivity-fault-management linktrace]

Release Information Statement introduced in Junos OS Release 8.5.

Description Time to wait (in minutes or seconds) for a response. If no response is received, the request and response entry is deleted from the linktrace database.

Default 10 minutes


Required Privilege Level

interface	—To view this statement in the configuration.
interface-control	—To add this statement to the configuration.

Related Documentation

- [Configuring Linktrace Protocol in CFM](#)

allow-remote-loopback

Syntax	<code>allow-remote-loopback;</code>
Hierarchy Level	[edit protocols oam ethernet link-fault-management interface <i>interface-name</i>]
Release Information	Statement introduced in Junos OS Release 9.4 for EX Series switches.
Description	Advertise that the interface is capable of getting into loopback mode. Enable remote loopback in Ethernet OAM link fault management (LFM) on all Ethernet interfaces or the specified interface on the EX Series switch.
	<div>  <p>WARNING: If you disable this statement on a peer interface, LFM loopback enable and disable commands will not work. Before disabling this configuration, please make sure the remote-loopback interface is disabled.</p> </div>
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • <i>Example: Configuring Ethernet OAM Link Fault Management</i> • Configuring Ethernet OAM Link Fault Management on page 48

apply-action-profile

Syntax	<code>apply-action-profile <i>profile-name</i>;</code>
Hierarchy Level	[edit protocols oam ethernet link-fault-management interface]
Release Information	Statement introduced in Junos OS Release 8.5.
Description	Apply the specified action profile to the interface for link-fault management.
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"> • Applying an Action Profile on page 32

auto-discovery (EX Series Switch Only)

Syntax	auto-discovery;
Hierarchy Level	[edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> mep <i>mep-id</i>]
Release Information	Statement introduced in Junos OS Release 10.2 for EX Series switches.
Description	Enable the MEP to accept continuity check messages from all remote MEPs.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Ethernet OAM Connectivity Fault Management (CLI Procedure) on page 57• Junos OS Network Interfaces Configuration Guide

calculation-weight

Syntax

```
calculation-weight {
  delay delay-value;
  delay-variation delay-variation-value;
}
```

Hierarchy Level [edit protocols oam [ethernet](#) connectivity-fault-management performance-monitoring sla-iterator-profiles *profile-name*]

Release Information Statement introduced in Junos OS Release 11.1.
Statement introduced in Junos OS Release 11.4 for EX Series switches.

Description Configure the calculation weight for delay and delay variation.



NOTE: This option is applicable only for two-way delay measurement.

The remaining statements are explained separately. See [CLI Explorer](#).

Required Privilege Level Configure—To enter configuration mode.
Control—To modify any configuration.

- Related Documentation**
- *Configuring an Iterator Profile*
 - [Configuring an Iterator Profile on a Switch \(CLI Procedure\)](#) on page 749
 - [delay](#) on page 1310
 - [delay-variation](#) on page 1311

connectivity-fault-management (EX Series Switch Only)

```
Syntax connectivity-fault-management {
  action-profile profile-name {
    action {
      interface-down;
    }
    default-actions {
      interface-down;
    }
    event {
      adjacency-loss;
    }
  }
  linktrace {
    age (30m | 10m | 1m | 30s | 10s);
    path-database-size path-database-size;
  }
  maintenance-domain domain-name {
    level number;
    mip-half-function (none | default | explicit);
    name-format (character-string | none | dns | mac+2oct);
    maintenance-association ma-name {
      continuity-check {
        hold-interval minutes;
        interface-status-tlv;
        interval (10m | 10s | 1m | 1s | 100ms);
        loss-threshold number;
        port-status-tlv;
      }
      mep mep-id {
        auto-discovery;
        direction down;
        interface interface-name;
        remote-mep mep-id {
          action-profile profile-name;
        }
      }
    }
  }
  performance-monitoring {
    sla-iterator-profiles {
      profile-name {
        calculation-weight {
          delay delay-value;
          delay-variation delay-variation-value;
        }
        cycle-time cycle-time-value;
        iteration-period iteration-period-value;
        measurement-type two-way-delay;
        passive;
      }
    }
  }
}
```



```
}  
}
```

Hierarchy Level [edit protocols [oam ethernet](#)]

Release Information Statement introduced in Junos OS Release 10.2 for EX Series switches.
performance-monitoring introduced in Junos OS Release 11.4 for EX Series switches.

Description Configure connectivity fault management for IEEE 802.1ag Operation, Administration, and Management (OAM) support.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Configuring Ethernet OAM Connectivity Fault Management \(CLI Procedure\) on page 57](#)
- [Junos OS Network Interfaces Configuration Guide](#)


continuity-check (EX Series Switch Only)

Syntax	<pre>continuity-check { hold-interval <i>minutes</i>; interface-status-tlv; interval (10m 10s 1m 1s 100ms); loss-threshold <i>number</i>; port-status-tlv; }</pre>
Hierarchy Level	[edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i>]
Release Information	Statement introduced in Junos OS Release 10.2 for EX Series switches.
Description	<p>Specify continuity check protocol options.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Options	<p>interface-status-tlv—Includes interface status TLV in CCM.</p> <p>port-status-tlv—Includes port status TLV in CCM.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Configuring Ethernet OAM Connectivity Fault Management (CLI Procedure) on page 57 Junos OS Network Interfaces Configuration Guide

cycle-time

Syntax	<code>cycle-time <i>cycle-time-value</i>;</code>
Hierarchy Level	[edit protocols oam ethernet connectivity-fault-management performance-monitoring sla-iterator-profiles <i>profile-name</i>]
Release Information	Statement introduced in Junos OS Release 11.1. Statement introduced in Junos OS Release 11.4 for EX Series switches.
Description	Configure the time (in milliseconds) taken between back-to-back transmissions of SLA frames for a single connection.
Options	<i>cycle-time-value</i> —Cycle time value in milliseconds. Range: 10 through 3,600,000 Default: 1000
Required Privilege Level	Configure—To enter configuration mode. Control—To modify any configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring an Iterator Profile • Configuring an Iterator Profile on a Switch (CLI Procedure) on page 749

delay

Syntax	<code>delay delay-value;</code>
Hierarchy Level	[edit protocols oam ethernet connectivity-fault-management performance-monitoring sla-iterator-profiles <i>profile-name</i> calculation-weight]
Release Information	Statement introduced in Junos OS Release 11.1. Statement introduced in Junos OS Release 11.4 for EX Series switches.
Description	Configure the calculation weight for delay.
Options	delay-value —Calculation weight for delay.
<div>  NOTE: This option is applicable only for two-way delay measurement. </div>	
Range: 1 through 65,535 Default: 1	
Required Privilege Level	Configure—To enter configuration mode. Control—To modify any configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring an Iterator Profile • Configuring an Iterator Profile on a Switch (CLI Procedure) on page 749 • calculation-weight on page 1305

delay-variation

Syntax	<code>delay-variation <i>delay-variation-value</i>;</code>
Hierarchy Level	[edit protocols oam ethernet connectivity-fault-management performance-monitoring sla-iterator-profiles <i>profile-name</i> calculation-weight]
Release Information	Statement introduced in Junos OS Release 11.1. Statement introduced in Junos OS Release 11.4 for EX Series switches.
Description	Configure the calculation weight for delay variation.
Options	<i>delay-variation-value</i> —Calculation weight for delay variation.



NOTE: This option is applicable only for two-way delay measurement.

Range: 1 through 65,535

Default: 1

Required Privilege	Configure—To enter configuration mode.
Level	Control—To modify any configuration.

Related Documentation	<ul style="list-style-type: none"> • Configuring an Iterator Profile • Configuring an Iterator Profile on a Switch (CLI Procedure) on page 749 • calculation-weight on page 1305
------------------------------	---

ethernet (Protocols OAM)

List of Syntax Syntax: MX, T, ACX Series Routers, SRX Firewalls, M320 and EX Series Switches on page 1312
 Syntax: EX Series Switches and NFX Series Devices on page 1315

Syntax: MX, T, ACX Series Routers, SRX Firewalls, M320 and EX Series Switches

```
ethernet {
  connectivity-fault-management {
    action-profile profile-name {
      default-actions {
        interface-down;
      }
    }
  }
  performance-monitoring {
    delegate-server-processing;
    hardware-assisted-timestamping;
    hardware-assisted-keepalives;
    sla-iterator-profiles {
      profile-name {
        avg-fd-twoway-threshold;
        avg-ifdv-twoway-threshold;
        avg-flr-forward-threshold;
        avg-flr-backward-threshold;
        disable;
        calculation-weight {
          delay delay-weight;
          delay-variation delay-variation-weight;
        }
        cycle-time milliseconds;
        iteration-period connections;
        measurement-type (loss | statistical-frame-loss | two-way-delay);
      }
    }
  }
  linktrace {
    age (30m | 10m | 1m | 30s | 10s);
    path-database-size path-database-size;
  }
  maintenance-domain domain-name {
    level number;
    name-format (character-string | none | dns | mac+2octet);
    maintenance-association ma-name {
      short-name-format (character-string | vlan | 2octet | rfc-2685-vpn-id);
      protect-maintenance-association protect-ma-name;
      remote-maintenance-association remote-ma-name;
      continuity-check {
        convey-loss-threshold;
        hold-interval minutes;
        interface-status-tlv;
        interval (10m | 10s | 1m | 1s | 100ms);
        loss-threshold number;
        port-status-tlv;
      }
    }
  }
}
```

1313

```
    }
    negotiation-options {
        allow-remote-loopback;
        no-allow-link-events;
    }
}
lmi {
    status-counter count;
    polling-verification-timer value;
    interface name {
        uni-id uni-name;
        status-counter number;
        polling-verification-timer value;
        evc-map-type (all-to-one-bundling | bundling | service-multiplexing);
        evc evc-name {
            default-evc;
            vlan-list vlan-id-list;
        }
    }
}
```


Syntax: EX Series
Switches and NFX
Series Devices

```

ethernet {
  connectivity-fault-management {
    action-profile profile-name {
      action {
        interface-down;
      }
      default-actions {
        interface-down;
      }
      event {
        adjacency-loss;
      }
    }
    esp-traceoptions {
      file filename <files number> <no-stamp> <replace> <size size> <world-readable |
        no-world-readable>;
      flag (all | error | esp | interface | krt | lib | normal | task | timer);
    }
    linktrace {
      age (30m | 10m | 1m | 30s | 10s);
      path-database-size path-database-size;
    }
    maintenance-domain domain-name {
      level number;
      mip-half-function (none | default | explicit);
      name-format (character-string | none | dns | mac+2oct);
      maintenance-association ma-name {
        continuity-check {
          hold-interval minutes;
          interface-status-tlv;
          interval (10m | 10s | 1m | 1s | 100ms);
          loss-threshold number;
          port-status-tlv;
        }
        mep mep-id {
          auto-discovery;
          direction down;
          interface interface-name;
          priority
          remote-mep mep-id {
            action-profile profile-name;
            sla-iterator-profile profile-name {
              data-tlv-size size;
              iteration-count count-value;
              priority priority-value;
            }
          }
        }
      }
      short-name-format (character-string | vlan | 2octet | rfc-2685-vpn-id);
    }
  }
  performance-monitoring {
    sla-iterator-profiles {
      profile-name {
        calculation-weight {

```

```

    delay delay-value;
    delay-variation delay-variation-value;
}
cycle-time cycle-time-value;
iteration-period iteration-period-value;
measurement-type two-way-delay;
passive;
}
}
}
traceoptions {
    file filename <files number> <match regex> <size size> <world-readable |
        no-world-readable>;
    flag flag ;
    no-remote-trace;
}
}
link-fault-management {
    action-profile profile-name;
    action {
        syslog;
        link-down;
    }
    event {
        link-adjacency-loss;
        link-event-rate {
            frame-error count;
            frame-period count;
            frame-period-summary count;
            symbol-period count;
        }
    }
}
interface interface-name {
    link-discovery (active | passive);
    pdu-interval interval;
    pdu-threshold threshold-value;
    remote-loopback;
    event-thresholds {
        frame-error count;
        frame-period count;
        frame-period-summary count;
        symbol-period count;
    }
    negotiation-options {
        allow-remote-loopback;
        no-allow-link-events;
    }
}
}
traceoptions {
    file filename <files number> <match regex> <size size> <world-readable |
        no-world-readable>;
    flag flag ;
    no-remote-trace;
}
}
}
```

```
}

```

Hierarchy Level [edit protocols oam]

Release Information Statement introduced in Junos OS Release 8.2 for MX, T, ACX Series routers, SRX firewalls, M320 and EX Series switches.
Statement introduced in Junos OS Release 9.4 for EX Series switches and NFX Series devices.
connectivity-fault-management introduced in Junos OS Release 10.2 for EX Series switches.

Description Provide IEEE 802.3ah Operation, Administration, and Maintenance (OAM) support for Ethernet interfaces or configure connectivity fault management (CFM) for IEEE 802.1ag Operation, Administration, and Management (OAM) support.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Enabling IEEE 802.3ah OAM Support on page 27](#)
- *Example: Configuring Ethernet OAM Link Fault Management*

event (LFM)

List of Syntax	Syntax: MX, M, T, ACX Series Routers, SRX Firewalls and EX Series Switches on page 1318 Syntax: EX Series Switches and NFX Series Devices on page 1318
Syntax: MX, M, T, ACX Series Routers, SRX Firewalls and EX Series Switches	<pre> event { link-adjacency-loss; link-event-rate { frame-error count; frame-period count; frame-period-summary count; symbol-period count; } protocol-down; } </pre>
Syntax: EX Series Switches and NFX Series Devices	<pre> event { link-adjacency-loss; link-event-rate { frame-error count; frame-period count; frame-period-summary count; symbol-period count; } } </pre>
Hierarchy Level	[edit protocols oam ethernet link-fault-management action-profile]
Release Information	<p>Statement introduced in Junos OS Release 8.5 for MX, M, T, ACX Series routers, SRX Series firewalls and EX Series switches.</p> <p>Statement introduced in Junos OS Release 9.4 for EX Series switches and NFX devices.</p>
Description	<p>Configure link events in an action profile for Ethernet OAM link fault management (LFM).</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Monitoring Protocol Status on page 35 • Configuring Ethernet OAM Link Fault Management on page 48

event-thresholds

Syntax

```
event-thresholds {  
  frame-error count;  
  frame-period count;  
  frame-period-summary count;  
  symbol-period count;  
}
```

Hierarchy Level [edit protocols [oam ethernet link-fault-management interface](#) *interface-name*]

Release Information Statement introduced in Junos OS Release 9.4 for EX Series switches.

Description Configure threshold limit values for link events in periodic OAM PDUs.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Configuring Ethernet OAM Link Fault Management on page 48](#)

event-thresholds

Syntax

```
event-thresholds {  
  frame-error count;  
  frame-period count;  
  frame-period-summary count;  
  symbol-period count;  
}
```

Hierarchy Level [edit protocols oam link-fault-management [interface](#) *interface-name*]

Release Information Statement introduced in Junos OS Release 8.4.


Description Configure threshold limit values for link events in periodic OAM PDUs.
The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Configuring Threshold Values for Local Fault Events on an Interface on page 38](#)

fast-aps-switch

Syntax	<code>fast-aps-switch;</code>
Hierarchy Level	[edit interfaces <i>interface-name</i> sonet-options aps]
Release Information	Statement introduced in Junos OS Release 12.1.
Description	(M320 routers with Channelized OC3/STM1 Circuit Emulation PIC with SFP only, EX Series switches, and MX series routers with Channelized OC3/STM1 Circuit Emulation PIC with SFP only using container interfaces) Reduce the Automatic Protection Switching (APS) switchover time in Layer 2 circuits.
	<div>  NOTE: <ul style="list-style-type: none"> The fast APS switching feature is supported only within a single chassis on a MX series router using a container interface. Configuring this statement reduces the APS switchover time only when the Layer 2 circuit encapsulation type for the interface receiving traffic from a Layer 2 circuit neighbor is SAToP. When the <code>fast-aps-switch</code> statement is configured in revertive APS mode, you must configure an appropriate value for revert time to achieve reduction in APS switchover time. To prevent the logical interfaces in the data path from being shut down, configure appropriate hold-time values on all the interfaces in the data path that support TDM. The <code>fast-aps-switch</code> statement cannot be configured when the APS annex-b option is configured. The interfaces that have the <code>fast-aps-switch</code> statement configured cannot be used in virtual private LAN service (VPLS) environments. </div>
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"> <i>Reducing APS Switchover Time in Layer 2 Circuits</i>

frame-error

Syntax	<code>frame-error <i>count</i>;</code>
Hierarchy Level	[edit protocols oam ethernet link-fault-management event link-event-rate], [edit protocols oam ethernet link-fault-management interface <i>interface-name</i> event-thresholds]
Release Information	Statement introduced in Junos OS Release 9.4 for EX Series switches.
Description	<p>Configure the threshold value for sending frame error events or taking the action specified in the action profile.</p> <p>Frame errors occur on the underlying physical layer. The threshold is reached when the number of frame errors reaches the configured value.</p>
Options	<p><i>count</i>—Threshold count in seconds for frame error events.</p> <p>Range: 1 through 100 seconds</p> <p>Default: 1 second</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring Ethernet OAM Link Fault Management on page 48

frame-period

Syntax	<code>frame-period <i>count</i>;</code>
Hierarchy Level	[edit protocols oam ethernet link-fault-management event link-event-rate], [edit protocols oam ethernet link-fault-management interface <i>interface-name</i> event-thresholds]
Release Information	Statement introduced in Junos OS Release 9.4 for EX Series switches.
Description	<p>Configure the number of frame errors within the last N frames that has exceeded a threshold.</p> <p>Frame errors occur on the underlying physical layer. The threshold is reached when the number of frame errors reaches the configured value.</p>
Options	<p><i>count</i>—Threshold count in seconds for frame error events.</p> <p>Range: 1 through 100 seconds</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Ethernet OAM Link Fault Management on page 48

frame-period

Syntax	<code>frame-period count;</code>
Hierarchy Level	<code>[edit protocols oam ethernet link-fault-management action-profile event link-event-rate],</code> <code>[edit protocols oam link-fault-management interface <i>interface-name</i> event-thresholds]</code>
Release Information	Statement introduced in Junos OS Release 8.4.
Description	<p>Threshold for sending frame period error events or taking the action specified in the action profile.</p> <p>A frame error is any frame error on the underlying physical layer. The frame period threshold is reached when the number of frame errors reaches the configured value within the period window. The default period window is the number of minimum-size frames that can be transmitted on the underlying physical layer in 1 second. The window is not configurable.</p>
Options	<p>count—Threshold count for frame period error events.</p> <p>Range: 0 through 100</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring Threshold Values for Local Fault Events on an Interface on page 38• Configuring Threshold Values for Fault Events in an Action Profile on page 31

frame-period-summary

Syntax	<code>frame-period-summary <i>count</i>;</code>
Hierarchy Level	[edit protocols oam ethernet link-fault-management event link-event-rate], [edit protocols oam ethernet link-fault-management interface <i>interface-name</i> event-thresholds]
Release Information	Statement introduced in Junos OS Release 9.4 for EX Series switches.
Description	<p>Configure the threshold value for sending frame period summary error events or taking the action specified in the action profile.</p> <p>An errored frame second is any 1-second period that has at least one errored frame. This event is generated if the number of errored frame seconds is equal to or greater than the specified threshold for that period.</p>
Options	<p><i>count</i>—Threshold count in seconds for frame period summary error events.</p> <p>Range: 1 through 100 seconds</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Ethernet OAM Link Fault Management on page 48


frame-period-summary

Syntax	<code>frame-period-summary count;</code>
Hierarchy Level	[edit protocols oam ethernet link-fault-management action-profile event link-event-rate], [edit protocols oam link-fault-management interface interface-name event-thresholds]
Release Information	Statement introduced in Junos OS Release 8.4.
Description	<p>Threshold for sending frame period summary error events or taking the action specified in the action profile.</p> <p>An errored frame second is any 1-second period that has at least one errored frame. This event is generated if the number of errored frame seconds is equal to or greater than the specified threshold for that period window. The default window is 60 seconds. The window is not configurable.</p>
Options	<p>count—Threshold count for frame period summary error events.</p> <p>Range: 0 through 100</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring Threshold Values for Local Fault Events on an Interface on page 38• Configuring Threshold Values for Fault Events in an Action Profile on page 31

hold-interval (OAM CFM, for EX Series Switch Only)

Syntax	<code>hold-interval <i>minutes</i>;</code>
Hierarchy Level	[edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> continuity-check]
Release Information	Statement introduced in Junos OS Release 10.2 for EX Series switches.
Description	Configure the time to wait before flushing the maintenance association end point (MEP) database, if no updates occur.
Options	<i>minutes</i> —Time to wait, in minutes.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Ethernet OAM Connectivity Fault Management (CLI Procedure) on page 57• Junos OS Network Interfaces Configuration Guide

hold-interval (OAM)

Syntax	<code>hold-interval <i>minutes</i>;</code>
Hierarchy Level	[edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> continuity-check]
Release Information	Statement introduced in Junos OS Release 8.4. Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.
Description	The time to wait in minutes before flushing the maintenance association end point (MEP) database, if no updates occur. The configurable range is 1 minute through 30240 minutes. The default value is 10 minutes.
<div>  <p>NOTE: Hold timer based flushing is applicable only for auto discovered remote MEPs and not for statically configured remote MEPs.</p> </div>	
Options	<i>minutes</i> —Time to wait, in minutes.
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"> • <i>Continuity Check Protocol Parameters Overview</i> • <i>Configuring Continuity Check Protocol Parameters for Fault Detection</i>

interface (OAM CFM, for EX Series Switch Only)

Syntax	<code>interface (<i>interface-name</i> ((<i>ge-</i> <i>xe-</i>) (<i>fpc/pic/port</i> <i>fpc/pic/port.unit-number</i> <i>fpc/pic/port.unit-number</i> <i>vlan</i> <i>vlan-id</i>)));</code>
Hierarchy Level	[edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> mep <i>mep-id</i>]
Release Information	Statement introduced in Junos OS Release 10.2 for EX Series switches.
Description	Configure IEEE 802.1ag Operation, Administration, and Management (OAM) Connectivity Fault Management (CFM) support for the specified interface.
Options	<i>interface-name</i> —Interface to which the MEP is attached. It can be a physical Ethernet interface or a logical interface. If the interface is a trunk interface, the VLAN associated with the interface must have a VLAN ID.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> Configuring Ethernet OAM Connectivity Fault Management (CLI Procedure) on page 57 Junos OS Network Interfaces Configuration Guide

interface (OAM Link-Fault Management)

List of Syntax	<p>Syntax: T, M, MX and ACX Series Routers, SRX Series Firewalls and EX Series Switches on page 1330</p> <p>Syntax: EX Series Switches and NFX Series Devices on page 1330</p>
<p>Syntax: T, M, MX and ACX Series Routers, SRX Series Firewalls and EX Series Switches</p>	<pre> interface <i>interface-name</i> { apply-action-profile <i>profile-name</i>; link-discovery (active passive); pdu-interval <i>interval</i>; pdu-threshold <i>threshold-value</i>; remote-loopback; event-thresholds { frame-error <i>count</i>; frame-period <i>count</i>; frame-period-summary <i>count</i>; symbol-period <i>count</i>; } negotiation-options { allow-remote-loopback; no-allow-link-events; } } </pre>
<p>Syntax: EX Series Switches and NFX Series Devices</p>	<pre> interface <i>interface-name</i> { link-discovery (active passive); pdu-interval <i>interval</i>; pdu-threshold <i>threshold-value</i>; remote-loopback; event-thresholds { frame-error <i>count</i>; frame-period <i>count</i>; frame-period-summary <i>count</i>; symbol-period <i>count</i>; } negotiation-options { allow-remote-loopback; no-allow-link-events; } } </pre>
Hierarchy Level	[edit protocols oam ethernet link-fault-management]
Release Information	<p>Statement introduced in Junos OS Release 8.2 for T, M, MX and ACX Series Routers, SRX Series firewalls and EX Series switches.</p> <p>Statement introduced in Junos OS Release 9.4 for EX Series switches and NFX Series devices.</p>

Description	<p>Configure Ethernet OAM link fault management (LFM) for all interfaces or for specific interfaces.</p> <p>For Ethernet interfaces on M320, MX Series, and T Series routers, configure IEEE 802.3ah Operation, Administration, and Management (OAM) support.</p>
Options	<p>interface <i>interface-name</i>—Interface to be enabled for IEEE 802.3ah link fault management OAM support.</p> <p>The remaining statements are described separately.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Enabling IEEE 802.3ah OAM Support on page 27• Example: Configuring Ethernet OAM Link Fault Management• Configuring Ethernet OAM Link Fault Management on page 48

interval (EX Series Switch Only)

Syntax	interval (10m 10s 1m 1s 100ms 10ms);
Hierarchy Level	[edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> continuity-check]
Release Information	Statement introduced in Junos OS Release 10.2 for EX Series switches.
Description	Configure the time between continuity check messages.
Options	<p>10m—10 minutes.</p> <p>10s—10 seconds.</p> <p>1m—1 minute.</p> <p>1s—1 second.</p> <p>100ms—100 milliseconds.</p> <p>10ms—10 milliseconds.</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring Ethernet OAM Connectivity Fault Management (CLI Procedure) on page 57• Junos OS Network Interfaces Configuration Guide

iteration-period

Syntax	<code>iteration-period <i>iteration-period-value</i>;</code>
Hierarchy Level	[edit protocols oam ethernet connectivity-fault-management performance-monitoring sla-iterator-profiles <i>profile-name</i>]
Release Information	Statement introduced in Junos OS Release 11.1. Statement introduced in Junos OS Release 11.4 for EX Series switches.
Description	Configure the iteration period, which is the maximum number of cycles per iteration (that is, the number of connections registered to an iterator cannot exceed this value).
Options	<i>iteration-period-value</i> —Maximum number of cycles per iteration. Range: 1 through 2000 Default: 2000
Required Privilege Level	Configure—To enter configuration mode. Control—To modify any configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring an Iterator Profile • Configuring an Iterator Profile on a Switch (CLI Procedure) on page 749

level (EX Series Switch Only)

Syntax	level <i>number</i> ;
Hierarchy Level	[edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i>]
Release Information	Statement introduced in Junos OS Release 10.2 for EX Series switches.
Description	Configure a number to be used in CFM messages to identify the maintenance association.
Options	number —Number used to identify the maintenance domain to which the CFM message belongs. Range: 0 through 7
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Ethernet OAM Connectivity Fault Management (CLI Procedure) on page 57• Junos OS Network Interfaces Configuration Guide

link-adjacency-loss

Syntax	link-adjacency-loss;
Hierarchy Level	[edit protocols oam ethernet link-fault-management action-profile event]
Release Information	Statement introduced in Junos OS Release 9.4 for EX Series switches.
Description	Configure loss of adjacency event with the IEEE 802.3ah link fault management (LFM) peer. When included, the loss of adjacency event triggers the action specified under the action statement.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Example: Configuring Ethernet OAM Link Fault Management• Configuring Ethernet OAM Link Fault Management on page 48

link-discovery

Syntax	link-discovery (active passive);
Hierarchy Level	[edit protocols oam ethernet link-fault-management interface <i>interface-name</i>]
Release Information	Statement introduced in Junos OS Release 9.4 for EX Series switches.
Description	Specify the discovery mode used for IEEE 802.3ah Operation, Administration, and Maintenance (OAM) link fault management (LFM) support. The discovery process is triggered automatically when OAM 802.3ah functionality is enabled on an interface. Link monitoring is done when the interface sends periodic OAM PDUs.
Options	<p><i>active</i>—In active mode, the interface discovers and monitors the peer on the link if the peer also supports IEEE 802.3ah OAM functionality.</p> <p><i>passive</i>—In passive mode, the peer initiates the discovery process.</p> <p>Once the discovery process is initiated, both sides participate in discovery.</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Ethernet OAM Link Fault Management on page 48

link-down

Syntax	link-down;
Hierarchy Level	[edit protocols oam ethernet link-fault-management action-profile <i>action</i>]
Release Information	Statement introduced in Junos OS Release 9.4 for EX Series switches.
Description	Mark the interface as down for transit traffic.
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Ethernet OAM Link Fault Management on page 48

link-event-rate

Syntax

```
link-event-rate {  
  frame-error count;  
  frame-period count;  
  frame-period-summary count;  
  symbol-period count;  
}
```

Hierarchy Level [edit protocols [oam ethernet link-fault-management action-profile event](#)]

Release Information Statement introduced in Junos OS Release 9.4 for EX Series switches.

Description Configure the number of link fault management (LFM) events per second.
The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Configuring Ethernet OAM Link Fault Management on page 48](#)

link-fault-management

```
Syntax link-fault-management {
    action-profile profile-name;
    action {
        syslog;
        link-down;
    }
    event {
        link-adjacency-loss;
        link-event-rate {
            frame-error count;
            frame-period count;
            frame-period-summary count;
            symbol-period count;
        }
    }
    interface interface-name {
        link-discovery (active | passive);
        pdu-interval interval;
        pdu-threshold threshold-value;
        remote-loopback;
        event-thresholds {
            frame-error count;
            frame-period count;
            frame-period-summary count;
            symbol-period count;
        }
        negotiation-options {
            allow-remote-loopback;
            no-allow-link-events;
        }
    }
}
```

Hierarchy Level [edit protocols [oam](#) [ethernet](#)]

Release Information Statement introduced in Junos OS Release 9.4 for EX Series switches.

Description Configure Ethernet OAM link fault management (LFM) for all interfaces or for specific interfaces.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- *Example: Configuring Ethernet OAM Link Fault Management*
- [Configuring Ethernet OAM Link Fault Management on page 48](#)

negotiation-options

Syntax	<pre>negotiation-options { allow-remote-loopback; no-allow-link-events; }</pre>
Hierarchy Level	[edit protocols oam ethernet link-fault-management interface <i>interface-name</i>]
Release Information	Statement introduced in Junos OS Release 9.4 for EX Series switches.
Description	<p>Enable and disable IEEE 802.3ah Operation, Administration, and Maintenance (OAM) link fault management (LFM) features for Ethernet interfaces.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Ethernet OAM Link Fault Management on page 48

no-allow-link-events

Syntax	<pre>no-allow-link-events;</pre>
Hierarchy Level	[edit protocols oam ethernet link-fault-management interface <i>interface-name</i> negotiation-options]
Release Information	Statement introduced in Junos OS Release 9.4 for EX Series switches.
Description	Disable the sending of link event TLVs.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Ethernet OAM Link Fault Management on page 48

oam

```

Syntax  oam {
        ethernet {
            connectivity-fault-management {
                action-profile profile-name {
                    action {
                        interface-down;
                    }
                    default-actions {
                        interface-down;
                    }
                    event {
                        adjacency-loss;
                    }
                }
            }
            linktrace {
                age (30m | 10m | 1m | 30s | 10s);
                path-database-size path-database-size;
            }
            maintenance-domain domain-name {
                level number;
                mip-half-function (none | default | explicit);
                name-format (character-string | none | dns | mac+2oct);
                maintenance-association ma-name {
                    continuity-check {
                        hold-interval minutes;
                        interface-status-tlv;
                        interval (10m | 10s | 1m | 1s | 100ms);
                        loss-threshold number;
                        port-status-tlv;
                    }
                    mep mep-id {
                        auto-discovery;
                        direction down;
                        interface interface-name;
                        remote-mep mep-id {
                            action-profile profile-name;
                        }
                    }
                }
            }
        }
        performance-monitoring {
            sla-iterator-profiles {
                profile-name {
                    calculation-weight {
                        delay delay-value;
                        delay-variation delay-variation-value;
                    }
                    cycle-time cycle-time-value;
                    iteration-period iteration-period-value;
                    measurement-type two-way-delay;
                    passive;
                }
            }
        }
    }

```

```

    }
  }
}
link-fault-management {
  action-profile profile-name;
  action {
    syslog;
    link-down;
  }
  event {
    link-adjacency-loss;
    link-event-rate {
      frame-error count;
      frame-period count;
      frame-period-summary count;
      symbol-period count;
    }
  }
}
interface interface-name {
  link-discovery (active | passive);
  pdu-interval interval;
  pdu-threshold threshold-value;
  remote-loopback;
  event-thresholds {
    frame-error count;
    frame-period count;
    frame-period-summary count;
    symbol-period count;
  }
  negotiation-options {
    allow-remote-loopback;
    no-allow-link-events;
  }
}
}
}
}

```

Hierarchy Level [edit protocols]

Release Information Statement introduced in Junos OS Release 9.4 for EX Series switches.
connectivity-fault-management introduced in Junos OS Release 10.2 for EX Series switches.

Description Provide IEEE 802.3ah Operation, Administration, and Maintenance (OAM) link fault management (LFM) support for Ethernet interfaces on EX Series switches or configure connectivity fault management (CFM) for IEEE 802.1ag Operation, Administration, and Management (OAM) support on the switches.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Example: Configuring Ethernet OAM Link Fault Management](#)
- [Example: Configuring Ethernet OAM Connectivity Fault Management on EX Series Switches on page 44](#)
- [Configuring Ethernet OAM Link Fault Management on page 48](#)
- [Configuring Ethernet OAM Connectivity Fault Management \(CLI Procedure\) on page 57](#)

path-database-size (EX Series Switch Only)

Syntax `path-database-size path-database-size;`

Hierarchy Level [edit protocols **oam** **ethernet connectivity-fault-management** linktrace]

Release Information Statement introduced in Junos OS Release 10.2 for EX Series switches.

Description Specify the number of linktrace reply entries to be stored per linktrace request.

Options *path-database-size*—Database size (number of entries stored per request).
Range: 1 through 500
Default: 100

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

Related Documentation

- [Configuring Ethernet OAM Connectivity Fault Management \(CLI Procedure\) on page 57](#)
- [Junos OS Network Interfaces Configuration Guide](#)

pdu-interval

Syntax	<code>pdu-interval <i>interval</i>;</code>
Hierarchy Level	<code>[edit protocols oam ethernet link-fault-management interface <i>interface-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 8.2 for MX, M, T, ACX, Series routers, SRX Series firewalls, and EX Series Switches. Statement introduced in Junos OS Release 9.4 for EX Series switches.
Description	For Ethernet interfaces on EX Series switches and M320, M120, MX Series, and T Series routers, specify the periodic OAM PDU sending interval for fault detection. Used for IEEE 802.3ah Operation, Administration, and Management (OAM) support.
Options	interval —Periodic OAM PDU sending interval. Range: For MX, M, T, ACX, Series routers, SRX Series firewalls and EX Series switches – 100 through 1000 milliseconds Default: For EX Series switches –1000 milliseconds
Required Privilege Level	<code>interface</code> —To view this statement in the configuration. <code>interface-control</code> —To add this statement to the configuration. <code>routing</code> —To view this statement in the configuration. <code>routing-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the OAM PDU Interval on page 28• Example: Configuring Ethernet OAM Link Fault Management• Configuring Ethernet OAM Link Fault Management on page 48

pdu-threshold

Syntax	<code>pdu-threshold <i>threshold-value</i>;</code>
Hierarchy Level	<code>[edit protocols oam ethernet link-fault-management interface <i>interface-name</i>]</code>
Release Information	<p>Statement introduced in Junos OS Release 8.2 for T, M, MX and ACX Series routers, SRX Series firewalls and EX Series switches.</p> <p>Statement introduced in Junos OS Release 9.4 for EX Series switches and NFX Series devices.</p>
Description	<p>Configure how many protocol data units (PDUs) are missed before declaring the peer lost in Ethernet OAM link fault management (LFM) for all interfaces or for specific interfaces.</p> <p>For Ethernet interfaces on EX Series switches and M320, M120, MX Series, and T Series routers, specify the number of OAM PDUs to miss before an error is logged. Used for IEEE 802.3ah Operation, Administration, and Management (OAM) support.</p>
Options	<p><i>threshold-value</i>—The number of PDUs missed before declaring the peer lost.</p> <p>Range: 3 through 10 PDUs</p> <p>Default: 3 PDUs</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the OAM PDU Threshold on page 29 • Configuring Ethernet OAM Link Fault Management on page 48

performance-monitoring (OAM LFM)

```
Syntax performance-monitoring {
  sla-iterator-profiles {
    profile-name {
      calculation-weight {
        delay delay-value;
        delay-variation delay-variation-value;
      }
      cycle-time cycle-time-value;
      iteration-period iteration-period-value;
      measurement-type two-way-delay;
      passive;
    }
  }
}
```

Hierarchy Level [edit protocols [oam ethernet connectivity-fault-management](#)]

Release Information Statement introduced in Junos OS Release 11.4 for EX Series switches.

Description Specify performance monitoring support for Ethernet frame delay measurement.
The remaining statements are explained separately. See [CLI Explorer](#).

Required Privilege Level Configure—To enter configuration mode.
Control—To modify any configuration.

Related Documentation

- [Configuring MEP Interfaces on Switches to Support Ethernet Frame Delay Measurements \(CLI Procedure\) on page 747](#)
- [Configuring One-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\) on page 748](#)
- [Configuring Two-Way Ethernet Frame Delay Measurements on Switches \(CLI Procedure\) on page 752](#)

protocol-down

Syntax	protocol-down;
Hierarchy Level	[edit protocols oam ethernet link-fault-management event]
Release Information	Statement introduced in JUNOS Release 9.4 for EX-series switches.
Description	Configure the upper layer indication of a protocol down event. When the protocol-down statement is included, the protocol down event triggers the action specified under the action statement.
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"> • <i>Example: Configuring Ethernet OAM Link Fault Management</i> • Configuring Ethernet OAM Link Fault Management on page 48

protocol-down

Syntax	protocol-down;
Hierarchy Level	[edit protocols oam ethernet link-fault-management action-profile event]
Release Information	Statement introduced in Junos OS Release 8.5.
Description	Upper layer indication of protocol down event. When the protocol-down statement is included, the protocol down event triggers the action specified under the action statement.
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"> • Configuring an OAM Action Profile on page 30

remote-loopback

Syntax	remote-loopback;
Hierarchy Level	[edit protocols oam ethernet link-fault-management interface <i>interface-name</i>]
Release Information	Statement introduced in Junos OS Release 9.4 for EX Series switches.
Description	Set the data terminal equipment (DTE) in loopback mode. Remove the statement from the configuration to take the DTE out of loopback mode. It is used for IEEE 802.3ah Operation, Administration, and Maintenance (OAM) link fault management (LFM) support.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• <i>Example: Configuring Ethernet OAM Link Fault Management</i>• Configuring Ethernet OAM Link Fault Management on page 48

remote-mep (EX Series Switch Only)

Syntax	<pre>remote-mep mep-id { action-profile profile-name; }</pre>
Hierarchy Level	[edit protocols oam ethernet connectivity-fault-management maintenance-domain domain-name maintenance-association ma-name mep mep-id]
Release Information	Statement introduced in Junos OS Release 10.2 for EX Series switches.
Description	Specify the numeric identifier of the remote maintenance association end point (MEP) within the maintenance association.
Options	<p>mep-id—Specify the numeric identifier of the MEP.</p> <p>Range: 1 through 8191</p> <p>The remaining statement is explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Ethernet OAM Connectivity Fault Management (CLI Procedure) on page 57 • Junos OS Network Interfaces Configuration Guide

send-critical-event

Syntax	<pre>send-critical-event;</pre>
Hierarchy Level	[edit protocols oam ethernet link-fault-management action-profile action]
Release Information	Statement introduced in Junos OS Release 8.5.
Description	Send OAM PDUs with the critical event bit set.
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Specifying the Actions to Be Taken for Link-Fault Management Events on page 41

sla-iterator-profiles (OAM LFM)

Syntax	<pre>sla-iterator-profiles { profile-name { calculation-weight { delay delay-value; delay-variation delay-variation-value; } cycle-time cycle-time-value; iteration-period iteration-period-value; measurement-type two-way-delay; passive; } }</pre>
Hierarchy Level	[edit protocols oam ethernet connectivity-fault-management performance-monitoring]
Release Information	Statement introduced in Junos OS Release 11.4 for EX Series switches.
Description	Configure an iterator application and specify the iterator profile options.
Options	<p><i>profile-name</i>—Name of the iterator profile.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	Configure—To enter configuration mode. Control—To modify any configuration.
Related Documentation	<ul style="list-style-type: none">Configuring an Iterator Profile on a Switch (CLI Procedure) on page 749

symbol-period

Syntax	<code>symbol-period <i>count</i>;</code>
Hierarchy Level	<p>[edit protocols oam ethernet link-fault-management action-profile; event link-event-rate]</p> <p>,</p> <p>[edit protocols oam ethernet link-fault-management interface <i>interface-name</i> event-thresholds]</p>
Release Information	Statement introduced in Junos OS Release 9.4 for EX Series switches.
Description	<p>Configure the threshold for sending symbol period events or taking the action specified in the action profile.</p> <p>Symbol code errors occur on the underlying physical layer. The symbol period threshold is reached when the number of symbol errors reaches the configured value within the period. You cannot configure the default value to a different value.</p>
Options	<p><i>count</i>—Threshold count in seconds for symbol period events.</p> <p>Range: 1 through 100 seconds</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Ethernet OAM Link Fault Management on page 48

syslog (OAM Action)

Syntax	syslog;
Hierarchy Level	[edit protocols oam ethernet link-fault-management action-profile action]
Release Information	<p>Statement introduced in Junos OS Release 8.5 for T, M, MX and ACX Series routers, SRX Series firewalls and EX Series switches.</p> <p>Statement introduced in Junos OS Release 9.4 for EX Series switches and NFX Series devices.</p>
Description	<p>Generate a syslog message for the Ethernet Operation, Administration, and Management (OAM) event.</p> <p>Generate a system log message for the Ethernet Operation, Administration, and Maintenance (OAM) link fault management (LFM) event.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Specifying the Actions to Be Taken for Link-Fault Management Events on page 41• Configuring Ethernet OAM Link Fault Management on page 48

traceoptions (Individual Interfaces)

List of Syntax	Syntax (Individual interfaces with PTX Series, EX Series, ACX Series) on page 1351 Syntax (Individual interfaces with QFX Series, OCX1100, EX4600, NFX Series) on page 1351 Syntax (OAMLFM with EX Series, QFX Series, NFX Series) on page 1351 Syntax (Interface process with ACX Series, SRX Series, MX Series, M Series, T Series) on page 1351
Syntax (Individual interfaces with PTX Series, EX Series, ACX Series)	<pre>traceoptions { file <i>filename</i> <files <i>name</i>> <size <i>size</i>> <world-readable no-world-readable>; flag <i>flag</i>; match; }</pre>
Syntax (Individual interfaces with QFX Series, OCX1100, EX4600, NFX Series)	<pre>traceoptions { flag <i>flag</i>; }</pre>
Syntax (OAMLFM with EX Series, QFX Series, NFX Series)	<pre>traceoptions { file <i>filename</i> <files <i>number</i>> <match <i>regex</i>> <size <i>size</i>> <world-readable no-world-readable>; flag <i>flag</i> ; no-remote-trace; }</pre>
Syntax (Interface process with ACX Series, SRX Series, MX Series, M Series, T Series)	<pre>traceoptions { file <<i>filename</i>> <files <i>number</i>> <match <i>regular-expression</i>> <size <i>size</i>> <world-readable no-world-readable>; flag <i>flag</i> <disable>; no-remote-trace; }</pre>
Hierarchy Level (Individual interfaces with PTX Series, EX Series, ACX Series, QFX Series, OCX1100, EX4600, NFX Series)	[edit interfaces <i>interface-name</i>]
Hierarchy Level (Interface process with ACX Series, SRX Series, MX Series, M Series, T Series)	[edit interfaces]

- Release Information** 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 Metro Routers.
Statement introduced in Junos OS Release 9.0 for EX Series switches.
Statement introduced in JUNOS Release 10.2 for EX Series switches.
Statement introduced in Junos OS Release 11.1 for the QFX Series.
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
- Description** Define tracing operations for individual interfaces.
- To specify more than one tracing operation, include multiple **flag** statements.
- The interfaces **traceoptions** statement does not support a trace file. The logging is done by the kernel, so the tracing information is placed in the system **syslog** file in the directory */var/log/dcd*.
- On EX Series, QFX Series, and NFX Series platforms, configure tracing options the link fault management.
- On ACX Series, SRX Series, MX Series, M Series, and T Series platforms define tracing operations for the interface process (dcd).
- Default** If you do not include this statement, no interface-specific tracing operations are performed.

Options [Table 219 on page 1354](#) lists options for traceoption command for the following platforms:

Table 219: Options for traceoptions

Option	Individual interfaces with PTX Series, ACX Series, EX Series	Individual interfaces with QFX Series, QFabric System, OCX1100, EX4600, NFX Series	Interface Process with OAMLFM with EX Series, QFX Series, NFX Series	Interface process with ACX Series, SRX Series, MX Series, M Series, T Series
file filename	—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <code>/var/log/dcd</code> . By default, interface process tracing output is placed in the file.		—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <code>/var/log/dcd</code> .	—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <code>/var/log/dcd</code> . By default, interface process tracing output is placed in the file <code>dcd</code> .
files number	—(Optional) Maximum number of trace files. When a trace file named <code>trace-file</code> reaches its maximum size, it is renamed trace-file.0 , then trace-file.1 , and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.		—(Optional) Maximum number of trace files. When a trace file named <code>trace-file</code> reaches its maximum size, it is renamed <code>trace-file.0</code> , then <code>trace-file.1</code> , and so on, until the maximum <code>xk</code> to specify KB, <code>xm</code> to specify MB, or <code>xg</code> to specify GB number of trace files is reached. Then the oldest trace file is overwritten. If you specify a maximum number of files, you also must specify a maximum file size with the <code>size</code> option.	—(Optional) Maximum number of trace files. When a trace file named trace-file reaches its maximum size, it is renamed trace-file.0 , then trace-file.1 , and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten. If you specify a maximum number of files, you also must specify a maximum file size with the <code>size</code> option. <i>Range: 2 through 1000</i> <i>Default: 3 files</i>
flag	—Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements. The following are the interface-specific tracing options. <ul style="list-style-type: none"> all—All interface tracing operations event—Interface events ipc—Interface interprocess 	—Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements. The following are the interface-specific tracing options. <ul style="list-style-type: none"> all—All interface tracing operations event—Interface events ipc—Interface interprocess 	—Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements. You can include the following flags: <ul style="list-style-type: none"> action-profile—Trace action profile invocation events. all—Trace all events. configuration—Trace configuration events. protocol—Trace 	—Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements. You can include the following flags: <ul style="list-style-type: none"> all change-events—Log changes that produce configuration events config-states—Log the configuration

Table 219: Options for traceoptions (continued)

Option	Individual interfaces with PTX Series, ACX Series, EX Series	Individual interfaces with QFX Series, QFabric System, OCX1100, EX4600, NFX Series	Interface Process with OAMLFM with EX Series, QFX Series, NFX Series	Interface process with ACX Series, SRX Series, MX Series, M Series, T Series
	communication (IPC) messages <ul style="list-style-type: none"> • media—Interface media changes • q921—Trace ISDN Q.921 frames • q931—Trace ISDN Q.931 frames 	communication (IPC) messages <ul style="list-style-type: none"> • media—Interface media changes • q921—Trace ISDN Q.921 frames • q931—Trace ISDN Q.931 frames 	protocol processing events. <ul style="list-style-type: none"> • routing socket—Trace routing socket events. 	state machine changes <ul style="list-style-type: none"> • kernel—Log configuration IPC messages to kernel • kernel-detail—Log details of configuration messages to kernel
match	—(Optional) Regular expression for lines to be traced.		—(Optional) Refine the output to log only those lines that match the given regular expression.	
size size	—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named trace-file reaches this size, it is renamed trace-file.0 . When the trace-file again reaches its maximum size, trace-file.0 is renamed trace-file.1 and trace-file is renamed trace-file.0 . This renaming scheme continues until the maximum number of trace files is reached. Then, the oldest trace file is overwritten.		—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named trace-file reaches its maximum size, it is renamed trace-file.0 , then trace-file.1 , and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten. If you specify a maximum number of files, you also must specify a maximum file size with the files option. <p><i>Syntax:</i> xk to specify KB, xm to specify MB, or xg to specify GB</p> <p><i>Range:</i> 10 KB through 1 GB</p> <p><i>Default:</i> 128 KB</p> <p><i>Default:</i> If you do not include this option, tracing output is appended to an existing trace file.</p>	

Table 219: Options for traceoptions (continued)

Option	Individual interfaces with PTX Series, ACX Series, EX Series	Individual interfaces with QFX Series, QFabric System, OCX1100, EX4600, NFX Series	Interface Process with OAMLFM with EX Series, QFX Series, NFX Series	Interface process with ACX Series, SRX Series, MX Series, M Series, T Series
				<p>—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named trace-file reaches this size, it is renamed trace-file.0. When the trace-file again reaches its maximum size, trace-file.0 is renamed trace-file.1 and trace-file is renamed trace-file.0. This renaming scheme continues until the maximum number of trace files is reached. Then, the oldest trace file is overwritten. If you specify a maximum file size, you also must specify a maximum number of trace files with the files option.</p> <p><i>Syntax:</i> xk to specify kilobytes, xm to specify megabytes, or xg to specify gigabytes</p> <p><i>Range:</i> 10 KB through the maximum file size supported on your router</p> <p><i>Default:</i> 1 MB</p>
no-world-readable	—(Optional) Prevent any user from reading the log file.		—(Optional) Restrict file access to the user who created the file.	—(Optional) Disallow any user to read the log file.
world-readable	—(Optional) Allow any user to read the log file.		—(Optional) Enable unrestricted file access.	—(Optional) Allow any user to read the log file.
disable				

Table 219: Options for traceoptions (continued)

Option	Individual interfaces with PTX Series, ACX Series, EX Series	Individual interfaces with QFX Series, QFabric System, OCX1100, EX4600, NFX Series	Interface Process with OAMLFM with EX Series, QFX Series, NFX Series	Interface process with ACX Series, SRX Series, MX Series, M Series, T Series
				—(Optional) Disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as all .
no-remote-trace			—(Optional) Disable the remote trace.	-
match <i>regex</i>				—(Optional) Refine the output to include only those lines that match the given regular expression.

Required Privilege Level

interface—To view this statement in the configuration.
 interface-control—To add this statement to the configuration.
 routing—To view this statement in the configuration.
 routing-control—To add this statement to the configuration.

- Related Documentation**
- *Tracing Operations of an Individual Router Interface*
 - *Tracing Operations of an Individual Router or Switch Interface*
 - *Example: Configuring Ethernet OAM Link Fault Management*
 - [Configuring Ethernet OAM Link Fault Management on page 48](#)
 - *Tracing Operations of the Interface Process*

version-ipfix (Services)

Syntax	<pre> version-ipfix { template <i>template-name</i> { flow-active-timeout <i>seconds</i>; flow-inactive-timeout <i>seconds</i>; flow-key { flow-direction; vlan-id; output-interface; } (<i>ipv4-template</i> <i>ipv6-template</i> <i>mpls-ipv4-template</i> <i>mpls-ipvx-template</i> <i>vpls-template</i>); nexthop-learning (enable disable); observation-domain-id option-refresh-rate <i>packets packets seconds seconds</i>; options-template-id template-id template-refresh-rate <i>packets packets seconds seconds</i>; tunnel-observation [<i>ipv4</i> <i>ipv6</i> <i>mpls-over-udp</i>]; } } </pre>
Hierarchy Level	[edit services flow-monitoring]
Release Information	<p>Statement introduced in Junos OS Release 10.2.</p> <p>Statement introduced in Junos OS Release 12.R3 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 15.1F4 for PTX Series routers with third-generation FPCs installed.</p> <p>Statement introduced in Junos OS Release 17.2R1 for QFX10002 switches.</p> <p>Statement introduced in Junos OS Release 17.4R1 for QFX10008 and QFX10016 switches.</p>
Description	<p>Specify the IPFIX output template properties to support flow monitoring.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> <i>Configuring Inline Active Flow Monitoring Using Routers, Switches or NFX250</i> <i>Configuring Flow Aggregation to Use IPFIX Flow Templates on MX, vMX and T Series Routers, EX Series Switches and NFX250</i> <i>Configuring Inline Active Flow Monitoring on PTX Series Routers</i>

CHAPTER 60


Configuration Statements: sFlow Technology

- [adaptive-sample-rate](#) on page 1360
- [agent-id](#) on page 1361
- [agent-id \(QFX Series\)](#) on page 1362
- [collector](#) on page 1363
- [collector \(QFX Series sFlow Technology\)](#) on page 1364
- [disable \(sFlow Monitoring Technology\)](#) on page 1365
- [interfaces \(sFlow\)](#) on page 1366
- [interfaces \(sFlow\)](#) on page 1368
- [polling-interval](#) on page 1369
- [polling-interval \(QFX Series\)](#) on page 1370
- [sample-rate](#) on page 1371
- [sample-rate \(QFX Series\)](#) on page 1372
- [sflow \(QFX Series\)](#) on page 1373
- [sflow](#) on page 1375
- [source-ip](#) on page 1378
- [source-ip \(QFX Series\)](#) on page 1379
- [traceoptions \(sFlow Technology\)](#) on page 1380
- [udp-port](#) on page 1382
- [udp-port \(QFX Series\)](#) on page 1383

adaptive-sample-rate

Syntax	<pre>adaptive-sample-rate rate { fallback; sample-limit-threshold; }</pre>
Hierarchy Level	[edit protocols sflow]
Release Information	<p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 18.1R1 for MX Series routers.</p> <p>Statement introduced in Junos OS Release 18.2R1 for PTX Series routers.</p> <p>Statement introduced in Junos OS Release 18.3R1 for QFX Series switches.</p>
Description	<p>Configure and back up the adaptive sampling rate in sFlow monitoring technology configurations.</p> <p>Switches use adaptive sampling to ensure both sampling accuracy and efficiency. Adaptive sampling is a process of monitoring the overall incoming traffic rate on the network device and providing intelligent feedback to interfaces to dynamically adapt the sampling rates on interfaces on the basis of traffic conditions.</p> <p>This statement is supported on EX Series switches that run Junos OS with Enhanced Layer 2 Software (ELS).</p>
Default	sFlow technology is disabled by default.
Options	<p><i>rate</i>—Include the rate in the range of 300 through 950 pps.</p> <p><i>fallback</i>—Use to back up the sampling rate to the previously configured sampling rate.</p> <p><i>sample-limit-threshold</i>—Explicitly specify the threshold value in packets per second (pps) for each FPC.</p> <p>Range: 0 through 2400 pps. The default is 150 pps.</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • sflow on page 1375 • show sflow interface (QFX Series) on page 1919 • Understanding How to Use sFlow Technology for Network Monitoring on page 546 • Example: Monitoring Network Traffic Using sFlow Technology on page 569

agent-id

List of Syntax	Syntax (EX Series, PTX Series) on page 1361 Syntax (MX Series) on page 1361
Syntax (EX Series, PTX Series)	<code>agent-id <i>ip-address</i>;</code>
Syntax (MX Series)	<code>agent-id (<i>ipv4-address</i> inet6 <i>ipv6-address</i>);</code>
Hierarchy Level	[edit protocols sflow]
Release Information	<p>Statement introduced in Junos OS Release 10.2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 18.1R1 for MX Series routers.</p> <p>Statement introduced in Junos OS Release 18.2R1 for PTX Series routers.</p>
Description	Configure the IP address to be assigned as the agent ID for the sFlow agent. By assigning an IP address, you ensure that the IP address is not dynamic. You can specify an IPv4 or IPv6 address.
<div>  <p>NOTE: Only IPv4 is supported for PTX Series routers at the current time.</p> </div>	
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Configuring sFlow Technology for Network Monitoring (CLI Procedure) on page 565

agent-id (QFX Series)

Syntax	<code>agent-id <i>ip-address</i>;</code>
Hierarchy Level	<code>[edit protocols sflow]</code>
Release Information	Statement introduced in Junos OS Release 11.3 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure the IP address of the sFlow agent. If you do not configure the sFlow agent ID, the IP address for the agent is dynamically created using the IP address of an interface configured on the QFX Series device.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring sFlow Technology on page 567• sflow on page 1373

collector

Syntax	<pre>collector { (ip4-address ipv6-address); udp-port port-number; }</pre>
Hierarchy Level	[edit protocols sflow]
Release Information	<p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 18.1R1 for MX Series routers.</p> <p>Statement introduced in Junos OS Release 18.2R1 for PTX Series routers.</p>
Description	<p>Configure a remote collector for sFlow network traffic monitoring. The device sends sFlow UDP datagrams to this collector for analysis. You can configure up to four collectors on the device. You configure a collector by specifying its IP address and a UDP port.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Default	The default port is 6343.
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches on page 555 • Configuring sFlow Technology for Network Monitoring (CLI Procedure) on page 565 • Example: Configuring sFlow Technology to Monitor Network Traffic on MX Series Routers on page 560

collector (QFX Series sFlow Technology)

Syntax	<pre>collector <i>ip-address</i> { <i>udp-port (QFX Series) port-number</i>; }</pre>
Hierarchy Level	[edit protocols sflow]
Release Information	<p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p>Statement introduced in Junos OS Release 17.2R1 for the ACX5000 line of routers.</p>
Description	<p>Configure a remote collector for sFlow network traffic monitoring. The device sends sFlow UDP datagrams to the configured collector for analysis. You can configure up to four collectors on the device. You specify the IP address for each collector you configure.</p> <p>The remaining statement is explained separately. See CLI Explorer.</p>
Options	<p><i>ip-address</i>—IP address of the collector.</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring sFlow Technology on page 567• Example: Monitoring Network Traffic Using sFlow Technology on page 569

disable (sFlow Monitoring Technology)

Syntax	<code>disable;</code>
Hierarchy Level	[edit protocols sflow], [edit protocols sflow interfaces <i>interface-name</i>]
Release Information	Statement introduced in Junos OS Release 9.3 for EX Series switches. Statement introduced in Junos OS Release 18.1R1 for MX Series routers.
Description	Disable the sFlow monitoring protocol on all interfaces on the switch or on the specified interface.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches on page 555• Configuring sFlow Technology for Network Monitoring (CLI Procedure) on page 565• Example: Configuring sFlow Technology to Monitor Network Traffic on MX Series Routers on page 560

interfaces (sFlow)

List of Syntax [Syntax: ACX Routers, OCX1100, EX4600 and QFX Switches on page 1366](#)
[Syntax: EX Series Switches, PTX Routers on page 1366](#)

Syntax: ACX Routers, OCX1100, EX4600 and QFX Switches

```
interfaces interface-name {
  polling-interval seconds;
  sample-rate (QFX Series) number;
}
```

Syntax: EX Series Switches, PTX Routers

```
interfaces interface-name {
  polling-interval seconds;
  sample-rate {
    egress number;
    ingress number;
  }
}
```

Hierarchy Level [\[edit protocols sflow \(QFX Series\)\]](#)

Release Information

Statement introduced in Junos OS Release 9.3 for EX Series switches.
 Statement introduced in Junos OS Release 11.3 for the QFX Series.
 Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
 Statement introduced in Junos OS Release 17.2R1 for the ACX5000 line of routers.
 Statement introduced in Junos OS Release 18.1R1 for MX Series routers.
 Statement introduced in Junos OS Release 18.2R1 for PTX Series routers.

Description

Configure sFlow network traffic monitoring on the specified interface on the device. You can configure sFlow parameters such as polling interval and sampling rate with different values on different interfaces, and you can also disable sFlow monitoring on individual interfaces.

The remaining statements are explained separately. See [CLI Explorer](#).

Options

interface-name—Name of the interface on which to configure sFlow parameters.

Required Privilege Level

routing—To view this statement in the configuration.
 routing-control—To add this statement to the configuration.

Related Documentation

- [Configuring sFlow Technology on page 567](#)
- [Example: Monitoring Network Traffic Using sFlow Technology on page 569](#)
- [Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches on page 555](#)
- [Configuring sFlow Technology for Network Monitoring \(CLI Procedure\) on page 565](#)

- [Example: Configuring sFlow Technology to Monitor Network Traffic on MX Series Routers on page 560](#)

interfaces (sFlow)

List of Syntax [Syntax: ACX Routers, OCX1100, EX4600 and QFX Switches on page 1368](#)
[Syntax: EX Series Switches, PTX Routers on page 1368](#)

Syntax: ACX Routers, OCX1100, EX4600 and QFX Switches

```
interfaces interface-name {
  polling-interval seconds;
  sample-rate (QFX Series) number;
}
```

Syntax: EX Series Switches, PTX Routers

```
interfaces interface-name {
  polling-interval seconds;
  sample-rate {
    egress number;
    ingress number;
  }
}
```

Hierarchy Level [\[edit protocols sflow \(QFX Series\)\]](#)

Release Information Statement introduced in Junos OS Release 9.3 for EX Series switches.
 Statement introduced in Junos OS Release 11.3 for the QFX Series.
 Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
 Statement introduced in Junos OS Release 17.2R1 for the ACX5000 line of routers.
 Statement introduced in Junos OS Release 18.1R1 for MX Series routers.
 Statement introduced in Junos OS Release 18.2R1 for PTX Series routers.

Description Configure sFlow network traffic monitoring on the specified interface on the device. You can configure sFlow parameters such as polling interval and sampling rate with different values on different interfaces, and you can also disable sFlow monitoring on individual interfaces.

The remaining statements are explained separately. See [CLI Explorer](#).

Options *interface-name*—Name of the interface on which to configure sFlow parameters.

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

Related Documentation

- [Configuring sFlow Technology on page 567](#)
- [Example: Monitoring Network Traffic Using sFlow Technology on page 569](#)
- [Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches on page 555](#)
- [Configuring sFlow Technology for Network Monitoring \(CLI Procedure\) on page 565](#)

- [Example: Configuring sFlow Technology to Monitor Network Traffic on MX Series Routers on page 560](#)

polling-interval

Syntax	<code>polling-interval seconds;</code>
Hierarchy Level	<code>[edit protocols sflow],</code> <code>[edit protocols sflow interfaces <i>interface-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 9.3 for EX Series switches. Statement introduced in Junos OS Release 18.1R1 for MX Series routers. Statement introduced in Junos OS Release 18.2R1 for PTX Series routers.
Description	Configure the interval (in seconds) that the device waits between port statistics update messages. <i>Polling</i> refers to the device gathering various statistics for the network interfaces configured for sFlow monitoring and exporting the statistics to the configured sFlow collector.
Default	If no polling interval is configured for a particular interface, the device waits the number of seconds that is configured as the polling interval in the global sFlow configuration. If no polling interval is specified in the global configuration, the device waits 20 seconds between messages.
Options	<i>seconds</i> —Number of seconds between port statistics update messages. A value of 0 (zero) specifies that polling is disabled. Range: 0 through 3600 seconds Default: 20 seconds
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring sFlow Technology for Network Monitoring (CLI Procedure) on page 565 • Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches on page 555 • Example: Configuring sFlow Technology to Monitor Network Traffic on MX Series Routers on page 560

polling-interval (QFX Series)

Syntax	<code>polling-interval <i>seconds</i>;</code>
Hierarchy Level	<code>[edit protocols sflow (QFX Series)],</code> <code>[edit protocols sflow (QFX Series) interfaces <i>interface-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.3 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. Statement introduced in Junos OS Release 17.2R1 for the ACX5000 line of routers.
Description	Configure the rate (in seconds) at which successive samples of interface statistics (counters) are taken.
Default	If no polling interval is configured for a particular interface, the device uses the global polling interval configured at the <code>[edit protocols sflow]</code> hierarchy level. If no global interval is configured, the device uses the default polling interval of 20 seconds.
Options	<i>seconds</i> —Number of seconds between successive samples of interface statistics. Specifying a value of 0 (zero) disables the polling. Range: 0 through 3600 seconds
Required Privilege Level	<code>routing</code> —To view this statement in the configuration. <code>routing-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring sFlow Technology on page 567• Example: Monitoring Network Traffic Using sFlow Technology on page 569

sample-rate

Syntax	<pre>sample-rate { egress <i>number</i>; ingress <i>number</i>; }</pre>
Hierarchy Level	[edit protocols sflow], [edit protocols sflow interfaces <i>interface-name</i>]
Release Information	<p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>The option <i>number</i> (which immediately followed sample-rate) is no longer available and options egress <i>number</i> and ingress <i>number</i> added in Junos OS Release 10.4 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 18.1R1 for MX Series routers.</p> <p>Statement introduced in Junos OS Release 18.2R1 for PTX Series routers.</p>
Description	<p>Specify the number of egress or ingress packets out of which one packet is sampled. If no interface sampling rates are configured, the global sampling rates take effect. If neither is configured, by default both ingress and egress packet sampling are disabled.</p>
Default	<p>By default, both egress and ingress sampling rates are disabled.</p>
Options	<p>egress <i>number</i>—Value for egress sampling rate. Range: 100 through 1,073,741,823</p> <p>ingress <i>number</i>—Value for ingress sampling rate. Range: 100 through 1,073,741,823</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring sFlow Technology for Network Monitoring (CLI Procedure) on page 565 • Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches on page 555

sample-rate (QFX Series)

Syntax	<code>sample-rate <i>number</i>;</code>
Hierarchy Level	<code>[edit protocols sflow (QFX Series)],</code> <code>[edit protocols sflow (QFX Series) interfaces <i>interface-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.3 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. Statement introduced in Junos OS Release 17.2R1 for the ACX5000 line of routers.
Description	Specify the denominator (<i>number</i>) of the ratio that is the sample rate in sFlow traffic monitoring. For example, to configure a sample rate of 1 in 1000 packets, you specify a <i>number</i> of 1000.
Default	If no sample rate is configured for a particular interface, the device uses the global sample rate configured at the <code>[edit protocols sflow]</code> hierarchy level. If no global rate is configured, the device uses the default sample rate of 1 in 2000 packets.
Options	<i>number</i> —Denominator of the ratio representing the sample rate (one packet out of <i>number</i>). Range: 1 through 16,777,215
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring sFlow Technology on page 567• Example: Monitoring Network Traffic Using sFlow Technology on page 569

sflow (QFX Series)

Syntax	<pre> sflow { adaptive-sample-rate fallback; sample-limit-threshold; } agent-id ip-address; collector ip-address { udp-port port-number; } interfaces interface-name { polling-interval number; sample-rate { egress number; ingress number; } } polling-interval number; sample-rate { ingress number; egress number; } source-ip ip-address; disable-sw-rate-limiter; } traceoptions { file filename <files number> <no-stamp> <replace> <size size> <world-readable no-world-readable>; flag flag; } } </pre>
Hierarchy Level	[edit protocols]
Release Information	<p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p>Statement introduced in Junos OS Release 17.2R1 for the ACX5000 line of routers.</p>
Description	<p>Configure sFlow technology to monitor traffic continuously on specified interfaces simultaneously. sFlow data can be used to characterize network activity.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Default	The sFlow protocol is disabled by default.
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>

- Related Documentation**
- [Configuring sFlow Technology on page 567](#)
 - [Example: Monitoring Network Traffic Using sFlow Technology on page 569](#)

sflow

- List of Syntax**
- Syntax (EX Series) on page 1375
 - Syntax (MX Series) on page 1375
 - Syntax (PTX Series) on page 1376
 - Syntax (QFX Series, OCX Series, ACX Series, and EX4600) on page 1377

Syntax (EX Series)

```
sflow {
  adaptive-sample-rate rate;
  agent-id ip-address;
  collector {
    ip-address;
    udp-port port-number;
  }
  interfaces interface-name {
    disable;
    polling-interval seconds;
    sample-rate {
      egress number;
      ingress number;
    }
  }
  polling-interval seconds;
  sample-rate {
    egress number;
    ingress number;
  }
  source-ip ip-address;
}
```

Syntax (MX Series)

```
sflow {
  adaptive-sample-rate rate;
  agent-id (ipv4-address | inet6 ipv6-address);
  collector {
    ip-address (ipv4-address | ipv6-address);
    udp-port port-number;
  }
  inline-sampling;
  interfaces interface-name {
    polling-interval seconds;
    sample-rate {
      egress rate;
      ingress rate;
    }
  }
  polling-interval seconds;
  sample-rate {
    egress rate;
    ingress rate;
  }
  source-ip (ipv4-address | inet6 ipv6-address);
}
```

```
}
```

Syntax (PTX Series)

```
sflow {  
  adaptive-sample-rate rate;  
  agent-id ip-address;  
  collector {  
    ip-address ip-address;  
    udp-port port-number;  
  }  
  disable-sw-rate-limiter;  
  inline-sampling;  
  interfaces interface-name {  
    polling-interval seconds;  
    sample-rate {  
      egress rate;  
      ingress rate;  
    }  
  }  
  polling-interval seconds;  
  sample-rate {  
    egress rate;  
    ingress rate;  
  }  
  source-ip ipv4-address;  
  traceoptions {  
    file filename <files number> <no-stamp> <replace> <size size> <world-readable |  
      no-world-readable>;  
    flag flag;  
  }  
}
```

Syntax (QFX Series,
OCX Series, ACX
Series, and EX4600)

```
sflow {
  adaptive-sample-rate rate;
  agent-id ip-address;
  collector {
    ip-address ip-address;
    udp-port port-number;
  }
  disable-sw-rate-limiter;
  inline-sampling;
  interfaces interface-name {
    polling-interval seconds;
    sample-rate {
      egress rate;
      ingress rate;
    }
  }
  polling-interval seconds;
  sample-rate {
    egress rate;
    ingress rate;
  }
  source-ip ipv4-address;
  traceoptions {
    file filename <files number> <no-stamp> <replace> <size size> <world-readable |
    no-world-readable>;
    flag flag;
  }
}
```

Hierarchy Level [edit protocols]

Release Information Statement introduced in Junos OS Release 9.3 for EX Series switches.
Statement introduced in Junos OS Release 11.3 for the QFX Series.
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Statement introduced in Junos OS Release 17.2R1 for the ACX5000 line of routers.
Statement introduced in Junos OS Release 18.1R1 for MX Series routers.
Statement introduced in Junos OS Release 18.2R1 for PTX Series routers.

Description Configure sFlow technology to continuously monitor traffic at wire speed on specified interfaces simultaneously. sFlow data can be used to provide network traffic visibility information.



NOTE: Only IPv4 is supported for PTX Series routers at the current time.

Default sFlow technology is disabled by default.

Options **inline-sampling**—Enable inline sampling of packets.

The remaining statements are explained separately.

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

source-ip

List of Syntax [Syntax \(EX Series, PTX Series\) on page 1378](#)
[Syntax \(MX Series\) on page 1378](#)

Syntax (EX Series, PTX Series) agent-id (*ip4-address* | *ipv6-address*);

Syntax (MX Series) source-ip (*ipv4-address* | inet6 *ipv6-address*);

Hierarchy Level [edit protocols [sflow](#)]

Release Information Statement introduced in Junos OS Release 10.2 for EX Series switches.
Statement introduced in Junos OS Release 18.1R1 for MX Series routers.
Statement introduced in Junos OS Release 18.2R1 for PTX Series routers.

Description Configure the IP address to be used for the sFlow datagrams. By configuring an IP address, you ensure that the IP address is not dynamic. You can specify an IPv4 or IPv6 address.



NOTE: Only IPv4 is supported for PTX Series routers at the current time.

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

Related Documentation • [Configuring sFlow Technology for Network Monitoring \(CLI Procedure\) on page 565](#)

source-ip (QFX Series)

Syntax	<code>source-ip <i>ip-address</i>;</code>
Hierarchy Level	[edit protocols sflow]
Release Information	Statement introduced in Junos OS Release 11.3 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure the source IP address to be used for sFlow datagrams. If you do not configure a source IP address, it is dynamically created based on the IP address of an Ethernet interface configured on the QFX Series device.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring sFlow Technology on page 567• sflow on page 1373

traceoptions (sFlow Technology)

Syntax	<pre> traceoptions { file <i>filename</i> <files <i>number</i>> <no-stamp> <replace> <size <i>size</i>> <world-readable no-world-readable>; flag <i>flag</i>; } </pre>
Hierarchy Level	[edit protocols sflow]
Release Information	<p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
Description	Define tracing operations for sFlow technology.
Default	The traceoptions feature is disabled.
Options	<p>file <i>filename</i>—Name of the file to receive the tracing operation output. Enclose the name in quotation marks. Output files are located in the <code>/var/log/</code> directory.</p> <p>files <i>number</i>—(Optional) Maximum number of trace files. When a trace file named trace-file reaches its maximum size, it is renamed trace-file.0. Incoming trace file data is logged in the now empty trace-file. When trace-file again reaches its maximum size, trace-file.0 is renamed trace-file.1 and trace-file is renamed trace-file.0. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify the maximum number of files, you must also specify the maximum file size using the size option.</p> <p>Range: 2 through 1000 files</p> <p>Default: 1 trace file</p> <p>flag <i>flag</i>—Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements.</p> <ul style="list-style-type: none"> • all—Trace all sFlow monitoring events. • client-server—Trace sFlow monitoring client-server events. • configuration—Trace sFlow monitoring configuration events. • interface—Trace sFlow monitoring interface events. • rtsock—Trace routing socket code events. <p>no-stamp—(Optional) Do not place timestamp information at the beginning of each line in the trace file.</p>

no-world-readable—(Optional) Prevent any user from reading the trace file.

replace—(Optional) Replace an existing trace file if there is one.

size size—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named **trace-file** reaches its maximum size, it is renamed **trace-file.0**. Incoming trace file data is logged in the now empty **trace-file**. When **trace-file** again reaches its maximum size, **trace-file.0** is renamed **trace-file.1** and **trace-file** is renamed **trace-file.0**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you must also specify a maximum number of trace files with the **files** option.

Syntax: *xk* to specify KB, *xm* to specify MB, or *xg* to specify GB

Range: 10 KB through the maximum file size of 4 GB

Default: 128 KB

world-readable—(Optional) Allow any user to read the trace file.

Required Privilege	routing and trace—To view this statement in the configuration.
Level	routing-control and trace-control—To add this statement to the configuration.

Related Documentation	<ul style="list-style-type: none">• Overview of sFlow Technology on page 541
------------------------------	--

udp-port

Syntax	<code>udp-port <i>port-number</i>;</code>
Hierarchy Level	[edit protocols sflow collector]
Release Information	Statement introduced in Junos OS Release 9.3 for EX Series switches. Statement introduced in Junos OS Release 18.1R1 for MX Series routers. Statement introduced in Junos OS Release 18.2R1 for PTX Series routers.
Description	Configure the UDP port for a remote collector for sFlow network traffic monitoring. The device sends sFlow UDP datagrams to the collector for analysis.
Options	<i>port-number</i> —UDP port number for this collector. Default: 6343
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches on page 555• Configuring sFlow Technology for Network Monitoring (CLI Procedure) on page 565• Example: Configuring sFlow Technology to Monitor Network Traffic on MX Series Routers on page 560

udp-port (QFX Series)

Syntax	<code>udp-port <i>port-number</i>;</code>
Hierarchy Level	[edit protocols sflow (QFX Series) collector]
Release Information	Statement introduced in Junos OS Release 11.3 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. Statement introduced in Junos OS Release 17.2R1 for the ACX5000 line of routers.
Description	Configure the UDP port for a remote collector for sFlow network traffic monitoring. The device sends sFlow UDP datagrams to the collector for analysis.
Default	Port 6343
Options	<i>port-number</i> —UDP port number for this collector.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring sFlow Technology on page 567• Example: Monitoring Network Traffic Using sFlow Technology on page 569

CHAPTER 61

Configuration Statements: Accounting Options, Source Class Usage and Destination Class Usage Options

- [accounting-options](#) on page 1387
- [allow-clear \(Accounting Options\)](#) on page 1390
- [archive-sites](#) on page 1391
- [backup-on-failure \(Accounting Options\)](#) on page 1392
- [class-usage-profile](#) on page 1393
- [cleanup-interval \(Accounting Options\)](#) on page 1394
- [compress \(Accounting Options\)](#) on page 1395
- [counters](#) on page 1395
- [destination-classes](#) on page 1396
- [egress-stats \(Flat-File Accounting Options\)](#) on page 1397
- [fields \(Flat-File Accounting Options\)](#) on page 1399
- [fields \(for Interface Profiles\)](#) on page 1401
- [fields \(for Routing Engine Profiles\)](#) on page 1402
- [file \(Associating with a Profile\)](#) on page 1403
- [file \(Configuring a Log File\)](#) on page 1404
- [file \(Flat-File Accounting Options\)](#) on page 1405
- [files](#) on page 1406
- [filter-profile](#) on page 1407
- [flat-file-profile \(Accounting Options\)](#) on page 1408
- [format \(Flat-File Accounting Options\)](#) on page 1410
- [general-param \(Flat-File Accounting Options\)](#) on page 1411
- [ingress-stats \(Flat-File Accounting Options\)](#) on page 1413
- [interface-profile](#) on page 1414
- [interval](#) on page 1415
- [interval \(Flat-File Accounting Options\)](#) on page 1416

- [l2-stats \(Flat-File Accounting Options\)](#) on page 1417
- [mib-profile](#) on page 1418
- [mpls \(Security Forwarding Options\)](#) on page 1419
- [nonpersistent](#) on page 1420
- [object-names](#) on page 1421
- [operation](#) on page 1422
- [overall-packet \(Flat-File Accounting Options\)](#) on page 1423
- [push-backup-to-master \(Accounting Options\)](#) on page 1424
- [routing-engine-profile](#) on page 1425
- [schema-version \(Flat-File Accounting Options\)](#) on page 1426
- [size](#) on page 1427
- [source-classes](#) on page 1428
- [start-time](#) on page 1429
- [traceoptions \(System Accounting\)](#) on page 1430
- [transfer-interval](#) on page 1432

accounting-options

```
Syntax  accounting-options {
        class-usage-profile profile-name {
            file filename;
            interval minutes;
            destination-classes {
                destination-class-name;
            }
            source-classes {
                source-class-name;
            }
        }
        cleanup-interval days;
        file filename {
            archive-sites {
                site-name;
            }
            backup-on-failure (master-and-slave | master-only);
            compress;
            files number;
            nonpersistent;
            push-backup-to-master;
            size bytes;
            start-time time;
            transfer-interval minutes;
        }
        filter-profile profile-name {
            counters {
                counter-name;
            }
            file filename;
            interval minutes;
        }
        flat-file-profile profile-name{
            fields {
                all-fields;
                egress-stats {
                    all-fields;
                    input-bytes;
                    input-packets;
                    output-bytes;
                    output-packets;
                    queue-id;
                    red-drop-bytes;
                    red-drop-packets;
                    tail-drop-packets;
                }
            }
            general-param {
                all-fields;
                accounting-type;
                descr;
                line-id;
            }
        }
    }
```

```

    logical-interface;
    nas-port-id;
    physical-interface;
    routing-instance;
    timestamp;
    user-name;
    vlan-id;
}
ingress-stats {
    all-fields;
    drop-packets;
    input-bytes;
    input-packets;
    output-bytes;
    output-packets;
    queue-id;
}
l2-stats {
    all-fields;
    input-mcast-bytes;
    input-mcast-packets;
}
overall-packet {
    all-fields;
    input-bytes;
    input-discards;
    input-errors;
    input-packets;
    inputv6-bytes;
    inputv6-packets;
    output-bytes;
    output-errors;
    output-packets;
    outputv6-bytes;
    outputv6-packets;
}
service-accounting;
}
file filename;
format (csv | ipdr)
interval minutes;
schema-version schema-name;
}
interface-profile profile-name {
    allow-clear;
    fields {
        field-name;
    }
    file filename;
    interval minutes;
}
mib-profile profile-name {
    file filename;
    interval seconds;
    object-names {

```

```
    mib-object-name;
  }
  operation operation-name;
}
routing-engine-profile profile-name {
  fields {
    field-name;
  }
  file filename;
  interval minutes;
}
```

Hierarchy Level [\[edit\]](#)

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure options for accounting statistics collection.

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

Related Documentation

- [Configuration Statements at the \[edit accounting-options\] Hierarchy Level on page 435](#)
- [Accounting Options Configuration on page 437](#)

allow-clear (Accounting Options)

Syntax	allow-clear;
Hierarchy Level	[edit accounting-options interface-profile <i>profile-name</i>]
Release Information	Statement introduced in Junos OS Release 17.3R1 on MX Series routers.
Description	Reports accounting statistics values cleared by the clear interfaces statistics command on a logical interface configured with accounting options to the accounting options flat file associated with the interface. By default, this statement is disabled and the cleared statistics are not reported to the flat file, although the counters do show as cleared in the CLI.
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">• Configuring the Interface Profile on page 450• Accounting Options Configuration on page 437

archive-sites

Syntax	<pre>archive-sites { site-name; }</pre>
Hierarchy Level	[edit accounting-options file <i>filename</i>]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure an archive site. If more than one site name is configured, an ordered list of archive sites for the accounting-data log files is created. When a file is archived, the router or switch attempts to transfer the file to the first URL in the list, moving to the next site only if the transfer does not succeed. The log file is stored at the archive site with a filename of the format <i>router-name_log-filename_timestamp</i> .
Options	<i>site-name</i> —Any valid FTP/SCP URL to a destination.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Archive Sites for the Files on page 446

backup-on-failure (Accounting Options)

Syntax	<code>backup-on-failure (master-and-slave master-only);</code>
Hierarchy Level	[edit accounting-options file <i>filename</i>]
Release Information	Statement introduced in Junos OS Release 16.1.
Description	Configure the router to save a copy of the accounting file locally, to the <code>/var/log/pfedBackup</code> directory of the relevant Routing Engine, in the event that file transfer to the remote archive sites cannot be completed.
Options	master-and-slave —Back up accounting files from both the master Routing Engine and the backup Routing Engine. master-only —Back up accounting files from only the master Routing Engine.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Accounting-Data Log Files on page 444• <i>Configuring Flat-File Accounting for Layer 2 Wholesale</i>• <i>Configuring Flat-File Accounting for Extensible Subscriber Services Management</i>• <i>Flat-File Accounting Overview</i>

class-usage-profile

Syntax	<pre> class-usage-profile <i>profile-name</i> { file <i>filename</i>; interval <i>minutes</i>; source-classes { <i>source-class-name</i>; } destination-classes { <i>destination-class-name</i>; } } </pre>
Hierarchy Level	[edit accounting-options]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	<p>Create a class usage profile, which is used to log class usage statistics to a file in the <code>/var/log</code> directory. The class usage profile logs class usage statistics for the configured source classes on every interface that has destination-class-usage configured.</p> <p>For information about configuring source classes, see the Junos Routing Protocols Configuration Guide. For information about configuring source class usage, see the Junos Network Management Configuration Guide.</p>
Options	<p>profile-name—Name of the destination class profile.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Configuring Class Usage Profiles on page 461

cleanup-interval (Accounting Options)

Syntax	<code>cleanup-interval <i>days</i>;</code>
Hierarchy Level	<code>[edit accounting-options]</code>
Release Information	Statement introduced in Junos OS Release 16.1.
Description	Configure the interval to delete files from the local backup directory.
Options	days —Number of days after which accounting-options files are to be deleted from the backup directory. Range: 1 through 31 days Default: 1 day
Required Privilege Level	system —To view this statement in the configuration. system-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Accounting-Data Log Files on page 444• <i>Configuring Flat-File Accounting for Layer 2 Wholesale</i>• <i>Configuring Flat-File Accounting for Extensible Subscriber Services Management</i>• <i>Flat-File Accounting Overview</i>

compress (Accounting Options)

Syntax	<code>compress;</code>
Hierarchy Level	<code>[edit accounting-options file <i>filename</i>]</code>
Release Information	Statement introduced in Junos OS Release 16.1.
Description	Compress the accounting file during file transfer to the backup site.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring Accounting-Data Log Files on page 444 • Configuring Flat-File Accounting for Layer 2 Wholesale • Configuring Flat-File Accounting for Extensible Subscriber Services Management • Flat-File Accounting Overview

counters

Syntax	<pre>counters { counter-name; }</pre>
Hierarchy Level	<code>[edit accounting-options filter-profile <i>profile-name</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Names of counters for which filter profile statistics are collected. The packet and byte counts for the counters are logged to a file in the <code>/var/log</code> directory.
Options	<i>counter-name</i> —Name of the counter.
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"> • Configuring the Counters on page 454

destination-classes

Syntax	<pre>destination-classes { <i>destination-class-name</i>; }</pre>
Hierarchy Level	[edit accounting-options class-usage-profile <i>profile-name</i>]
Release Information	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 15.1F6 for PTX Series routers with third-generation FPCs installed.
Description	Specify the destination classes for which statistics are collected.
Options	<i>destination-class-name</i> —Name of the destination class to include in the source class usage profile.
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">• Configuring a Class Usage Profile on page 462

egress-stats (Flat-File Accounting Options)

Syntax	<pre>egress-stats { all-fields; input-bytes; input-packets; output-bytes; output-packets; queue-id; red-drop-bytes; red-drop-packets; tail-drop-packets; }</pre>
Hierarchy Level	[edit accounting-options flat-file-profile <i>profile-name</i> fields]
Release Information	Statement introduced in Junos OS Release 16.1R4.
Description	Specify egress queue statistics to be collected for the interface.
Options	<p>all-fields—Collect all egress queue statistics available for the interface context, logical or physical.</p> <p>input-bytes—Collect the number of octets queued including traffic dropped because of congestion.</p> <p>input-packets—Collect the number of packets queued including traffic dropped because of congestion.</p> <p>output-bytes—Collect the number of octets transmitted by the egress queue.</p> <p>output-packets—Collect the number of packets transmitted by the egress queue.</p> <p>queue-id—Collect the logical identifier for the egress queue; identifies the traffic class.</p> <p>red-drop-bytes—Collect the number of octets dropped on the egress queue because of random early detection.</p> <p>red-drop-packets—Collect the number of packets dropped on the egress queue because of random early detection.</p> <p>tail-drop-packets—Collect the number of packets dropped in the egress queue because of tail drop.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>

- Related Documentation**
- *Configuring Flat-File Accounting for Layer 2 Wholesale*
 - *Configuring Flat-File Accounting for Extensible Subscriber Services Management*
 - *Flat-File Accounting Overview*

fields (Flat-File Accounting Options)

```
Syntax  fields {
        all-fields;
        egress-stats {
            all-fields;
            input-bytes;
            input-packets;
            output-bytes;
            output-packets;
            queue-id;
            red-drop-bytes;
            red-drop-packets;
            tail-drop-packets;
        }
        general-param {
            all-fields;
            accounting-type;
            descr;
            line-id;
            logical-interface;
            nas-port-id;
            physical-interface;
            routing-instance;
            timestamp;
            user-name;
            vlan-id;
        }
        ingress-stats {
            all-fields;
            drop-packets;
            input-bytes;
            input-packets;
            output-bytes;
            output-packets;
            queue-id;
        }
        l2-stats {
            all-fields;
            input-mcast-bytes;
            input-mcast-packets;
        }
        overall-packet {
            all-fields;
            input-bytes;
            input-discards;
            input-errors;
            input-packets;
            inputv6-bytes;
            inputv6-packets;
            output-bytes;
            output-errors;
            output-packets;
        }
    }
```

```

    outputv6-bytes;
    outputv6-packets;
  }
  service-accounting;
}

```

Hierarchy Level [edit accounting-options [flat-file-profile](#) *profile-name*]

Release Information Statement introduced in Junos OS Release 16.1R4.

Description Specify the accounting statistics and the nonstatistical information to be collected for an interface and recorded in the accounting flat file created by the profile.

Options **all-fields**—Include all available statistical fields in the accounting file. Many fields are available for both logical interfaces and physical interfaces, but some fields are available only for one or the other interface type.

service-accounting—Include the filter counts in bytes for the inet input filter, inet output filter, inet6 input filter, and inet6 output filter in the service accounting flat file. Statistics reported are the running total values.



NOTE: Starting in Junos OS Release 18.4R1, the **service-accounting** option is no longer supported. If included in a configuration, it is ignored.

The remaining statements are explained separately. Search for a statement in [CLI Explorer](#) or click a linked statement in the Syntax section for details.

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

Related Documentation

- *Configuring Flat-File Accounting for Layer 2 Wholesale*
- *Configuring Flat-File Accounting for Extensible Subscriber Services Management*
- *Configuring Service Accounting in Local Flat Files*
- *Flat-File Accounting Overview*

fields (for Interface Profiles)

Syntax	<pre>fields { field-name; }</pre>
Hierarchy Level	[edit accounting-options interface-profile <i>profile-name</i>]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Statistics to collect in an accounting-data log file for an interface.
Options	<p><i>field-name</i>—Name of the field:</p> <ul style="list-style-type: none"> • input-bytes—Input bytes • input-errors—Generic input error packets • input-multicast—Input packets arriving by multicast • input-packets—Input packets • input-unicast—Input unicast packets • output-bytes—Output bytes • output-errors—Generic output error packets • output-multicast—Output packets sent by multicast • output-packets—Output packets • output-unicast—Output unicast packets
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Interface Profile on page 450

fields (for Routing Engine Profiles)

Syntax	<pre>fields { <i>field-name</i>; }</pre>
Hierarchy Level	[edit accounting-options routing-engine-profile <i>profile-name</i>]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	Statistics to collect in an accounting-data log file for a Routing Engine.
Options	<p><i>field-name</i>—Name of the field:</p> <ul style="list-style-type: none">• cpu-load-1—Average system load over the last 1 minute• cpu-load-5—Average system load over the last 5 minutes• cpu-load-15—Average system load over the last 15 minutes• date—Date, in YYYYMMDD format• host-name—Hostname for the router• time-of-day—Time of day, in HHMMSS format• uptime—Time since last reboot, in seconds
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">• Configuring the Routing Engine Profile on page 466

file (Associating with a Profile)

Syntax	<code>file <i>filename</i>;</code>
Hierarchy Level	<code>[edit accounting-options class-usage-profile <i>profile-name</i>],</code> <code>[edit accounting-options filter-profile <i>profile-name</i>],</code> <code>[edit accounting-options interface-profile <i>profile-name</i>],</code> <code>[edit accounting-options mib-profile <i>profile-name</i>],</code> <code>[edit accounting-options routing-engine-profile <i>profile-name</i>]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>The <code>[edit accounting-options mib-profile <i>profile-name</i>]</code> hierarchy added in Junos OS Release 8.2.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series Switches.</p>
Description	Specify the accounting log file associated with the profile.
Options	<i>filename</i> —Name of the log file. You must specify a filename already configured in the <code>file</code> statement at the <code>[edit accounting-options]</code> hierarchy level.
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Interface Profile on page 450 • Configuring the Filter Profile on page 453 • Configuring the MIB Profile on page 464 • Configuring the Routing Engine Profile on page 466

file (Configuring a Log File)

Syntax	<pre>file <i>filename</i> { archive-sites { <i>site-name</i>; } backup-on-failure (master-and-slave master-only); compress; files <i>number</i>; nonpersistent; push-backup-to-master; size <i>bytes</i>; start-time <i>time</i>; transfer-interval <i>minutes</i>; }</pre>
Hierarchy Level	[edit accounting-options]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Specify a log file to be used for accounting data.
Options	<p><i>filename</i>—Name of the file in which to write accounting data.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Accounting-Data Log Files on page 444 • Configuring Flat-File Accounting for Layer 2 Wholesale • Configuring Flat-File Accounting for Extensible Subscriber Services Management • Flat-File Accounting Overview

file (Flat-File Accounting Options)

Syntax	<code>file <i>filename</i>;</code>
Hierarchy Level	[edit accounting-options flat-file-profile <i>profile-name</i>]
Release Information	Statement introduced in Junos OS Release 16.1R4.
Description	Specify the name of the accounting file created by a flat-file profile. By default, the filename becomes the name of the local directory where the accounting file is backed up: <code>/var/log/pfedBackup/<i>filename</i></code> .
Options	<i>filename</i> —Name of the accounting file. The complete output filename is in the format <i>filename.hostname.file-number_timestamp.gz</i> .
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • <i>Configuring Flat-File Accounting for Layer 2 Wholesale</i> • <i>Configuring Flat-File Accounting for Extensible Subscriber Services Management</i> • <i>Flat-File Accounting Overview</i>

files

Syntax	<code>files <i>number</i>;</code>
Hierarchy Level	<code>[edit accounting-options file <i>filename</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Specify the maximum number of log files to be used for accounting data.
Options	<i>number</i> —The maximum number of files. When a log file (for example, profilelog) reaches its maximum size, it is renamed profilelog.0 , then profilelog.1 , and so on, until the maximum number of log files is reached. Then the oldest log file is overwritten. The minimum value for <i>number</i> is 3 and the default value is 10.
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">• Configuring Accounting-Data Log Files on page 444

filter-profile

Syntax	<pre>filter-profile <i>profile-name</i> { counters { counter-name; } file <i>filename</i>; interval <i>minutes</i>; }</pre>
Hierarchy Level	[edit accounting-options]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	<p>Create a profile to filter and collect packet and byte count statistics and write them to a file in the <code>/var/log</code> directory. To apply the profile to a firewall filter, you include the accounting-profile statement at the [edit firewall filter <i>filter-name</i>] hierarchy level. For more information about firewall filters, see <i>Firewall Filters Overview</i>.</p>
Options	<p><i>profile-name</i>—Name of the filter profile.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> <i>Firewall Filters Overview</i> Configuring the Filter Profile on page 453

flat-file-profile (Accounting Options)

```
Syntax flat-file-profile profile-name{
  fields {
    all-fields;
    egress-stats {
      all-fields;
      input-bytes;
      input-packets;
      output-bytes;
      output-packets;
      queue-id;
      red-drop-bytes;
      red-drop-packets;
      tail-drop-packets;
    }
    general-param {
      all-fields;
      accounting-type;
      descr;
      line-id;
      logical-interface;
      nas-port-id;
      physical-interface;
      routing-instance;
      timestamp;
      user-name;
      vlan-id;
    }
    ingress-stats {
      all-fields;
      drop-packets;
      input-bytes;
      input-packets;
      output-bytes;
      output-packets;
      queue-id;
    }
    l2-stats {
      all-fields;
      input-mcast-bytes;
      input-mcast-packets;
    }
    overall-packet {
      all-fields;
      input-bytes;
      input-discards;
      input-errors;
      input-packets;
      inputv6-bytes;
      inputv6-packets;
      output-bytes;
      output-errors;
    }
  }
}
```

```

    output-packets;
    outputv6-bytes;
    outputv6-packets;
  }
  service-accounting;
}
file filename;
format (csv | ipdr)
interval minutes;
schema-version schema-name;
}

```

Hierarchy Level [edit [accounting-options](#)]

Release Information Statement introduced in Junos OS Release 16.1R4.
service-accounting option added in Junos OS Release 17.1.
 Support for the **service-accounting** option removed in Junos OS Release 18.1R4.

Description Configure a flat-file accounting profile that defines the contents of a flat file that records accounting statistics collected from the Packet Forwarding Engine for an interface at regular intervals. To be used, the profile is associated with a subscriber interface. The accounting flat file is archived by the accounting-options archiving mechanism.

Options *profile-name*—Name of the flat-file profile.

The remaining statements are explained separately. Search for a statement in [CLI Explorer](#) or click a linked statement in the Syntax section for details.

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

Related Documentation

- [Configuring Accounting-Data Log Files on page 444](#)
- [Configuring Flat-File Accounting for Layer 2 Wholesale](#)
- [Configuring Flat-File Accounting for Extensible Subscriber Services Management](#)
- [Configuring Service Accounting in Local Flat Files](#)
- [Flat-File Accounting Overview](#)
- [show extensible-subscriber-services accounting](#)

format (Flat-File Accounting Options)

Syntax	<code>format (csv ipdr);</code>
Hierarchy Level	<code>[edit accounting-options flat-file-profile <i>profile-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 16.1R4.
Description	Specify the format for logging the flat-file accounting statistics.
Options	<p>csv—Comma-separated values (CSV) format.</p> <p>ipdr—IP Detail Record (IPDR) format.</p> <p>Default: ipdr</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• <i>Configuring Flat-File Accounting for Layer 2 Wholesale</i>• <i>Configuring Flat-File Accounting for Extensible Subscriber Services Management</i>• <i>Flat-File Accounting Overview</i>

general-param (Flat-File Accounting Options)

Syntax	<pre> general-param { all-fields; accounting-type; descr; line-id; logical-interface; nas-port-id; physical-interface; routing-instance; timestamp; user-name; vlan-id; } </pre>
Hierarchy Level	[edit accounting-options flat-file-profile <i>profile-name</i> fields]
Release Information	Statement introduced in Junos OS Release 16.1R4. user-name option added in Junos OS Release 17.1.
Description	Specify general, nonstatistical interface parameters that are displayed as part of the header for the accounting file.
Options	<p>all-fields—Display all available nonstatistical fields. Many fields are available for both logical interfaces and physical interfaces, but some fields are available for only one interface type.</p> <p>accounting-type—(Logical interfaces only) Display the accounting status type.</p> <p>descr—Display the description of the interface as configured.</p> <p>line-id—(Logical interfaces only) Display the access line identifier.</p> <p>logical-interface—(Logical interfaces only) Display the name of the logical interface.</p> <p>nas-port-id—(Logical interfaces only) Display the NAS port ID.</p> <p>physical-interface—(Physical interfaces only) Display the name of the physical interface.</p> <p>routing-instance—Display the name of the routing instance to which the interface belongs.</p> <p>timestamp—Display the timestamp of the accounting record.</p> <p>user-name—Display the name of the subscriber.</p> <p>vlan-id—(Logical interfaces only) Display the VLAN identifier.</p>

Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• <i>Configuring Flat-File Accounting for Layer 2 Wholesale</i>• <i>Configuring Flat-File Accounting for Extensible Subscriber Services Management</i>• <i>Configuring Service Accounting in Local Flat Files</i>• <i>Flat-File Accounting Overview</i>

ingress-stats (Flat-File Accounting Options)

Syntax	<pre>ingress-stats { all-fields; drop-packets; input-bytes; input-packets; output-bytes; output-packets; queue-id; }</pre>
Hierarchy Level	[edit accounting-options flat-file-profile <i>profile-name</i> fields]
Release Information	Statement introduced in Junos OS Release 16.1R4.
Description	Specify ingress queue statistics to be collected for the interface.
Options	<p>all-fields—Collect all ingress queue statistics available for the interface context, logical or physical.</p> <p>drop-packets—Collect the number of received packets dropped on the Ingress queue.</p> <p>input-bytes—Collect the number of octets received on the queue for the traffic class indicated by the queue identifier.</p> <p>input-packets—Collect the number of packets received on the queue for the traffic class indicated by the queue identifier.</p> <p>output-bytes—Collect the number of octets forwarded for the traffic class indicated by the queue identifier. Same value as input-bytes unless oversubscription is present at the ingress.</p> <p>output-packets—Collect the number of packets forwarded for the traffic class indicated by the queue identifier. Same value as input-packets unless oversubscription is present at the ingress.</p> <p>queue-id—Collect the logical identifier for the ingress queue; identifies the traffic class.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • <i>Configuring Flat-File Accounting for Layer 2 Wholesale</i> • <i>Configuring Flat-File Accounting for Extensible Subscriber Services Management</i> • <i>Flat-File Accounting Overview</i>

interface-profile

Syntax

```
interface-profile profile-name {  
    allow-clear;  
    fields {  
        field-name;  
    }  
    file filename;  
    interval minutes;  
}
```

Hierarchy Level [edit accounting-options]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 on EX Series switches.

Description Create a profile to filter and collect error and packet statistics and write them to a file in the `/var/log` directory. You can specify an interface profile for either a physical or a logical interface.

Options *profile-name*—Name of the interface profile.

The remaining statements are explained separately. See [CLI Explorer](#).

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


Related Documentation

- [Configuring the Interface Profile on page 450](#)
- [Accounting Options Configuration on page 437](#)

interval

Syntax	<code>interval <i>minutes</i>;</code>
Hierarchy Level	<code>[edit accounting-options class-usage-profile <i>profile-name</i>],</code> <code>[edit accounting-options filter-profile <i>profile-name</i>],</code> <code>[edit accounting-options interface-profile <i>profile-name</i>],</code> <code>[edit accounting-options mib-profile <i>profile-name</i>],</code> <code>[edit accounting-options routing-engine-profile <i>profile-name</i>]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>The <code>[edit accounting-options mib-profile <i>profile-name</i>]</code> hierarchy level added in Junos OS Release 8.2.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Specify how often statistics are collected for the accounting profile.
Options	<p><i>minutes</i>—Length of time between each collection of statistics.</p> <p>Range: 1 through 2880 minutes</p> <p>Default: 30 minutes</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Interface Profile on page 450 • Configuring the Filter Profile on page 453 • Configuring the MIB Profile on page 464 • Configuring the Routing Engine Profile on page 466

interval (Flat-File Accounting Options)

Syntax	<code>interval <i>minutes</i>;</code>
Hierarchy Level	<code>[edit accounting-options flat-file-profile <i>profile-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 16.1R4.
Description	Specify the interval in minutes at which the Packet Forwarding Engine associated with the interface is polled to collect the statistics specified in the flat-file accounting profile. These interim accounting results are recorded in the flat file.
	<p> NOTE: The value configured with this statement is superseded by the value configured with the <code>update-interval</code> statement at the <code>[edit access profile <i>profile-name</i> service accounting]</code> hierarchy level. That access profile interval value is in turn superseded by an update interval value configured in the RADIUS attribute, Service-Interim-Acct-Interval (VSA 26–140).</p>
Options	<p><i>minutes</i>—Polling interval.</p> <p>Range: 1 through 2880 minutes</p> <p>Default: 15 minutes</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • <i>Configuring Flat-File Accounting for Layer 2 Wholesale</i> • <i>Configuring Flat-File Accounting for Extensible Subscriber Services Management</i> • <i>Configuring Service Accounting in Local Flat Files</i> • <i>Flat-File Accounting Overview</i>

l2-stats (Flat-File Accounting Options)

Syntax	<pre>l2-stats { all-fields; input-mcast-bytes; input-mcast-packets; }</pre>
Hierarchy Level	[edit accounting-options flat-file-profile <i>profile-name</i> fields]
Release Information	Statement introduced in Junos OS Release 16.1R4.
Description	Specify the statistics to collect for the named flat-file-profile field.
Options	<p>all-fields—Collect all Layer 2 statistics for the named flat-file profile.</p> <p>input-mcast-bytes—Collect multicast bytes from the input side for the named flat-file profile.</p> <p>input-mcast-packets—Collect multicast packets from the input side for the named flat-file profile.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • <i>Configuring Flat-File Accounting for Layer 2 Wholesale</i> • <i>Configuring Flat-File Accounting for Extensible Subscriber Services Management</i> • <i>Flat-File Accounting Overview</i>

mib-profile

Syntax

```
mib-profile profile-name {
  file filename;
  interval minutes;
  object-names {
    mib-object-name;
  }
  operation operation-name;
}
```

Hierarchy Level [edit accounting-options]

Release Information Statement introduced in Junos OS Release 8.2.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Create a MIB profile to collect selected MIB statistics and write them to a file in the `/var/log` directory.



NOTE: Do not configure MIB objects related to interface octets or packets for a MIB profile, because it can cause the SNMP walk or a CLI show command to time out.

Options *profile-name*—Name of the MIB statistics profile.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Configuring the MIB Profile on page 464](#)

mpls (Security Forwarding Options)

Syntax `mpls {
 mode packet-based;
 }`

Hierarchy Level [edit security forwarding-options family]

Release Information Statement introduced in Junos OS Release 9.0.

Description Enable the forwarding of MPLS traffic. By default, the device drops MPLS traffic.



CAUTION: Because MPLS operates in packet mode, security services are not available.




NOTE: Packet-based processing is not supported on the following SRX Series devices: SRX1500, SRX5600, and SRX5800.

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

Related Documentation • [MPLS Overview](#)

nonpersistent

Syntax	nonpersistent;
Hierarchy Level	[edit accounting-options file filename]
Release Information	Statement introduced in Junos OS Release 8.3.
Description	<p>Store log files used for accounting data in the mfs/var/log directory (located on DRAM) instead of the cf/var/log directory (located on the compact flash drive). This feature is useful for minimizing read/write traffic on the router's compact flash drive.</p> <div> NOTE: If log files for accounting data are stored on DRAM, these files are lost when you reboot the router. Therefore, you should back up these files periodically.</div>
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">• Configuring the Storage Location of the File on page 447

object-names

Syntax	<pre>object-names { <i>mib-object-name</i>; }</pre>
Hierarchy Level	[edit accounting-options mib-profile <i>profile-name</i>]
Release Information	Statement introduced in Junos OS Release 8.2. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Specify the name of each MIB object for which MIB statistics are collected for an accounting-data log file.
Options	<i>mib-object-name</i> —Name of a MIB object. You can specify more than one MIB object name.
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">• Configuring the MIB Profile on page 464

operation

Syntax	<code>operation <i>operation-name</i>;</code>
Hierarchy Level	[edit accounting-options mib-profile <i>profile-name</i>]
Release Information	Statement introduced in Junos OS Release 8.2. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Specify the name of the operation used to collect MIB statistics for an accounting-data log file.
Options	<i>operation-name</i> —Name of the operation to use. You can specify a get , get-next , or walk operation. Default: walk
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">• Configuring the MIB Profile on page 464

overall-packet (Flat-File Accounting Options)

Syntax

```
overall-packet {
  all-fields;
  input-bytes;
  input-discards;
  input-errors;
  input-packets;
  inputv6-bytes;
  inputv6-packets;
  output-bytes;
  output-errors;
  output-packets;
  outputv6-bytes;
  outputv6-packets;
}
```

Hierarchy Level [edit accounting-options flat-file-profile *profile-name* **fields**]

Release Information Statement introduced in Junos OS Release 16.1R4.

Description Specify overall packet statistics to be collected for the interface.

Options

- all-fields**—Collect all overall packet statistics available for the interface context, logical or physical.
- input-bytes**—Collect the number of octets received on the interface.
- input-discards**—(Physical interfaces only) Collect the number of received packets that were discarded on the interface.
- input-errors**—(Physical interfaces only) Collect the number of frames with errors received on the interface.
- input-packets**—Collect the number of packets received on the interface.
- input-v6-bytes**—Collect the number of IPv6 octets received on the interface.
- input-v6-packets**—Collect the number of IPv6 packets received on the interface.
- output-bytes**—Collect the number of octets transmitted on the interface.
- output-errors**—(Physical interfaces only) Collect the number of frames that could not be transmitted on the interface because of errors.
- output-packets**—Collect the number of packets transmitted on the interface.
- output-v6-bytes**—Collect the number of IPv6 octets transmitted on the interface.
- output-v6-packets**—Collect the number of IPv6 packets transmitted on the interface.

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

Related Documentation

- [Configuring Flat-File Accounting for Layer 2 Wholesale](#)
- [Configuring Flat-File Accounting for Extensible Subscriber Services Management](#)
- [Flat-File Accounting Overview](#)

push-backup-to-master (Accounting Options)

Syntax push-backup-to-master;

Hierarchy Level [edit accounting-options [file](#) filename]

Release Information Statement introduced in Junos OS Release 16.1R4.

Description Configure the router to save the accounting files from the new backup Routing Engine to the new master Routing Engine when a change in mastership occurs. The files are saved to the `/var/log/pfedBackup` directory on the router. The master Routing Engine includes these accounting files with its own current accounting files when it transfers the files from the backup directory to the archive site at the next transfer interval. Use this statement when the new backup Routing Engine is not able to connect to the archive site; for example, when site is not connected by means of an out-of-band interface or the path to the site is routed through a line card.



NOTE: The backup Routing Engine's files on the master Routing Engine are sent at each interval even though the files remain the same. If this is more activity than you want, consider using the `backup-on-failure master-and-slave` statement instead.

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

Related Documentation

- [Configuring Accounting-Data Log Files on page 444](#)
- [Configuring Flat-File Accounting for Layer 2 Wholesale](#)
- [Configuring Flat-File Accounting for Extensible Subscriber Services Management](#)
- [Flat-File Accounting Overview](#)

routing-engine-profile

Syntax	<pre> routing-engine-profile <i>profile-name</i> { fields { <i>field-name</i>; } file <i>filename</i>; interval <i>minutes</i>; } </pre>
Hierarchy Level	[edit accounting-options]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Create a Routing Engine profile to collect selected Routing Engine statistics and write them to a file in the <code>/var/log</code> directory.
Options	<p><i>profile-name</i>—Name of the Routing Engine statistics profile.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Configuring the Routing Engine Profile on page 466

schema-version (Flat-File Accounting Options)

Syntax	<code>schema-version <i>schema-name</i>;</code>
Hierarchy Level	<code>[edit accounting-options flat-file-profile <i>profile-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 16.1R4.
Description	Specify the name of the XML schema that defines the contents and format of the accounting file, and appears in the accounting record header.
Options	<i>schema-name</i> —Name of the schema.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• <i>Configuring Flat-File Accounting for Layer 2 Wholesale</i>• <i>Configuring Flat-File Accounting for Extensible Subscriber Services Management</i>• <i>Flat-File Accounting Overview</i>

size

Syntax	<code>size bytes;</code>
Hierarchy Level	<code>[edit accounting-options file filename]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Specify attributes of an accounting-data log file.
Options	<p>bytes—Maximum size of each log file, in bytes, kilobytes (KB), megabytes (MB), or gigabytes (GB). When a log file (for example, profilelog) reaches its maximum size, it is renamed profilelog.0, then profilelog.1, and so on, until the maximum number of log files is reached. Then the oldest log file is overwritten. If you do not specify a size, the file is closed, archived, and renamed when the time specified for the transfer interval is exceeded.</p> <p>Syntax: <i>x</i> to specify bytes, <i>xk</i> to specify KB, <i>xm</i> to specify MB, <i>xg</i> to specify GB</p> <p>Range: 256 KB through 1 GB</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Maximum Size of the File on page 446

source-classes

Syntax	<pre>source-classes { <i>source-class-name</i>; }</pre>
Hierarchy Level	[edit accounting-options class-usage-profile <i>profile-name</i>]
Release Information	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 15.1F6 for PTX Series routers with third-generation FPCs installed.
Description	Specify the source classes for which statistics are collected.
Options	<i>source-class-name</i> —Name of the source class to include in the class usage profile.
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">• Configuring a Class Usage Profile on page 462

start-time

Syntax	<code>start-time <i>time</i>;</code>
Hierarchy Level	[edit accounting-options file <i>filename</i>]
Release Information	Statement introduced in Junos OS Release 8.2. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Specify the start time for transfer of an accounting-data log file.
Options	<i>time</i> —Start time for file transfer. Syntax: <i>YYYY-MM-DD.hh:mm</i>
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">• Configuring the Start Time for File Transfer on page 448

traceoptions (System Accounting)

Syntax	<pre> traceoptions { file <i>filename</i> <files <i>number</i>> <size <i>size</i>> <world-readable no-world-readable>; flag (all config events radius tacplus); no-remote-trace } </pre>
Hierarchy Level	[edit system accounting]]
Release Information	<p>Statement introduced in Junos OS Release 14.2.</p> <p>tacplus option introduced in Junos OS Release 15.1.</p>
Description	Define tracing operations for System Accounting.
Default	Trace options are not enabled by default.
Options	<p>file <i>filename</i>—Name of the file in which Junos OS stores the accounting logs. By default, this is created under the /var/log directory.</p> <p>files <i>number</i>—(Optional) Maximum number of trace files. When a trace file reaches the size specified by the size option, the filename is appended with 0 and compressed. For example, when trace file named trace-file-log reaches size <<i>size</i>>, it is renamed and compressed to trace-file-log.0.gz. When trace-file-log reaches size <<i>size</i>> or the second time, the trace-file-log.0.gz is renamed to trace-file-log.1.gz and trace-file-log is renamed and compressed to trace-file-log.0.gz. This renaming scheme ensures that the older logs to have a greater index number. When number of trace files reach <<i>number</i>> then the oldest file is deleted.</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the size option and a filename.</p> <p>Range: 2 through 1000 files</p> <p>Default: 10</p> <p>flag <i>flag</i>—Tracing operation to perform. You can include one or more of the following flags:</p> <ul style="list-style-type: none"> • all—Trace all operations. • config—Trace configuration processing. • events—Trace accounting events and their processing. • radius—Trace RADIUS processing. • tacplus—Trace TACPLUS processing.

no-remote-trace—(Optional) Disable tracing and logging operations that track normal operations, error conditions, and packets that are generated by or passed through the Juniper Networks device.

no-world-readable—Restrict access to the trace files to the owner.

Default: no-world-readable

size *size*—(Optional) Maximum size of each trace file in bytes, kilobytes (KB), megabytes (MB), or gigabytes (GB). If you do not specify a unit, the default is bytes. If you specify a maximum file size, you also must specify a maximum number of trace files by using the **files** option and a filename by using the **file** option.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

Syntax: *size* to specify bytes, *sizek* to specify KB, *sizem* to specify MB, or *sizeg* to specify GB.

Range: 10 KB through 1 MB

Default: 128 KB

world-readable—Enable any user to access the trace files.

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

transfer-interval

Syntax	<code>transfer-interval <i>minutes</i>;</code>
Hierarchy Level	[edit accounting-options file <i>filename</i>]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Specify the length of time the file remains open and receives new statistics before it is closed and transferred to an archive site.
Options	<i>minutes</i> —Time the file remains open and receives new statistics before it is closed and transferred to an archive site. Range: 5 through 2880 minutes Default: 30 minutes
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">• Configuring the Transfer Interval of the File on page 449

CHAPTER 62

Configuration Statements: Chassis Cluster

- [cluster \(Chassis\) on page 1434](#)
- [global-threshold on page 1437](#)
- [global-weight on page 1438](#)
- [ip-monitoring on page 1439](#)
- [ip-monitoring \(Services\) on page 1441](#)
- [next-hop on page 1442](#)

cluster (Chassis)

```

Syntax cluster {
  configuration-synchronize {
    no-secondary-bootup-auto no-secondary-bootup-auto;
  }
  control-link-recovery control-link-recovery;
  control-ports fpc {
    port;
  }
  health-monitoring {
    configuration-synchronize {
      no-secondary-bootup-auto no-secondary-bootup-auto;
    }
    control-link-recovery control-link-recovery;
    control-ports fpc {
      port;
    }
    heartbeat-interval milliseconds;
    heartbeat-threshold heartbeat-threshold;
    network-management {
      cluster-master cluster-master;
    }
    redundancy-group name {
      gratuitous-arp-count gratuitous-arp-count;
      hold-down-interval seconds;
      interface-monitor name {
        weight weight;
      }
      ip-monitoring {
        family {
          inet name logical-interface-name secondary-ip-address weight weight;
        }
        global-threshold number;
        global-weight number;
        retry-count number;
        retry-interval seconds;
      }
      node (0 | 1) {
        priority number;
      }
      preempt {
        delay seconds;
        limit limit;
        period seconds;
      }
    }
  }
  reth-count number;
  traceoptions {
    file <filename> <files files> <match match> <size size> <(world-readable |
      no-world-readable)>;
    flag name;
    level (alert | all | critical | debug | emergency | error | info | notice | warning);
  }
}

```



```

    no-remote-trace no-remote-trace;
  }
  heartbeat-interval milliseconds;
  heartbeat-threshold heartbeat-threshold;
  network-management {
    cluster-master cluster-master;
  }
  redundancy-group name {
    gratuitous-arp-count gratuitous-arp-count;
    hold-down-interval seconds;
    interface-monitor name {
      weight weight;
    }
    ip-monitoring {
      family {
        inet name logical-interface-name secondary-ip-address weight weight;
      }
      global-threshold number;
      global-weight number;
      retry-count number;
      retry-interval seconds;
    }
    node (0 | 1 ) {
      priority number;
    }
    preempt {
      delay seconds;
      limit limit;
      period seconds;
    }
  }
  reth-count number;
  traceoptions {
    file <filename> <files files> <match match> <size size> <(world-readable |
      no-world-readable)>;
    flag name;
    level (alert | all | critical | debug | emergency | error | info | notice | warning);
    no-remote-trace no-remote-trace;
  }
}

```

Hierarchy Level [edit chassis]

Release Information Statement introduced in Junos OS Release 9.0.
The **health-monitoring** option is introduced in the Junos OS Release 18.4R1.

Description Configure a chassis cluster. You can perform the configuration under the [edit chassis cluster] configuration stanza to define chassis cluster configuration, operations, and monitoring. The configuration includes specifying configuration synchronization, control link recovery, heartbeat interval and threshold, network management, redundancy group, and traceoptions.

Options **configuration-synchronize** —Disable automatic chassis cluster synchronization. See *configuration-synchronize (Chassis Cluster)*.

control-link-recovery—Enable automatic control link recovery option.

control-ports—Enable specific chassis cluster control ports.

Values:

- **fpc**—FPC slot number
- **port**—Port number

health-monitoring—Enable to monitor the health status of the SRX Series devices operating in chassis cluster mode. The health status between the two nodes is monitored and shared over control links and fabric links. Failover between the nodes occurs based on the heart beat status and health status of the control links and fabric links. By default, the option is disabled.

heartbeat-interval—Interval between successive heartbeats (milliseconds)

Default: 1000

Range: 1000-2000

heartbeat-threshold—Number of consecutive missed heartbeats to indicate device failure

Default: 3

Range: 3-8

network-management—Define parameters for network management. See *network-management*.

redundancy-group *name*—Define a redundancy group. See *redundancy-group (Chassis Cluster)*.

reth-count—Number of redundant ethernet interfaces

Range: 1-128

traceoptions—Define chassis cluster redundancy process tracing operations. See *traceoptions (Chassis Cluster)*.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation • [ip-monitoring on page 1439](#)

global-threshold

Syntax	<code>global-threshold <i>number</i>;</code>
Hierarchy Level	<code>[edit chassis cluster redundancy-group <i>group-number</i> ip-monitoring]</code>
Release Information	Statement introduced in Junos OS Release 10.1.
Description	<p>Define global threshold for IP monitoring. This is the number that needs to be met or exceeded by all of the cumulative weights of the monitored IP addresses to trigger a failover.</p> <p>When a monitored address is marked as unreachable, the weight value associated with that address is deducted from the the redundancy group IP address monitoring global threshold. If the accumulated monitored address weight values surpass the global-threshold value, that is, when the global threshold reaches 0, the global weight is deducted from the redundancy group threshold. Every redundancy group has a default threshold of 255. If the threshold reaches 0, a failover is triggered</p>
Options	<p><i>number</i>—Value at which the IP monitoring weight is applied against the redundancy group failover threshold.</p> <p>Range: 0 through 255</p> <p>Default: 0</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • ip-monitoring on page 1439

global-weight

Syntax	global-weight <i>number</i> ;
Hierarchy Level	[edit chassis cluster redundancy-group <i>group-number</i> ip-monitoring]
Release Information	Statement introduced in Junos OS Release 10.1.
Description	<p>Define global weight for IP monitoring. This is the weight that is subtracted from the redundancy group weight for all of the hosts being monitored. This number specifies the relative importance of IP address monitored objects in the operation of the redundancy group.</p> <p>Every monitored IP address is assigned a weight. If the monitored address becomes unreachable, the weight of the object is deducted from the global-threshold of IP monitoring objects in its redundancy group. When the global-threshold reaches 0, the global-weight is deducted from the redundancy group. Every redundancy group has a default threshold of 255. If the threshold reaches 0, a failover is triggered. Failover is triggered even if the redundancy group is in manual failover mode and preemption is not enabled.</p>
Options	<p><i>number</i> —Combined weight assigned to all monitored IP addresses. A higher weight value indicates a greater importance.</p> <p>Range: 0 through 255</p> <p>Default: 255</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• ip-monitoring on page 1439

ip-monitoring

```
Syntax ip-monitoring {
    family {
        inet {
            ipv4-address {
                interface {
                    logical-interface-name;
                    secondary-ip-address ip-address;
                }
                weight number;
            }
        }
    }
    global-threshold number;
    global-weight number;
    retry-count number;
    retry-interval seconds;
}
```

Hierarchy Level [edit chassis cluster redundancy-group *group-number*]

Release Information Statement updated in Junos OS Release 10.1.

Description Specify a global IP address monitoring threshold and weight, and the interval between pings (**retry-interval**) and the number of consecutive ping failures (**retry-count**) permitted before an IP address is considered unreachable for all IP addresses monitored by the redundancy group. Also specify IP addresses, a monitoring weight, a redundant Ethernet interface number, and a secondary IP monitoring ping source for each IP address, for the redundancy group to monitor.

Options *IPv4 address*—The address to be continually monitored for reachability. You also set up a secondary IP address to allow testing from the secondary node.



NOTE: All monitored object failures, including IP monitoring, are deducted from the redundancy group threshold priority. Other monitored objects include interface monitor, SPU monitor, cold-sync monitor, and NPC monitor (on supported platforms).

interface *interface* **secondary-ip-address** *ip-address*;—Define source address for monitoring packets on secondary link.

global-threshold—Define global threshold for IP monitoring. See [global-threshold](#).

Default: 0

Range: 0-255

global-weight—Define global weight for IP monitoring. See [global-weight](#).

Default: 255

Range: 0-255

retry-count—Number of retries needed to declare reachability failure. See *retry-count (Chassis Cluster)*.

Default: 5

Range: 5-15

retry-interval—Define the time interval in seconds between retries. See *retry-interval (Chassis Cluster)*.

Default: 1

Range: 1-30

The remaining statements are explained separately. See [CLI Explorer](#).

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">• Example: Configuring Chassis Cluster Redundancy Group IP Address Monitoring on page 536
------------------------------	---

ip-monitoring (Services)

```

Syntax  ip-monitoring {
        policy policy-name {
            match {
                rpm-probe [probe-name];
            }
            no-preempt;
            then {
                interface interface-name (disable | enable);
                preferred-route {
                    route destination-address {
                        discard
                        next hop next-hop;
                        preferred-metric metric;
                    }
                    routing-instances name;
                }
            }
        }
    }
    traceoptions {
        file {
            filename;
            files number;
            match regular-expression;
            size maximum-file-size;
            (world-readable | no-world-readable);
        }
        flag flag;
        no-remote-trace;
    }
}

```

Hierarchy Level [edit services]

Release Information Statement introduced in Junos OS Release 10.4.
Support added for the **discard** option starting from Junos OS Release 15.1X49-D60.

Description Configure IP monitoring.

Options The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation • [icmp on page 1451](#)

next-hop

Syntax	<code>next-hop <i>next-hop</i>;</code>
Hierarchy Level	<code>[edit services rpm probe <i>owner</i> test <i>test-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.4.
Description	Specify the next-hop address to which the probe should be sent.
Required Privilege Level	services—To view this statement in the configuration. services-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• probe on page 1273

CHAPTER 63

Configuration Statements: Datapath Debug

- [action-profile](#) on page 1444
- [capture-file \(Security\)](#) on page 1446
- [datapath-debug](#) on page 1447
- [flow \(Security Flow\)](#) on page 1449
- [icmp](#) on page 1451
- [maximum-capture-size \(Datapath Debug\)](#) on page 1451
- [traceoptions \(Security Datapath Debug\)](#) on page 1452

action-profile

Syntax

```

action-profile profile-name {
    event (jexec | lbt | lt-enter | lt-leave | mac-egress | mac-ingress | np-egress | np-ingress |
    pot) {
        count;
        packet-dump;
        packet-summary;
        trace;
    }
    module {
        flow {
            flag {
                all;
            }
        }
    }
    preserve-trace-order;
    record-pic-history;
}

```

Hierarchy Level [edit security datapath-debug]

Release Information Command introduced in Junos OS Release 10.0.

Description Configure the action profile options for data path debugging.

- Options**
- ***action-profile name*** — Name of the action profile.
 - **event**—Enable the events to trace the packet when the packet hit the events (jexec, lbt, lt-enter, lt-leave, mac-egress, mac-ingress, np-egress, np-ingress, pot)
 - **count**—Number of times a packet hits the specified event.
 - **packet-dump**—Capture the packet that hits the specified event.
 - **packet-summary**—Print the source/destination IP address details with protocol number and IP length details along with trace message for the specified event.
 - **trace**—Print the standard trace message when the packet hits the specified event.
 - **module**—Turn on the flow session related trace messages.
 - **flow**—Trace flow session related messages.
 - **flag**—Specify which flow message needs to be traced.
 - **all**—Trace all possible flow trace messages.
 - **trace**—Print the standard trace message when the packet hits the specified event.
 - **preserve-trace-order**—Preserve trace order.

- **record-pic-history**—Record the PICs in which the packet has been processed.

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

Related Documentation • [Example: Configuring Packet Capture for Datapath Debugging on page 1228](#)

capture-file (Security)

Syntax	<pre>capture-file { filename; files number; format <i>pcap-format</i>; size <i>maximum-file-size</i>; (world-readable no-world-readable); }</pre>
Hierarchy Level	[edit security datapath-debug]
Release Information	Statement introduced in Junos OS Release 10.4.
Description	Sets packet capture for performing the datapath-debug action.
Options	<ul style="list-style-type: none"> • filename—Name of the file to receive the output of the packet capturing operation. • files—Maximum number of capture files. If you specify a maximum number of files, you also must specify a maximum file size with the size option and a filename. Range: 1 through 10 files • format—Describes the format of the capture file. The default format file is pcap. You can also set it as private (binary) format. • size—Describes the size limit of the capture file. If you specify a maximum file size, you also must specify a maximum number of trace files with the files option and a filename. Range: 10 KB through 100 MB • world-readable no-world-readable—By default, log files can be accessed only by the user who configures the tracing operation. The world-readable option enables any user to read the file. To explicitly set the default behavior, use the no-world-readable option.
Required Privilege Level	security—To view this statement in the configuration. security-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • System Log Messages

datapath-debug

Syntax

```
datapath-debug {
  action-profile profile-name {
    event (jexec | lbt | lt-enter | lt-leave | mac-egress | mac-ingress | np-egress | np-ingress
      | pot) {
      count;
      packet-dump;
      packet-summary;
      trace;
    }
    module {
      flow {
        flag {
          all;
        }
      }
    }
  }
  preserve-trace-order;
  record-pic-history;
}
capture-file {
  filename;
  files number;
  format pacp-format;
  size maximum-file-size;
  (world-readable | no-world-readable);
}
maximum-capture-size value;
packet-filter packet-filter-name {
  action-profile (profile-name | default);
  destination-port (port-range | protocol-name);
  destination-prefix destination-prefix;
  interface logical-interface-name;
  protocol (protocol-number | protocol-name);
  source-port (port-range | protocol-name);
  source-prefix source-prefix;
}
traceoptions {
  file {
    filename;
    files number;
    match regular-expression;
    size maximum-file-size;
    (world-readable | no-world-readable);
  }
  no-remote-trace;
}
}
```

Hierarchy Level [edit security]

Release Information Command introduced in Junos OS Release 10.0.

Description Configure the data path debugging options.



.....
NOTE: Data path debugging is supported on SRX1400, SRX3400, SRX3600, SRX5400, SRX5600, and SRX5800.
.....

Options The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- *Understanding Data Path Debugging for Logical Systems*

flow (Security Flow)

```

Syntax flow {
    aging {
        early-ageout seconds;
        high-watermark percent;
        low-watermark percent;
    }
    allow-dns-reply;
    ethernet-switching {
        block-non-ip-all;
        bpdu-vlan-flooding;
        bypass-non-ip-unicast;
        no-packet-flooding {
            no-trace-route;
        }
    }
    force-ip-reassembly;
    ipsec-performance-acceleration;
    load distribution {
        session-affinity ipsec;
    }
    packet-log {
        enable;
        throttle-interval;
        packet-filter <filter-name>;
    }
    pending-sess-queue-length (high | moderate | normal);
    route-change-timeout seconds;
    syn-flood-protection-mode (syn-cookie | syn-proxy);
    tcp-mss {
        all-tcp mss value;
        gre-in {
            mss value;
        }
        gre-out {
            mss value;
        }
        ipsec-vpn {
            mss value;
        }
    }
    tcp-session {
        fin-invalidate-session;
        no-sequence-check;
        no-syn-check;
        no-syn-check-in-tunnel;
        rst-invalidate-session;
        rst-sequence-check;
        strict-syn-check;
        tcp-initial-timeout seconds;
        time-wait-state {
            (session-ageout | session-timeout seconds);
        }
    }
}

```

```

    }
  }
  traceoptions {
    file {
      filename;
      files number;
      match regular-expression;
      size maximum-file-size;
      (world-readable | no-world-readable);
    }
    flag flag;
    no-remote-trace;
    packet-filter filter-name {
      destination-port port-identifier;
      destination-prefix address;
      interface interface-name;
      protocol protocol-identifier;
      source-port port-identifier;
      source-prefix address;
    }
    rate-limit messages-per-second;
  }
}

```

Hierarchy Level	[edit security]
Release Information	Statement modified in Junos OS Release 9.5.
Description	Determine how the device manages packet flow. The device can regulate packet flow in the following ways:
Options	The remaining statements are explained separately. See CLI Explorer .
Required Privilege Level	security—To view this statement in the configuration. security-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • <i>Understanding Traffic Processing on Security Devices</i> • <i>Understanding Session Characteristics for SRX Series Services Gateways</i> • <i>Understanding Packet Flow in Logical Systems for SRX Series Devices</i>

icmp

Syntax	icmp{ destination-interface <i>interface-name</i> ; }
Hierarchy Level	[edit services rpm probe-server]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	Specify the port information for the ICMP server. The remaining statements are explained separately. See CLI Explorer .
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"> • Understanding ICMP Fragment Protection

maximum-capture-size (Datapath Debug)

Syntax	maximum-capture-size <i>maximum-capture-size</i> ;
Hierarchy Level	[edit security datapath-debug]
Release Information	Statement introduced in Junos OS Release 10.0.
Description	Specifies maximum packet capture length.
Options	<ul style="list-style-type: none"> • maximum-capture-size <i>maximum-capture-size</i>—Specify the maximum packet capture length. <p>Range: 68 through 10,000 bytes</p>
Required Privilege Level	security—To view this statement in the configuration. security-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • System Log Messages

traceoptions (Security Datapath Debug)

Syntax

```
traceoptions {
  file {
    filename;
    files number;
    match regular-expression;
    size maximum-file-size;
    (world-readable | no-world-readable);
  }
  no-remote-trace;
}
```

Hierarchy Level [edit security datapath-debug]

Release Information Command introduced in Junos OS Release 9.6.

Description Sets the trace options for datapath-debug.



NOTE: Data path debugging is supported on SRX1400, SRX3400, SRX3600, SRX5400, SRX5600, and SRX5800.

Options

- file**—Configure the trace file options.

- filename**—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 **/var/log**. By default, the name of the file is the name of the process being traced.
- files number**—Maximum number of trace files. When a trace file named **trace-file** reaches its maximum size, it is renamed to **trace-file.0**, then **trace-file.1**, and so on, until the maximum number of trace files is reached. The oldest archived file is overwritten.

If you specify a maximum number of files, you also must specify a maximum file size with the size option and a filename.

Range: 2 through 1000 files

Default: 10 files

- match regular-expression**—Refine the output to include lines that contain the regular expression.
- size maximum-file-size**—Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named **trace-file** reaches this size, it is renamed **trace-file.0**. When the trace-file again reaches its maximum size, **trace-file.0** is renamed **trace-file.1** and **trace-file** is renamed **trace-file.0**. This renaming scheme

continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the `files` option and a filename.

Syntax: `x K` to specify KB, `x m` to specify MB, or `x g` to specify GB

Range: 10 KB through 1 GB

Default: 128 KB

- **world-readable | no-world-readable**—By default, log files can be accessed only by the user who configures the tracing operation. The **world-readable** option enables any user to read the file. To explicitly set the default behavior, use the **no-world-readable** option
- **no-remote-trace**—Set remote tracing as disabled.

Required Privilege	<code>trace</code> —To view this statement in the configuration.
Level	<code>trace-control</code> —To add this statement to the configuration.

CHAPTER 64

Configuration Statements: Health Monitoring

- [falling-threshold on page 1456](#)
- [health-monitor on page 1457](#)
- [idp \(SNMP\) on page 1458](#)
- [routing-engine \(SNMP Resource Level\) on page 1459](#)
- [interval on page 1460](#)
- [rising-threshold on page 1461](#)

falling-threshold

Syntax	<code>falling-threshold <i>percentage</i>;</code>
Hierarchy Level	<code>[edit snmp health-monitor],</code> <code>[edit snmp health-monitor idp]</code>
Release Information	Statement introduced in Junos OS Release 8.0. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 9.3 for the <code>[edit snmp health-monitor idp]</code> hierarchy level.
Description	Set the lower threshold for the monitored object when you configure a health monitor alarm. By setting a rising and a falling threshold for a monitored variable, you can be alerted whenever the value of the variable falls outside the allowable operational range.
Options	<i>percentage</i> —The lower threshold for the alarm entry. Range: 1 through 100 Default: 70 percent of the maximum possible value
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Falling Threshold or Rising Threshold on page 275• rising-threshold on page 1461

health-monitor

Syntax	<pre> health-monitor { falling-threshold <i>percentage</i>; interval <i>seconds</i>; rising-threshold <i>percentage</i>; idp { falling-threshold <i>percentage</i>; interval <i>seconds</i>; rising-threshold <i>percentage</i>; } } </pre>
Hierarchy Level	[edit snmp]
Release Information	<p>Statement introduced in Junos OS Release 8.0.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Option idp introduced in Junos OS Release 9.3 for all supported platforms.</p>
Description	<p>Configure health monitoring.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Health Monitoring on Devices Running Junos OS on page 273

idp (SNMP)

Syntax	<pre>idp { falling-threshold <i>percentage</i>; interval <i>seconds</i>; rising-threshold <i>percentage</i>; }</pre>
Hierarchy Level	[edit snmp health-monitor]
Release Information	Statement introduced in Junos OS Release 9.3.
Description	Configure health monitoring for Intrusion Detection and Prevention (IDP).
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Health Monitoring on Devices Running Junos OS on page 273

routing-engine (SNMP Resource Level)

Syntax	<pre> routing-engine { resource <cpu memory open-files-count process-count storage temperature traceoptions > ; { interval <interval in secs>; moderate-threshold <percentage level>; high-threshold <percentage level>; critical-threshold <percentage level>; action <monitor prevent recover>; } } </pre>
Hierarchy Level	[edit snmp health-monitor routing-engine]
Release Information	Statement introduced in Junos OS Release 12.1X44-D10. Statement modified in Junos OS Release 15.1X49-D10.
Description	Override the global configuration for a resource.
Options	<ul style="list-style-type: none"> • interval—Monitoring interval in seconds. Range: 1 through 604800 seconds Default: 300 seconds • moderate-threshold—Percentage of moderate threshold level resource utilization. Range: 30 through 99 percent Default: 70 percent • high-threshold —Percentage of high-threshold level resource utilization. Range: 30 through 99 percent Default: 80 percent • critical-threshold —Percentage of critical threshold level resource utilization. Range: 30 through 99 percent Default: 90 percent • action—Enable action for all resources. Default: If action is not enabled, the default action is prevent.



WARNING: If the system health management action for an affected resource is configured to recover, then certain intrusive operations necessary for preventing system breakdown are taken. Intrusive operations

can include restarting or terminating processes, deleting files, and so on. Such action information is logged in the system health management history and system log.

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

interval

Syntax	<code>interval <i>seconds</i>;</code>
Hierarchy Level	<code>[edit snmp health-monitor],</code> <code>[edit snmp health-monitor idp]</code>
Release Information	Statement introduced in Junos OS Release 8.0. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 9.3 for the <code>[edit snmp health-monitor idp]</code> hierarchy level.
Description	Interval between samples.
Options	<i>seconds</i> —Time between samples, in seconds. Range: 1 through 2147483647 seconds Default: 300 seconds
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Interval on page 276

rising-threshold

Syntax	<code>rising-threshold <i>percentage</i>;</code>
Hierarchy Level	<code>[edit snmp health-monitor],</code> <code>[edit snmp health-monitor idp]</code>
Release Information	Statement introduced in Junos OS Release 8.0. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 9.3 for the <code>[edit snmp health-monitor idp]</code> hierarchy level.
Description	Set the upper threshold for the monitored object when you configure a health monitor alarm. By setting a rising and a falling threshold for a monitored object, you can be alerted whenever the value of the variable falls outside the allowable operational range.
Options	<i>percentage</i> —The lower threshold for the alarm entry. Range: 1 through 100 Default: 80 percent of the maximum possible value
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• falling-threshold on page 1456• Configuring the Falling Threshold or Rising Threshold on page 275

CHAPTER 65

Configuration Statements: Resource Monitoring for Memory Regions

- `free-fw-memory-watermark` (Resource Monitor) on page 1464
- `free-heap-memory-watermark` (Resource Monitor) on page 1465
- `free-nh-memory-watermark` (Resource Monitor) on page 1466
- `high-cos-queue-threshold` on page 1467
- `high-threshold` (Resource Monitor) on page 1468
- `no-load-throttle` (Resource Monitor) on page 1468
- `no-logging` (Resource Monitor) on page 1469
- `no-throttle` (Resource Monitor) on page 1470
- `resource-category jtree` (Resource Monitor) on page 1471
- `resource-monitor` on page 1472
- `subscribers-limit` (Resource Monitor) on page 1474
- `traceoptions` (Resource Monitor) on page 1475

free-fw-memory-watermark (Resource Monitor)

Syntax	<code>free-fw-memory-watermark <i>number</i>;</code>
Hierarchy Level	[edit system services resource-monitor]
Release Information	Statement introduced in Junos OS Release 15.1 for MX80, MX104, MX240, MX480, MX960, MX2010, and MX2020 routers.
Description	Configure the percentage of free memory space used for firewall or filters to be monitored with a watermark value. You can configure the resource-monitoring capability on MX80, MX104, MX240, MX480, MX960, MX2010, and MX2020 routers with I-chip-based DPCs and Trio-based FPCs.
Options	<p><i>number</i>—Percentage of free memory space used for firewall and filters to be monitored with a watermark value. When the configured watermark is exceeded, error logs are triggered. The default watermark values for the percentage of free ukernel or heap memory, next-hop memory, and firewall filter memory are 20.</p> <p>Range: 1 through 100</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>


free-heap-memory-watermark (Resource Monitor)

Syntax	<code>free-heap-memory-watermark <i>number</i>;</code>
Hierarchy Level	[edit system services resource-monitor]
Release Information	Statement introduced in Junos OS Release 15.1 for MX80, MX104, MX240, MX480, MX960, MX2010, and MX2020 routers.
Description	Configure the percentage of free memory space used for ukernel or heap (ASIC) memory to be monitored with a watermark value. You can configure the resource-monitoring capability on MX80, MX104, MX240, MX480, MX960, MX2010, and MX2020 routers with I-chip-based DPCs and Trio-based FPCs.
Options	<p><i>number</i>—Percentage of free memory space used for ukernel or heap to be monitored with a watermark value. When the configured watermark is exceeded, error logs are triggered. The default watermark values for the percentage of free ukernel or heap memory, next-hop memory, and firewall filter memory are 20.</p> <p>Range: 1 through 100</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>

free-nh-memory-watermark (Resource Monitor)

Syntax	<code>free-nh-memory-watermark <i>number</i>;</code>
Hierarchy Level	<code>[edit system services resource-monitor]</code>
Release Information	Statement introduced in Junos OS Release 15.1 for MX80, MX104, MX240, MX480, MX960, MX2010, and MX2020 routers.
Description	Configure the percentage of free memory space used for next-hops to be monitored with a watermark value. The default value and the configured value of the watermark value for the percentage of free next-hop memory also applies to encapsulation memory. You can configure the resource-monitoring capability on MX80, MX104, MX240, MX480, MX960, MX2010, and MX2020 routers with I-chip-based DPCs and Trio-based FPCs.
Options	<p><i>number</i>—Percentage of free memory space used for next-hops to be monitored with a watermark value. The NH memory watermark is applicable only for encapsulation memory (output WAN static RAM memory). When the configured watermark is exceeded, error logs are triggered. The default watermark values for the percentage of free ukernel or heap memory, next-hop memory, and firewall filter memory are 20.</p> <p>Range: 1 through 100</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>

high-cos-queue-threshold

Syntax	high-cos-queue-threshold <i>number</i> ;
Hierarchy Level	[edit system services resource-monitor]
Release Information	Statement introduced in Junos OS Release 17.4R1.
Description	Configure the class-of-service (CoS) queue threshold by percentage.
	<p> NOTE: This feature is only available when you enable subscriber management. For more information on enabling subscriber management, see <i>Configuring Junos OS Enhanced Subscriber Management</i>.</p> <p>This CoS resource monitoring feature bases admission decisions only on queues. Other CoS resources are not part of this criteria. This feature does not support throttling for subscribers arriving on pseudo-wire, logical tunnel, or redundant logical tunnel devices. The feature is supported on the following hardware:</p> <ul style="list-style-type: none"> • MX240, MX480, and MX960 routers • MPC2E legacy, MPC2E-NG, MPC3E-NG, MPC5E, and MPC7E line cards
Options	<p>number—High-threshold percentage for CoS queue utilization per scheduler. When CoS queue utilization on a given FPC reaches that FPC's configured threshold level, further subscriber logins on that FPC are not allowed. This resource monitoring mechanism provides adjustable safety margins to proactively avoid completely exhausting each FPC's available CoS queue resources.</p> <p>Range: 1 through 90</p> <p>Default: 100</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • <i>Throttling Subscriber Load Based on CoS Resource Capacity</i>

high-threshold (Resource Monitor)

Syntax	high-threshold <i>number</i> ;
Hierarchy Level	[edit system services resource-monitor]
Release Information	Statement introduced in Junos OS Release 15.1 for MX80, MX104, MX240, MX480, MX960, MX2010, and MX2020 routers.
Description	Configure the high threshold value, exceeding which warnings or error logs are generated, for all the regions of memory, such as heap or ukernel, next-hop and encapsulation, and firewall filter memory. You can configure the resource-monitoring capability on MX80, MX104, MX240, MX480, MX960, MX2010, and MX2020 routers with I-chip-based DPCs and Trio-based FPCs.
Options	<i>number</i> —High threshold percentage for memory resource utilization Range: 1 through 100
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

no-load-throttle (Resource Monitor)

Syntax	no-load-throttle;
Hierarchy Level	[edit system services resource-monitor]
Release Information	Statement introduced in Junos OS Release 17.3R1 for MX series routers.
Description	The no-load-throttle statement disables line card load-based throttling. Load-based throttling is also disabled when you configure the no-throttle statement.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

no-logging (Resource Monitor)

Syntax	no-logging;
Hierarchy Level	[edit system services resource-monitor]
Release Information	Statement introduced in Junos OS Release 15.1 for MX80, MX104, MX240, MX480, MX960, MX2010, and MX2020 routers.
Description	Disable the generation of error log messages when the utilization of memory resources exceeds the threshold or checkpoint levels. By default, messages are written to /var/log/rsmonlog.
Options	no-logging —Disable the generation of error log messages when the utilization of memory resources exceeds the configured level. By default, error logs are recorded when the resource level utilization is exceeded.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

no-throttle (Resource Monitor)

Syntax	no-throttle;
Hierarchy Level	[edit system services resource-monitor]
Release Information	Statement introduced in Junos OS Release 15.1 for MX240, MX480, MX960, MX2010, and MX2020 routers.
Description	Disable the throttling of subscriber services and sessions when the utilization of memory resources exceeds the threshold levels. For the subscriber service management, sessions are throttled based on line card resources, such as heap, counter memory, expansion memory, and firewall counter memory. If the resource has been used above a certain threshold, the subscribers and services are throttled to prevent the system from being overloaded and resulting in a breakdown. This feature gathers input from each of the line cards and transfers this statistical detail to the Routing Engine process using a well-known internal port. This information is scanned by the daemon on the Routing Engine and using the shared memory space built into the session database, the existing active subscribers and sessions are throttled. You can configure the resource-monitoring capability on MX240, MX480, MX960, MX2010, and MX2020 routers with I-chip-based DPCs and Trio-based FPCs.
Options	no-throttle —Disable the throttling of subscriber services and sessions when the utilization of memory resources exceeds the threshold levels. The throttling capability is enabled by default.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

resource-category jtree (Resource Monitor)

Syntax	<pre>resource-category jtree { resource-type (contiguous-pages free-dwords free-pages) { low-watermark <i>number</i>; high-watermark <i>number</i>; } }</pre>
Hierarchy Level	[edit system services resource-monitor]
Release Information	Statement introduced in Junos OS Release 15.1 for MX240, MX480, MX960, MX2010, and MX2020 routers.
Description	<p>Define the resource category that you want to monitor and analyze for ensuring system stability, especially the health and operating efficiency of I-chip-based line cards and Trio-based FPCs on MX Series routers. The resource category includes detailed CPU utilization, session rate, and session count statistics. You use the resource category statistics to understand the extent to which new attack objects or applications affect performance. The jtree memory on all MX Series router Packet Forwarding Engines has two segments: one segment primarily stores routing tables and related information, and the other segment primarily stores firewall-filter-related information. The Junos OS provides the memory-enhanced statement to reallocate the jtree memory for routes, firewall filters, and Layer 3 VPNs.</p>
Options	<p>jtree—Specify the Jtree resource category for which you want to monitor the health (working condition), operating efficiency, traffic-handling capacity, and performance status.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>

resource-monitor

```

Syntax resource-monitor {
    free-fw-memory-watermark number;
    free-heap-memory-watermark number;
    free-nh-memory-watermark number;
    high-cos-queue-threshold number;
    high-threshold number;
    no-logging;
    no-throttle;
    resource-category jtree {
        resource-type (contiguous-pages | free-dwords | free-pages) {
            low-watermark number;
            high-watermark number;
        }
    }
    subscribers-limit {
        client-type (any | dhcp | l2tp | pppoe) {
            chassis {
                limit limit;
            }
            fpc slot-number {
                limit limit;
                pic number {
                    limit limit;
                    port number {
                        limit limit;
                    }
                }
            }
        }
    }
    traceoptions {
        file filename <files number> <match regular-expression> <size maximum-file-size>
        <world-readable | no-world-readable>;
        flag flag;
        no-remote-trace;
    }
}

```

Hierarchy Level [edit system services]

Release Information Statement introduced in Junos OS Release 15.1 for MX240, MX480, MX960, MX2010, and MX2020 routers.
high-cos-queue-threshold option introduced in Junos OS Release 17.4R1.

Description Enable the resource monitoring capability to provision sufficient headroom (memory space limits that are set for the application or virtual router) for monitoring the health and operating efficiency of DPCs and MPCs. This feature also enables the memory resource monitoring mechanism to avoid the system operations from compromising on

the health and traffic-handling stability of the line cards by generating error logs when a specified watermark value for memory regions and threshold value for the jtree memory region are exceeded. A trade-off on the system performance can be detrimental for supporting live traffic and protocols.

The variable *number* in the Syntax section represents a percentage.

You can configure the resource-monitoring capability on MX240, MX480, MX960, MX2010, and MX2020 routers with I-chip-based DPCs and Trio-based FPCs.

The remaining statements are explained separately. Search for a statement in [CLI Explorer](#) or click a linked statement in the Syntax section for details.

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

Related Documentation	<ul style="list-style-type: none">• Diagnosing and Debugging System Performance by Configuring Memory Resource Usage Monitoring on MX Series Routers on page 1182• <i>Resource Monitoring for Subscriber Management and Services Overview</i>• Resource Monitoring Usage Computation Overview on page 1179• <i>Limiting Subscribers by Client Type and Hardware Element with Resource Monitor</i>
------------------------------	--

subscribers-limit (Resource Monitor)

```
Syntax subscribers-limit {
  client-type (any | dhcp | l2tp | pppoe) {
    chassis {
      limit limit;
    }
    fpc slot-number {
      limit limit;
    }
    pic number {
      limit limit;
    }
    port number {
      limit limit;
    }
  }
}
```

Hierarchy Level [edit system services [resource-monitor](#)]

Release Information Statement introduced in Junos OS Release 17.3R1.

Description Configure the maximum number of subscribers of a specified client type allowed to be logged in on the chassis, per MPC, per MIC, and per port. When that number is reached, subsequent logins are denied until the current number of subscribers drops below the maximum allowed.

Limit the number of subscribers allowed to log in per chassis, MPC, MIC, or port.

The remaining statements are explained separately. Search for a statement in [CLI Explorer](#) or click a linked statement in the Syntax section for details.

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

Related Documentation

- *Limiting Subscribers by Client Type and Hardware Element with Resource Monitor*
- *Resource Monitoring for Subscriber Management and Services Overview*

traceoptions (Resource Monitor)

Syntax	<pre> traceoptions { file <i>filename</i> <files <i>number</i>> <match <i>regular-expression</i>> <size <i>maximum-file-size</i>> <world-readable no-world-readable>; flag <i>flag</i>; } </pre>
Hierarchy Level	[edit system services resource-monitor]
Release Information	Statement introduced in Junos OS Release 15.1 for MX80, MX104, MX240, MX480, MX960, MX2010, and MX2020 routers.
Description	Define tracing operations for the memory resource utilization processes.
Options	<p>file <i>filename</i>—Name of the file to receive the output of the tracing operation. All files are placed in the directory <code>/var/log</code>. Default: <code>rmopd</code></p> <p>files <i>number</i>—(Optional) Maximum number of trace files to create before overwriting the oldest one. If you specify a maximum number of files, you also must specify a maximum file size with the size option. Range: 2 through 1000 Default: 3 files</p> <p>match <i>regular-expression</i>—(Optional) Refine the output to include lines that contain the regular expression.</p> <p>size <i>maximum-file-size</i>—(Optional) Maximum size of each trace file. By default, the number entered is treated as bytes. Alternatively, you can include a suffix to the number to indicate kilobytes (KB), megabytes (MB), or gigabytes (GB). If you specify a maximum file size, you also must specify a maximum number of trace files with the files option. Range: 10 KB through 1 GB Default: 128 KB</p> <p>world-readable—(Optional) Enable unrestricted file access.</p> <p>no-world-readable—(Default) Disable unrestricted file access. This means the log file can be accessed only by the user who configured the tracing operation.</p> <p>flag <i>flag</i>—Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements. You can include the following flags:</p> <ul style="list-style-type: none"> all—Trace all operations.

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

Configuration Statements: Security Alarms

- [decryption-failures](#) on page 1477
- [idp \(Security Alarms\)](#) on page 1478

decryption-failures

Syntax	decryption-failures { threshold <i>value</i> ; }
Hierarchy Level	[edit security alarms potential-violation]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Raise a security alarm after exceeding a specified number of decryption failures. This statement is supported on SRX300, SRX320, SRX340, SRX345, SRX550HM, and SRX1500 devices and vSRX instances.
Default	Multiple decryption failures do not cause an alarm to be raised.
Options	<p>failures—Number of decryption failures up to which an alarm is not raised. When the configured number is exceeded, an alarm is raised.</p> <p>Range: 0 through 1 through 1,000,000,000.</p> <p>Default: 1000</p>
Required Privilege Level	<p>security—To view this statement in the configuration.</p> <p>security-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • IPsec VPN Overview

idp (Security Alarms)

Syntax	idp;
Hierarchy Level	[edit security alarms potential-violation]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Configure alarms for IDP attack.
Required Privilege Level	security—To view this statement in the configuration. security-control—To add this statement to the configuration.

CHAPTER 67

Configuration Statements: Network Analytics

- [address \(Analytics Collector\) on page 1480](#)
- [agent \(Analytics\) on page 1481](#)
- [analytics on page 1483](#)
- [collector \(Analytics\) on page 1488](#)
- [depth-threshold on page 1489](#)
- [export-profiles on page 1491](#)
- [file \(Analytics\) on page 1493](#)
- [inputs \(Analytics\) on page 1495](#)
- [interface \(Export Profiles\) on page 1498](#)
- [interfaces \(Analytics Resource\) on page 1499](#)
- [interfaces \(Analytics\) on page 1500](#)
- [latency-threshold on page 1502](#)
- [local \(Analytics Collector\) on page 1503](#)
- [outputs \(Analytics\) on page 1504](#)
- [queue-statistics on page 1506](#)
- [resource \(Analytics\) on page 1508](#)
- [resource-profiles \(Analytics\) on page 1509](#)
- [service-agents \(Analytics\) on page 1511](#)
- [streaming-servers on page 1513](#)
- [system \(Analytics Resource\) on page 1515](#)
- [system \(Export Profiles\) on page 1516](#)
- [traceoptions \(Analytics\) on page 1517](#)
- [traceoptions \(Analytics Agent\) on page 1518](#)
- [traffic-statistics on page 1520](#)

address (Analytics Collector)

Syntax

```
address ip-address {
  port number {
    transport protocol {
      export-profile profile-name;
    }
  }
}
```

Hierarchy Level [edit services analytics collector]

Release Information Statement introduced in Junos OS Release 13.2 for the QFX Series.
Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.

Description Configure the address of a remote server to receive streamed analytics (queue and traffic statistics) data.



NOTE: The `address` statement is not available in Junos OS Releases prior to 13.2X51-D15.

Options

- ip-address***—IP address of the remote server receiving the streamed data.
- port number***—Port number of the remote server receiving the streaming data.
- export-profile profile-name***—Name of the export profile containing the parameters for the analytics data being streamed.
- transport protocol***—A transport protocol used to stream data to the port.
Values:
 - **tcp**—Transmission Control Protocol (TCP)
 - **udp**—User Datagram Protocol (UDP)

Required Privilege Level

- interface—To view this statement in the configuration.
- interface-control—To add this statement to the configuration.

Related Documentation

- [Network Analytics Overview on page 753](#)

agent (Analytics)

```
Syntax agent {
    service-agents {
        agent-name {
            inputs {
                analytics {
                    parameters {
                        generate-tags value;
                        sample-frequency value;
                        sensors file-path;
                    }
                }
            }
            input-ipfix {
                parameters {
                    maximum-connections number;
                    tcp-port port-number;
                    vrf-name name;
                }
            }
            input-jti-ipfix {
                parameters {
                    record-group group-name {
                        record ipfix-record-name;
                        reporting-interval seconds;
                    }
                }
            }
        }
        outputs {
            output-ipfix {
                parameters {
                    collector-address ip-address;
                    collector-ca-certificate file-path;
                    collector-certificate file-path;
                    collector-certificate-key file-path;
                    collector-connection-retry-interval seconds;
                    collector-tcp-port port-number;
                    collector-vrf-name vrf-name;
                }
            }
            plugin-name {
                parameters {
                    key-parameter value-parameter;
                }
            }
        }
    }
    traceoptions {
        filename filename;
        flag (debug | error | info | trace);
    }
}
```

```
}
```

Hierarchy Level [edit services [analytics](#)]

Release Information Statement introduced in Junos OS Release 18.3R1 on MX Series routers.
Statement introduced in Junos OS Release 18.4R1 on PTX Series routers.

Description Configure the Network Telemetry Framework (NTF) agent and corresponding service agents that use input and output plug-ins to collect, transform, and forward network telemetry data.

The remaining statements are explained separately. Search for a statement in [CLI Explorer](#) or click a linked statement in the Syntax section for details.

Required Privilege Level system

Related Documentation

- *Configuring the BNG as an IPFIX Mediator to Collect and Export IPFIX Data*
- *Configuring the Collection and Export of Local Telemetry Data on the IPFIX Mediator*
- *IPFIX Mediation on the BNG*
- *Telemetry Data Collection on the IPFIX Mediator for Export to an IPFIX Collector*
- *Configuring NTF Agent*

analytics

List of Syntax [Syntax \(EX Series and QFX Series\) on page 1483](#)
 [Syntax \(MX Series\) on page 1486](#)

Syntax (EX Series and QFX Series) *Junos OS Release 13.2X51-D15 and later:*

```
analytics {
  collector {
    local {
      file filename {
        size size;
        files number;
      }
    }
    address ip-address {
      port number {
        transport protocol {
          export-profile profile-name;
        }
      }
    }
  }
}
export-profiles {
  profile-name {
    interface {
      information;
      statistics {
        queue;
        traffic;
      }
      status {
        link;
        queue;
        traffic;
      }
    }
  }
  stream-format format;
  system {
    information;
    status {
      queue;
      traffic;
    }
  }
}
resource {
  interfaces {
    interface-name {
      resource-profile name;
    }
  }
}
```

```
system {
  polling-interval {
    queue-monitoring interval;
    traffic-monitoring interval;
  }
  resource-profile name;
}
resource-profiles {
  profile-name {
    depth-threshold {
      high number;
      low number;
    }
    latency-threshold {
      high number;
      low number;
    }
    no-queue-monitoring;
    no-traffic-monitoring;
    queue-monitoring;
    traffic-monitoring;
  }
}
traceoptions {
  file filename {
    files number;
    size size;
  }
}
```

Junos OS Release 13.2X50-D15 and 13.2X51-D10 only:

```
analytics {
  interfaces {
    all {
      depth-threshold high number low number;
      latency-threshold high number low number;
      queue-statistics;
      no-queue-statistics;
      traffic-statistics;
      no-traffic-statistics;
    }
    interface-name {
      depth-threshold high number low number;
      latency-threshold high number low number;
      queue-statistics;
      no-queue-statistics;
      traffic-statistics;
      no-traffic-statistics;
    }
  }
  queue-statistics {
    file filename {
      files number-of-files;
      size size;
    }
    interval interval;
  }
  streaming-servers {
    address ip-address {
      port number {
        stream-format format;
        stream-type type
      }
    }
  }
  traceoptions {
    file filename {
      files number;
      size size;
    }
  }
  traffic-statistics {
    file filename {
      files number-of-files;
      size size;
    }
    interval interval;
  }
}
```

Syntax (MX Series)

```

analytics {
  agent {
    service-agents {
      agent-name {
        inputs {
          analytics {
            parameters {
              generate-tags value;
              sample-frequency value;
              sensors file-path;
            }
          }
          input-ipfix {
            parameters {
              maximum-connections number;
              tcp-port port-number;
              vrf-name name;
            }
          }
          input-jti-ipfix {
            parameters {
              record-group group-name {
                record ipfix-record-name;
                reporting-interval seconds;
              }
            }
          }
        }
      }
      outputs {
        output-ipfix {
          parameters {
            collector-address ip-address;
            collector-ca-certificate file-path;
            collector-certificate file-path;
            collector-certificate-key file-path;
            collector-connection-retry-interval seconds;
            collector-tcp-port port-number;
            collector-vrf-name vrf-name;
          }
        }
        plugin-name {
          parameters {
            key-parameter value-parameter;
          }
        }
      }
    }
  }
  traceoptions {
    filename filename;
    flag (debug | error | info | trace);
  }
}

```

Hierarchy Level	[edit services]
Release Information	<p>Statement introduced in Junos OS Release 13.2 on QFX Series switches.</p> <p>Statement introduced in Junos OS Release 13.2X51-D25 on EX Series switches.</p> <p>Statement introduced in Junos OS Release 18.3R1 on MX Series routers.</p>
Description	<p>Configure the network analytics feature that includes monitoring for traffic and queue statistics. The network analytics processes running on the Packet Forwarding Engine and Routing Engine collect and analyze the data, and generate reports that may be saved in log files or sent as streaming data to remote servers.</p> <p>The remaining statements are explained separately. Search for a statement in CLI Explorer or click a linked statement in the Syntax section for details.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Network Analytics Overview on page 753 • <i>Configuring the BNG as an IPFIX Mediator to Collect and Export IPFIX Data</i> • <i>IPFIX Mediation on the BNG</i> • <i>Configuring the Collection and Export of Local Telemetry Data on the IPFIX Mediator</i> • <i>Telemetry Data Collection on the IPFIX Mediator for Export to an IPFIX Collector</i>

collector (Analytics)

```
Syntax collector {
    local {
        file filename {
            size size;
            files number;
        }
    }
    address ip-address {
        port number {
            transport protocol {
                export-profile profile-name;
            }
        }
    }
}
```

Hierarchy Level [edit services analytics]

Release Information Statement introduced in Junos OS Release 13.2 for the QFX Series.
Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.

Description Configure a local file for storing network analytics statistics and/or a remote server for receiving streamed statistics data.



NOTE: The `collector` statement is not available in Junos OS Releases prior to 13.2X51-D15.


The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Network Analytics Overview on page 753](#)

depth-threshold

Syntax	<pre>depth-threshold { high <i>number</i>; low <i>number</i>; }</pre>
Hierarchy Level	[edit services analytics interfaces] [edit services analytics resource-profiles]
Release Information	<p>Statement introduced in Junos OS Release 13.2 for the QFX Series.</p> <p>Statement in the [edit services analytics resource-profiles] hierarchy level introduced in Junos OS Release 13.2X51-D15.</p> <p>Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.</p>
Description	<p>If network analytics queue statistics monitoring is enabled, specify the high and low values (in bytes) of the queue depth (buffer) threshold. If you configure a depth threshold, you cannot configure the latency threshold. You can configure the depth threshold for one interface or all interfaces. Specify the high and low queue depth threshold numbers:</p>
	<div>  <p>NOTE: The configuration for a specific interface supersedes the global configuration for all interfaces.</p> </div>
Options	<p>high <i>number</i>—Specify the maximum value for the depth threshold.</p> <p>Range: 1 to 1,250,000,000 bytes</p> <p>Default:</p> <ul style="list-style-type: none"> Junos OS Release 13.2X51-D10 or later—0 bytes Junos OS Release 13.2X50-D15—14,680,064 bytes (14 MB) <p>low <i>number</i>—Specify the minimum value for the depth threshold.</p> <p>Range: 1 to 1,250,000,000 bytes</p> <p>Default:</p> <ul style="list-style-type: none"> Junos OS Release 13.2X51-D10 or later—0 bytes Junos OS Release 13.2X50-D15—1024 bytes (1 KB)
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Network Analytics Overview on page 753

- [latency-threshold on page 1502](#)
- [resource-profiles \(Analytics\) on page 1509](#)

export-profiles

Syntax

```
export-profiles {
  profile-name {
    interface {
      information;
      statistics {
        queue;
        traffic;
      }
      status {
        link;
        queue;
        traffic;
      }
    }
  }
  stream-format format;
  system {
    information;
    status {
      queue;
      traffic;
    }
  }
}
```

Hierarchy Level [edit services analytics]

Release Information Statement introduced in Junos OS Release 13.2 for the QFX Series.
Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.

Description Configure an profile to specify the network analytics data being streamed to remote servers. Each profile is a template that defines the type of data being streamed.



NOTE: The `export-profile` statement is not available in Junos OS Releases prior to 13.2X51-D15.

Options *profile-name*—Name of the export profile containing the configuration of the data being streamed.

stream-format format—Format of the streaming data being sent to a server. Only one format can be sent to each port on a server.

Values:

- **csv**—Comma-separated Values (CSV). Data sent in this format is newline separated, and each record contains one stream type (queue or traffic data) per

interface. Each record contains either a “q” for a queue statistics, or a “t” for a traffic statistics.

- **gpb**—Google Protocol Buffer (GPB). Data sent in this format has a hierarchical format, and is categorized by resource type (system or interfaces), which is specified in the message header. You can generate data formatted in other formats (CSV, TSV, and JSON) from GPB-encoded data.

Each message includes a 8-byte header containing the following information:

- Bytes 0 to 3—Length of the message.
- Byte 4—Message version.
- Bytes 5 to 7—Reserved for future use.



NOTE: A schema file called `analytics.proto` containing the definitions of the GPB messages is available for downloading from the following location:

https://www.juniper.net/documentation/en_US/junos32/topics/reference/proto-files/analytics-prototxt


- **json**—JavaScript Object Notation (JSON). Data sent in this format is newline separated, and each record contains one stream type (queue or traffic data) per interface. Each record contains either “queue-statistics” or “traffic-statistics” in the “record type” field.
- **tsv**—Tab-separated Values (TSV). Data sent in this format is newline separated, and each record contains one stream type (queue or traffic data) per interface. Each record contains a “q” for a queue statistics, or a “t” for a traffic statistics.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation	<ul style="list-style-type: none">• Network Analytics Overview on page 753
------------------------------	--

file (Analytics)

Syntax	<pre>file <i>filename</i> { files <i>number-of-files</i>; size <i>size</i>; }</pre>
Hierarchy Level	<pre>[edit services analytics collector local] [edit services analytics queue-statistics] [edit services analytics traffic-statistics]</pre>
Release Information	<p>Statement introduced in Junos OS Release 13.2 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.</p>
Description	<p>Enable the logging of queue or traffic monitoring statistics in a local file. This statement does not enable monitoring.</p>
Default	<p>This feature is disabled by default.</p>
Options	<p><i>filename</i>—Specify a filename for storing queue and traffic monitoring statistics in the Comma-separated Values (CSV) format. The file is stored in the <code>/var/log/</code> directory of your device.</p> <p>If you do not specify a filename, the data is not stored in a file.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p> NOTE: In Junos OS Release 13.2X51-D15 or later, you configure a single filename to store both queue and traffic monitoring statistics. In Junos OS Release 13.2X51-D10 and earlier, you configure separate files for storing monitoring data, one for queue statistics, and another for traffic statistics.</p> </div> <p>files <i>number-of-files</i>—Specify the number of files to store locally. After the number of files with the maximum file size is reached, the system starts over and writes the data to the first file.</p> <p>Range: 2 to 1,000 files.</p> <p>size <i>size</i>—Configure the file size in megabytes (MB).</p> <p>Syntax: <i>xm</i> to specify MB.</p> <p>Range: 10 to 4095 MB</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

Release History Table

Release	Description
13.2X51-D15	In Junos OS Release 13.2X51-D15 or later, you configure a single filename to store both queue and traffic monitoring statistics.
13.2X51-D10	In Junos OS Release 13.2X51-D10 and earlier, you configure separate files for storing monitoring data, one for queue statistics, and another for traffic statistics.

**Related
Documentation**

- [Network Analytics Overview on page 753](#)

inputs (Analytics)

```
Syntax inputs {
  analytics {
    parameters {
      generate-tags value;
      sample-frequency value;
      sensors path;
    }
  }
  input-ipfix {
    parameters {
      maximum-connections number;
      tcp-port port-number;
      vrf-name name;
    }
  }
  input-jti-ipfix {
    parameters {
      record-group group-name {
        record ipfix-record-name;
        reporting-interval seconds;
      }
    }
  }
}
```

Hierarchy Level [edit services analytics agent [service-agents](#) *agent-name*]

Release Information Statement introduced in Junos OS Release 18.3R1 on MX Series routers.
Statement introduced in Junos OS Release 18.4R1 on PTX Series routers.
input-jti-ipfix option added in Junos OS Release 18.4R1 on MX Series routers.

Description Configure parameters for a Network Telemetry Framework (NTF) service agent input plug-in. You can configure a single service agent instance to collect data from multiple input plugins.

Options **analytics parameters**—Configure parameters to collect data from Junos Telemetry Interface (JTI) sensors.

generate-tags *value*—(Optional) Enable tag generation.

Default: Enabled

sample-frequency *value*—Specify the frequency interval (in milliseconds) at which the JTI sensor generates data to export to the data collector.

Default: 5000 milliseconds

sensors *file-path*—Specify the resource string associated with the JTI sensor for collecting JTI data from a specific resource. The format is a file path and must be entered

exactly. For a list of available JTI resource string options, see the *sensor* configuration statement and *Guidelines for gRPC Sensors (Junos Telemetry Interface)* documentation.

input-ipfix parameters—Configure parameters for the IPFIX mediation service agent to gather and consolidate IPFIX records from downstream devices.



NOTE: Any change you make to an existing **input-ipfix** plug-in configuration restarts the IPFIX service agent daemon to apply the changes.



NOTE: Although each of the parameters has a default value, you must configure at least one of the parameters to enable the plug-in. If you configure only one parameter and want to use the default value, you must specify that value.

maximum-connections *number*—(Optional) Maximum number of TCP connections that the IPFIX mediator can support.

Range: 1 through 500

Default: 100

tcp-port *port-number*—(Optional) TCP port on the IPFIX mediator that receives TCP packets; the listening port.

Default: 4739

vrf-name *name*—(Optional) Name of the VRF (routing instance) in which IPFIX packets are accepted.

Default: default

input-jti-ipfix parameters—Configure parameters for the IPFIX mediation service agent to collect and report local sensor data from the BNG configured as an IPFIX mediator. For each group of records, the plug-in subscribes to the specific sensor data sets associated with each record.

When you remove a record group from the configuration, the sensor sets for the member records are unsubscribed. The template IDs for the associated IPFIX records are returned to the pool for re-use.

record *ipfix-record-name*—One of the following individual IPFIX records associated with a nonconfigurable set of local sensor data. See *Telemetry Data Collection on the IPFIX Mediator for Export to an IPFIX Collector* for the sensors collected by each record.

address-pool-utilization	port-statistics
chassis-inventory	resource-utilization
chassis-power	subscriber-statistics
dhcpv4-server-stats	thermal
interface-metadata	uptime

record-group *group-name*—Name of a group of IPFIX records that subscribes to the sensor data sets associated with the individual records that comprise the record group. You can configure a maximum of 10 record groups.

reporting-interval *seconds*—(Optional) Interval in seconds between reports for the subscribed sensor data. The interval applies to all records (and all sensor sets) in the record group.

Range: 60 through 86,400 seconds

Default: 900 seconds

Required Privilege Level system

- Related Documentation**
- *Configuring the BNG as an IPFIX Mediator to Collect and Export IPFIX Data*
 - *Configuring the Collection and Export of Local Telemetry Data on the IPFIX Mediator*
 - *Configuring NTF Agent*
 - *IPFIX Mediation on the BNG*
 - *Telemetry Data Collection on the IPFIX Mediator for Export to an IPFIX Collector*

interface (Export Profiles)

Syntax

```
interface {
  information;
  statistics {
    queue;
    traffic;
  }
  status {
    link;
    queue;
    traffic;
  }
}
```

Hierarchy Level [edit services analytics export-profiles]

Release Information Statement introduced in Junos OS Release 13.2 for the QFX Series.
Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.

Description Configure an export profile for streaming network analytics data for a specific interface to remote servers. Each profile is a template that defines the type of data being streamed for that interface.



NOTE: The **interface** statement is not available in Junos OS Releases prior to 13.2X51-D15.

Options **information**—Information about the specified interface, including SNMP index, interface index, slot, port number, media type, capability, and port type.

statistics—Type of monitoring statistics to be streamed.

Values:

- **queue**
- **traffic**

status—Status information about the interface to be streamed.

Values:

- **link**
- **queue**
- **traffic**

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

Related Documentation • [Network Analytics Overview on page 753](#)

interfaces (Analytics Resource)

Syntax

```
interfaces {
  interface-name {
    resource-profile profile-name;
  }
}
```

Hierarchy Level [edit services analytics resource]

Release Information Statement introduced in Junos OS Release 13.2 for the QFX Series.
 Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.

Description Apply the network analytics resource profile to an interface for which you wish to enable queue or traffic statistics monitoring. The resource profile is a template that specifies the parameters for queue and traffic monitoring, as well as for the depth and latency thresholds.



NOTE: The `interfaces` statement in the [edit services analytics resource] hierarchy is not available in Junos OS Releases prior to 13.2X51-D15.

Options *interface-name*—Name of the interface for which a resource profile has been configured.
resource-profile profile-name—Name of a resource profile containing the analytics parameters that have been specified for interfaces. Information contained in a resource profile includes the configuration of queue and traffic monitoring (whether enabled or disabled), and values for the depth and latency thresholds (if applicable).

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

Related Documentation • [Network Analytics Overview on page 753](#)

interfaces (Analytics)

Syntax

```

interfaces {
  all {
    depth-threshold high number low number;
    latency-threshold high number low number;
    queue-statistics;
    no-queue-statistics;
    traffic-statistics;
    no-traffic-statistics;
  }
  interface-name {
    depth-threshold high number low number;
    latency-threshold high number low number;
    queue-statistics;
    no-queue-statistics;
    traffic-statistics;
    no-traffic-statistics;
  }
}

```

Hierarchy Level [edit services analytics]

Release Information Statement introduced in Junos OS Release 13.2 for the QFX Series.
Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.

Description Configure physical interfaces for monitoring traffic and queue statistics by the network analytics processes running on the Packet Forwarding Engine and Routing Engine. You may specify one interface or all interfaces in your configuration.



NOTE: The configuration for a specific interface supersedes the global configuration for all interfaces. You can configure traffic and queue monitoring for physical interfaces only; logical interfaces and Virtual Chassis port (VCP) interfaces are not supported.



NOTE: Disabling the queue or traffic monitoring (using the `no-queue-statistics` or `no-traffic-statistics` configuration statements) supersedes the configuration (enabling) of the feature.

Options **all**—Configure all interfaces on the device for high-frequency monitoring.

interface-name—Name of the interface to configure for high-frequency monitoring.

no-queue-statistics—Disable the collection of queue statistics.



NOTE: The **no-queue-statistics** statement supersedes the **queue-statistics** statement.

no-traffic-statistics—Disable the collection of traffic statistics.



NOTE: The **no-traffic-statistics** statement supersedes the **traffic-statistics** statement.

queue-statistics—Enable the collection of queue statistics for a specific interface or all interfaces.

traffic-statistics—Enable the collection of traffic statistics for a specific interface or all interfaces.

The remaining statements are explained separately. See [CLI Explorer](#).

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"> • Network Analytics Overview on page 753

latency-threshold

Syntax	<pre>latency-threshold { high <i>number</i>; low <i>number</i>; }</pre>
Hierarchy Level	<pre>[edit services analytics interfaces] [edit services analytics resource-profiles]</pre>
Release Information	<p>Statement introduced in Junos OS Release 13.2 for the QFX Series.</p> <p>Statement in the [edit services analytics resource-profiles] hierarchy level introduced in Junos OS Release 13.2X51-D15.</p> <p>Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.</p>
Description	<p>If network analytics queue statistics monitoring is enabled, specify the high and low values (in microseconds) of the latency threshold of the queue. If you configure a latency threshold, you cannot configure the depth threshold. You can configure the latency threshold for one interface or all interfaces. Specify the high and low latency threshold numbers:</p>



NOTE: The configuration for a specific interface supersedes the global configuration for all interfaces.

Options	<p>high <i>number</i>—Specify the maximum value for the latency threshold.</p> <p>Range:</p> <ul style="list-style-type: none"> Junos OS Release 13.2X51-D15 or later—1 to 100,000,000 nanoseconds (0.001 to 100,000 microseconds) Junos OS Release 13.2X51-D10 or earlier—1 to 100,000 microseconds <p>Default:</p> <ul style="list-style-type: none"> Junos OS Release 13.2X51-D15 or later—1,000,000 nanoseconds (1000 microseconds or 1 millisecond) Junos OS Release 13.2X51-D10—1000 microseconds Junos OS Release 13.2X50-D15—900 microseconds <p>low <i>number</i>—Specify the minimum value for the latency threshold.</p> <p>Range:</p> <ul style="list-style-type: none"> Junos OS Release 13.2X51-D15 or later—1 to 100,000,000 nanoseconds Junos OS Release 13.2X51-D10 or earlier—1 to 100,000 microseconds
----------------	---

Default:

- Junos OS Release 13.2X51-D15 or later—100 nanoseconds (0.1 microseconds)
- Junos OS Release 13.2X51-D10—50 microseconds
- Junos OS Release 13.2X50-D15—300 microseconds

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

Related Documentation

- [Network Analytics Overview on page 753](#)
- [depth-threshold on page 1489](#)

local (Analytics Collector)

Syntax

```
local {
  file filename {
    size size;
    files number;
  }
}
```

Hierarchy Level [edit services analytics collector]

Release Information Statement introduced in Junos OS Release 13.2 for the QFX Series.
Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.

Description Configure a local file for logging network analytics (queue and traffic) statistics.



NOTE: The `local` statement is not available in Junos OS Releases prior to 13.2X51-D15.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Network Analytics Overview on page 753](#)
- [collector \(Analytics\) on page 1488](#)

outputs (Analytics)

```
Syntax  outputs {
        output-ipfix {
            parameters {
                collector-address ip-address;
                collector-ca-certificate file-path;
                collector-certificate file-path;
                collector-certificate-key file-path;
                collector-connection-retry-interval seconds;
                collector-tcp-port port-number;
                collector-vrf-name vrf-name;
            }
        }
        plugin-name {
            parameters {
                key-parameter value-parameter;
            }
        }
    }
```

Hierarchy Level [edit services analytics agent [service-agents](#) *agent-name*]

Release Information Statement introduced in Junos OS Release 18.3R1 on MX Series routers.
Statement introduced in Junos OS Release 18.4R1 on PTX Series routers.

Description Configure parameters for the Network Telemetry Framework (NTF) agent output plug-in.

Options **output-ipfix parameters**—Configure parameters for the IPFIX mediation service agent to send the IPFIX records that have been consolidated on the router to the IPFIX collector.

You must configure the IP address of the upstream IPFIX collector. When you optionally configure at least one of the collector certificate options (**collector-ca-certificate**, **collector-certificate**, and **collector-certificate-key**), the IPFIX mediator attempts to use TLS to connect with the collector. Otherwise, the mediator uses a TCP connection.



NOTE: Any change you make to an existing **output-ipfix** output plug-in configuration restarts the IPFIX service agent daemon to apply the changes.

collector-address *ip-address*—IP address of the upstream IPFIX collector.

collector-ca-certificate *file-path*—(Optional) Path for the certificate, provided by a trusted certificate authority (CA), that is used to sign the peer certificate at the peer (IPFIX collector) level. The certificate is expected to be in .pem container format.

collector-certificate *file-path*—(Optional) Path for the client certificate that the server (IPFIX collector) uses to authenticate the client and enable mutual authentication. The fully-qualified domain name (FQDN) of both the client and the server are stored in the certificate's Subject Alternative Name field when the client and server certificates are generated. The certificate is expected to be in .pem container format.

collector-certificate-key *file-path*—(Optional) Private key file that is loaded to decrypt the encrypted message sent from the peer.

collector-connection-retry-interval *seconds*—(Optional) Interval in seconds at which the output plug-in retries connecting to the IPFIX collector.

Range: 1 through 25

Default: 20

collector-tcp-port *port-number*—(Optional) Number of the TCP port used to connect to the IPFIX collector.

Default: 4740

collector-vrf-name *vrf-name*—(Optional) Name of the VRF (routing instance) in which IPFIX packets are routed.

Default: default

***plugin-name* parameters**—Name of the JTI output plug-in file for which you will configure key/value pair parameters.

key-parameter—Key parameter for the key/value pair.

value-parameter—Value parameter for the key/value pair.

Required Privilege Level system

Related Documentation

- *Configuring NTF Agent*

queue-statistics

Syntax

```
queue-statistics {
  file filename {
    files number-of-files;
    size size;
  }
  interval interval;
}
```

Hierarchy Level [edit services analytics]

Release Information Statement introduced in Junos OS Release 13.2 for the QFX Series.
Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.

Description Enable the logging of queue statistics in a local file. This statement does not enable queue statistics monitoring.

To enable queue monitoring, you must specify the **queue-statistics** configuration statement at the **[edit services analytics interfaces]** hierarchy level.

Default This feature is disabled by default.

Options **interval *interval***—Configure the polling interval in milliseconds.



NOTE: You can configure the polling interval for queue statistics globally for all interfaces only. Due to limitations and variations in the hardware capability of different devices, you might see a difference in value between the actual interval and configured interval.

Range:

- Junos OS Release 13.2X50-D15—8 to 1000 milliseconds (8 milliseconds to 1 second)
- Junos OS Release 13.2X51-D10 or later—10 to 1000 milliseconds (10 milliseconds to 1 second)



NOTE: In Junos OS Release 13.2X51-D10 or later, if you configured an interval of less than 10 milliseconds, the following warning messages appear during the commit process: Queue statistics polling interval can not be less than 10 milliseconds and Setting Queue statistics polling interval to 10 milliseconds. These messages do not stop the commit operation, but the interval is automatically set to 10 milliseconds.

Default:

- Junos OS Release 13.2X50-D15—8 milliseconds
- Junos OS Release 13.2X51-D10 or later—10 milliseconds

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation	<ul style="list-style-type: none">• Network Analytics Overview on page 753
------------------------------	--

resource (Analytics)

Syntax

```
resource {
  interfaces {
    interface-name {
      resource-profile profile-name;
    }
  }
  system {
    polling-interval {
      queue-monitoring interval;
      traffic-monitoring interval;
    }
    resource-profile profile-name;
  }
}
```

Hierarchy Level [edit services analytics]

Release Information Statement introduced in Junos OS Release 13.2 for the QFX Series.
Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.

Description Configure network analytics resources such as resource profiles (for interfaces and system), and polling intervals (for queue and traffic monitoring).



NOTE: The **resource** statement is not available in Junos OS Releases prior to 13.2X51-D15.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Network Analytics Overview on page 753](#)

resource-profiles (Analytics)

Syntax

```
resource-profiles {
  profile-name {
    depth-threshold {
      high number;
      low number;
    }
    latency-threshold {
      high number;
      low number;
    }
    no-queue-monitoring;
    no-traffic-monitoring;
    queue-monitoring;
    traffic-monitoring;
  }
}
```

Hierarchy Level [edit services analytics]

Release Information Statement introduced in Junos OS Release 13.2 for the QFX Series.
Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.

Description Configure resource profiles that are used as templates for specifying network analytics parameters. You use resource profiles to enable and disable queue and traffic monitoring, and specify depth and latency thresholds as applicable. Once you have defined a resource profile, you can apply it specifically to individual interfaces, or globally to a system.



NOTE: The **resource-profiles** statement is not available in Junos OS Releases prior to 13.2X51-D15.

The remaining statements are explained separately. See [CLI Explorer](#).

Options **profile-name**—Specify a name for the resource profile.

no-queue-monitoring—Disable queue monitoring.

no-traffic-monitoring—Disable traffic monitoring.

queue-monitoring—Enable queue monitoring.

traffic-monitoring—Enable traffic monitoring.

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

Related Documentation • [Network Analytics Overview on page 753](#)

service-agents (Analytics)

```
Syntax agent {
  service-agents {
    agent-name {
      inputs {
        analytics {
          parameters {
            generate-tags value;
            sample-frequency value;
            sensors file-path;
          }
        }
        input-ipfix {
          parameters {
            maximum-connections number;
            tcp-port port-number;
            vrf-name name;
          }
        }
        input-jti-ipfix {
          parameters {
            record-group group-name {
              record ipfix-record-name;
              reporting-interval seconds;
            }
          }
        }
      }
    }
    outputs {
      output-ipfix {
        parameters {
          collector-address ip-address;
          collector-ca-certificate file-path;
          collector-certificate file-path;
          collector-certificate-key file-path;
          collector-connection-retry-interval seconds;
          collector-tcp-port port-number;
          collector-vrf-name vrf-name;
        }
      }
      plugin-name {
        parameters {
          key-parameter value-parameter;
        }
      }
    }
  }
  traceoptions {
    filename filename;
    flag (debug | error | info | trace);
  }
}
```

```
}
```

Hierarchy Level [edit services analytics [agent](#)]

Release Information Statement introduced in Junos OS Release 18.3R1 on MX Series routers.

Description Configure a network analytics service agent that uses input and output plug-ins to collect, transform, and forward network telemetry data.

Options **ipfix**—Service agent for IPFIX mediation, which enables an MX Series router acting as a BNG to perform a mediation function between downstream flow record exporters and an upstream flow record collector. The IPFIX mediator collects the flow records from connected downstream devices, transforms the records to a uniform IPFIX format, and then exports the records to an external IPFIX collector. The mediator also acts as a single point of contact for external control and management of the BNG and the downstream devices.

The remaining statements are explained separately. Search for a statement in [CLI Explorer](#) or click a linked statement in the Syntax section for details.

Required Privilege Level system

Related Documentation

- *Configuring the BNG as an IPFIX Mediator to Collect and Export IPFIX Data*
- *Configuring the Collection and Export of Local Telemetry Data on the IPFIX Mediator*
- *IPFIX Mediation on the BNG*
- *Telemetry Data Collection on the IPFIX Mediator for Export to an IPFIX Collector*

streaming-servers

Syntax

```
streaming-servers {
  address ip-address {
    port number {
      stream-format format;
      stream-type type
    }
  }
}
```

Hierarchy Level [edit services analytics]

Release Information Statement introduced in Junos OS Release 13.2 for the QFX Series.
Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.

Description Configure remote servers to receive streaming output for the network analytics monitoring of traffic and queue statistics. The streaming function supports TCP connections only, and sends records separated by a newline character.



NOTE: Before you use the remote server to receive streaming data, you must set up the TCP server software to process records that are separated by the newline character (\n).

You can configure multiple servers and multiple ports on each server to receive the streaming data. You can configure different streaming data types and formats for different ports on a server, but you can configure only one streaming type and one format for each port on a server.

Options **address *ip-address***—IP address of the remote server receiving the streaming data.

port *number*—Port number of the remote server receiving the streaming data.

stream-format *format*—Format of the streaming data being sent to a server. Only one format can be sent to each port on a server.

Values:

- **csv**—Comma-separated Values (CSV). Records sent in this format contain a “q” for a queue statistics, or a “t” for a traffic statistics.
- **json**—JavaScript Object Notification (JSON). Records sent in this format contain “queue-statistics” or “traffic-statistics” in the “record type” field.
- **tsv**—Tab-separated Values (TSV). Records sent in this format contain a “q” for a queue statistics, or a “t” for a traffic statistics.

stream-type *type*—Type of streaming data sent to a port. You can specify different types of streaming data to be sent to different ports on the same server.

Values:

- **queue-statistics**
- **traffic-statistics**

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

Related Documentation	<ul style="list-style-type: none">• Network Analytics Overview on page 753• Understanding Network Analytics Streaming Data on page 769
------------------------------	---

system (Analytics Resource)

Syntax

```
system {
  polling-interval {
    queue-monitoring interval;
    traffic-monitoring interval;
  }
  resource-profile profile-name;
}
```

Hierarchy Level [edit services analytics resource]

Release Information Statement introduced in Junos OS Release 13.2 for the QFX Series.
Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.

Description Apply a network analytics resource profile to a system for which you wish to enable queue or traffic monitoring. The resource profile is a template that specifies the parameters for queue and traffic monitoring, as well as for the depth and latency thresholds.



NOTE: The **system** statement in the [edit services analytics resource] hierarchy is not available in Junos OS Releases prior to 13.2X51-D15.

Options **polling-interval**—Configure the polling interval for queue and traffic monitoring:

queue-monitoring *polling-interval*—Configure the queue monitoring interval in milliseconds.

Range: 1 to 1000 milliseconds (1 millisecond to 1 second) on devices other than EX4300 switches. 8 to 1000 milliseconds (8 milliseconds to 1 second) on EX4300 switches.

traffic-monitoring *polling-interval*—Configure the traffic monitoring interval in seconds.

Range: 1 to 300 seconds (1 second to 5 minutes) on devices other than EX4300 switches. 5 to 300 seconds (5 seconds to 5 minutes) on EX 4300 switches.

resource-profile *profile-name*—Name of a resource profile containing the global analytics parameters that have been configured for the system. Information contained in a resource profile includes the configuration of queue and traffic monitoring (whether enabled or disabled), and values for the depth and latency thresholds (if applicable).

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

Related Documentation • [Network Analytics Overview on page 753](#)

system (Export Profiles)

Syntax

```
system {
  information;
  status {
    queue;
    traffic;
  }
}
```

Hierarchy Level [edit services analytics export-profiles]

Release Information Statement introduced in Junos OS Release 13.2 for the QFX Series.
Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.

Description Configure a system-wide export profile for streaming network analytics data to remote servers. Each profile is a template that defines the type of data being streamed for that system.



NOTE: The **system** statement is not available in Junos OS Releases prior to 13.2X51-D15.

Options **information**—Information about the system, including boot time, model, serial number, maximum number of ports, collector information, and interface list.

status—System status information to be streamed.

Values:

- **queue**
- **traffic**


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

Related Documentation • [Network Analytics Overview on page 753](#)

traceoptions (Analytics)

Syntax	<pre>traceoptions { file <i>filename</i>; files <i>number-of-files</i>; size <i>size</i>; }</pre>
Hierarchy Level	[edit services analytics]
Release Information	<p>Statement introduced in Junos OS Release 13.2 on QFX Series switches.</p> <p>Statement introduced in Junos OS Release 13.2X51-D25 on EX Series switches.</p>
Description	Configure traceoptions for the network analytics daemon (analyticsd) running on the Routing Engine.
Options	<p>file <i>filename</i>—Specify a filename for storing the traceoptions data. The file is stored in the <code>/var/log/</code> directory of your device.</p> <p>If you do not specify a filename, the data is not stored in a file.</p> <p>files <i>number-of-files</i>—Specify the number of files to store locally. After the number files with the maximum file size is reached, the system starts over and writes the data to the first file.</p> <p>Range: 2 to 1,000 files.</p> <p>size <i>size</i>—Configure the file size in megabytes (MB).</p> <p>Syntax: <i>xm</i> to specify MB.</p> <p>Range: 10 to 4095 MB</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Network Analytics Overview on page 753

traceoptions (Analytics Agent)

Syntax	<pre>traceoptions { file <i>filename</i>; flag (debug error info trace); }</pre>
Hierarchy Level	[edit services analytics agent]
Release Information	<p>Statement introduced in Junos OS Release 18.3R1 on MX Series routers.</p> <p>Statement introduced in Junos OS Release 18.4R1 on PTX Series routers.</p>
Description	<p>Configure tracing operations for Network Telemetry Framework (NTF) agent. You can specify the name of the file where the NTF agent log messages are stored. You can also specify a severity level for messages to be logged. The severity level that you configure depends on the issue that you are trying to resolve. In some cases you might be interested in seeing all messages relevant to the logged event, so you specify trace. As levels become more restrictive, fewer messages are logged.</p>
	<p> NOTE: Although the syntax uses the keyword flag, its function in this statement corresponds to the level keyword used for other traceoptions statements.</p>
Options	<p>file <i>filename</i>—Name of the file to receive the output of the tracing operation. The file is stored in the <code>/var/log/</code> directory of your device.</p> <p>Default: ntf-agent</p> <p>flag (debug error info trace)—Specify the severity level for messages to be logged. The order of severity, from most to least severe is as follows:</p> <p>error > info > debug > trace</p> <ul style="list-style-type: none"> debug—Match debug messages. error—Match error messages. This is the most restrictive level. info—Match informational messages. trace—Match all messages. <p>Default: error</p>
Required Privilege Level	system

- Related Documentation**
- *IPFIX Mediation on the BNG*
 - *Configuring NTF Agent*

traffic-statistics

Syntax

```
traffic-statistics {
  file filename {
    files number-of-files;
    size size;
  }
  interval interval;
}
```

Hierarchy Level [edit services analytics]

Release Information Statement introduced in Junos OS Release 13.2 for the QFX Series.
Statement introduced in Junos OS Release 13.2X51-D25 for EX Series switches.

Description Enable the logging of traffic statistics in a local file. This statement does not enable traffic statistics monitoring.

To enable the monitoring of traffic statistics, configure the **traffic-statistics** configuration statement at the [edit services analytics interfaces] hierarchy level.

Default This feature is disabled by default.

Options **file *filename***—Specify a filename for storing the traffic statistics in the JavaScript Object Notification (JSON) format. The file is stored in the **/var/log/** directory of your device.

If you do not specify a filename, the data is not stored in a file.

files *number-of-files*—Specify the number of files to store locally. After the number files with the maximum file size is reached, the system starts over and writes the data to the first file.

Range: 2 to 1,000 files.

interval *interval*—Configure the polling interval in seconds.



NOTE: You can configure the polling interval for traffic statistics globally for all interfaces only. Due to limitations and variations in the hardware capability of different devices, you might see a difference in value between the actual interval and configured interval.

Range:

- Junos OS Release 13.2X51-D10 or later—2 to 300 seconds (2 seconds to 5 minutes)
- Junos OS Release 13.2X50-D15—1 to 300 seconds (1 second to 5 minutes)



NOTE: In Junos OS Release 13.2X51-D10 or later, if you configured an interval of less than 2 seconds, the following warning messages appear during the commit process:

Traffic statistics polling interval can not be less than 2 seconds, and

Setting Traffic statistics polling interval to 2 seconds.

These messages do not stop the commit operation, but the interval is automatically set to 2 seconds.

Default:

- Junos OS Release 13.2X50-D15—1 second
- Junos OS Release 13.2X51-D10 or later—2 seconds

size *size*—Configure the file size in megabytes (MB).

Syntax: *xm* to specify MB.

Range: 10 to 4095 MB

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"> • Network Analytics Overview on page 753

CHAPTER 68

Configuration Statements: SNMP

- [access \(SNMP\) on page 1527](#)
- [access-list on page 1528](#)
- [address \(SNMP\) on page 1529](#)
- [address-mask on page 1530](#)
- [agent-address on page 1531](#)
- [alarm-id on page 1532](#)
- [alarm \(SNMP RMON\) on page 1533](#)
- [alarm-list-name on page 1534](#)
- [alarm-management on page 1535](#)
- [alarm-state on page 1536](#)
- [authentication-md5 on page 1537](#)
- [authentication-none on page 1538](#)
- [authentication-password on page 1539](#)
- [authentication-sha on page 1540](#)
- [authorization on page 1541](#)
- [authorization on page 1542](#)
- [bucket-size on page 1543](#)
- [categories on page 1544](#)
- [client-list on page 1545](#)
- [client-list-name on page 1546](#)
- [clients on page 1547](#)
- [commit-delay on page 1548](#)
- [community \(SNMP\) on page 1549](#)
- [community on page 1550](#)
- [community \(RMON\) on page 1551](#)
- [community-name on page 1552](#)
- [contact \(SNMP\) on page 1553](#)
- [description on page 1554](#)

- [description on page 1555](#)
- [description \(RMON\) on page 1556](#)
- [destination-port on page 1557](#)
- [engine-id on page 1558](#)
- [enterprise-oid on page 1559](#)
- [event on page 1560](#)
- [event on page 1561](#)
- [falling-event-index on page 1562](#)
- [falling-event-index \(RMON\) on page 1563](#)
- [falling-threshold \(Health Monitor\) on page 1564](#)
- [falling-threshold \(RMON\) on page 1565](#)
- [falling-threshold on page 1566](#)
- [falling-threshold-interval on page 1567](#)
- [falling-threshold-interval on page 1568](#)
- [filter-duplicates on page 1569](#)
- [filter-interfaces on page 1570](#)
- [group \(Defining Access Privileges for an SNMPv3 Group\) on page 1571](#)
- [group \(Configuring Group Name\) on page 1572](#)
- [health-monitor on page 1573](#)
- [history on page 1574](#)
- [interface \(SNMP\) on page 1575](#)
- [interface \(SNMP RMON History\) on page 1576](#)
- [interval on page 1577](#)
- [interval \(Health Monitor\) on page 1578](#)
- [interval \(SNMP RMON\) on page 1579](#)
- [local-engine on page 1580](#)
- [location \(SNMP\) on page 1581](#)
- [logical-system on page 1582](#)
- [logical-system-trap-filter on page 1583](#)
- [message-processing-model on page 1583](#)
- [name on page 1584](#)
- [nonvolatile on page 1585](#)
- [notify on page 1586](#)
- [notify-filter \(Applying to the Management Target\) on page 1587](#)
- [notify-filter \(Configuring the Profile Name\) on page 1588](#)
- [notify-view on page 1589](#)
- [oid \(SNMPv3\) on page 1590](#)

- [oid](#) on page 1591
- [owner](#) on page 1592
- [parameters](#) on page 1593
- [port](#) on page 1594
- [privacy-3des](#) on page 1595
- [privacy-aes128](#) on page 1596
- [privacy-des](#) on page 1597
- [privacy-none](#) on page 1598
- [privacy-password](#) on page 1599
- [proxy \(snmp\)](#) on page 1600
- [read-view](#) on page 1601
- [remote-engine](#) on page 1602
- [request-type](#) on page 1603
- [request-type](#) on page 1604
- [retry-count](#) on page 1605
- [rising-event-index](#) on page 1606
- [rising-event-index](#) on page 1607
- [rising-threshold](#) on page 1608
- [rising-threshold \(Health Monitor\)](#) on page 1609
- [rising-threshold \(RMON\)](#) on page 1610
- [rmon](#) on page 1611
- [rmon](#) on page 1612
- [routing-instance](#) on page 1613
- [routing-instance-access](#) on page 1614
- [sample-type](#) on page 1615
- [sample-type](#) on page 1616
- [startup-alarm](#) on page 1617
- [security-level \(Defining Access Privileges\)](#) on page 1618
- [security-level \(Generating SNMP Notifications\)](#) on page 1619
- [security-model \(Access Privileges\)](#) on page 1620
- [security-model \(Group\)](#) on page 1621
- [security-model \(SNMP Notifications\)](#) on page 1622
- [security-name \(Community String\)](#) on page 1623
- [security-name \(Security Group\)](#) on page 1624
- [security-name \(SNMP Notifications\)](#) on page 1625
- [security-to-group](#) on page 1626
- [snmp](#) on page 1627

- [snmp-community](#) on page 1631
- [snmp-value-match-msmic](#) (Services NAT Options) on page 1632
- [source-address](#) on page 1633
- [startup-alarm](#) on page 1634
- [syslog-subtag](#) on page 1635
- [syslog-subtag](#) on page 1635
- [tag](#) (Configuring Notification Targets) on page 1636
- [tag-list](#) on page 1637
- [target-address](#) on page 1638
- [target-parameters](#) on page 1639
- [targets](#) on page 1640
- [timeout](#) on page 1641
- [traceoptions](#) (SNMP) on page 1642
- [traceoptions](#) (SNMP) on page 1644
- [trap-group](#) on page 1646
- [trap-options](#) on page 1648
- [type](#) (RMON Notification) on page 1649
- [type](#) on page 1650
- [type](#) on page 1651
- [user](#) on page 1652
- [usm](#) on page 1653
- [v3](#) on page 1655
- [vacm](#) on page 1658
- [variable](#) on page 1659
- [variable](#) on page 1660
- [version](#) (SNMP) on page 1661
- [view](#) (Associating a MIB View with a Community) on page 1662
- [view](#) (Configuring a MIB View) on page 1663
- [write-view](#) on page 1664

access (SNMP)

```
Syntax  access {
          group group-name {
            (default-context-prefix | context-prefix context-prefix) {
              security-model (any | usm | v1 | v2c) {
                security-level (authentication | none | privacy) {
                  notify-view view-name;
                  read-view view-name;
                  write-view view-name;
                }
              }
            }
          }
        }
```

Hierarchy Level [edit snmp v3 vacm]

Release Information Statement introduced in Junos OS Release 11.1 for the QFX Series.
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

Description Set SNMP access limits.

The remaining statements are explained separately. See [CLI Explorer](#).

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

access-list

Syntax

```
[edit snmp]
  routing-instance-access {
    access-list {
      routing-instance;
      routing-instance restrict;
    }
  }
```

Hierarchy Level [edit snmp routing-instance-access]

Release Information Statement introduced in Junos OS Release 8.4.

Description Create access lists to control SNMP agents in routing instances from accessing SNMP information. To enable the SNMP agent on a routing instance to access SNMP information, specify the routing instance name. To disable the SNMP agent on a routing instance from accessing SNMP information, include the routing-instance name followed by the **restrict** keyword.

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

Related Documentation

- [routing-instance-access on page 1614](#)

address (SNMP)

Syntax	<code>address <i>address</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-address <i>target-address-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Specify the SNMP target address for receiving traps or informs.
Options	<i>address</i> —IPv4 address of the system to receive traps or informs. You must specify an address, not a hostname.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• <i>Understanding the Implementation of SNMP on the QFabric System</i>• Configuring SNMP on page 192• Example: Configuring SNMP on page 269

address-mask

Syntax	<code>address-mask <i>address-mask</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-address <i>target-address-name</i>]</code>
Release Information	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 11.1 on the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Verify the source addresses for a group of target addresses.
Options	<i>address-mask</i> combined with the address defines a range of addresses.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Address Mask on page 303

agent-address

Syntax	agent-address outgoing-interface;
Hierarchy Level	[edit snmp trap-options]
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX, and PTX Series Routers and SRX firewalls.</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 and EX4600.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p>
Description	Set the agent address of all SNMPv1 traps generated by this router or switch. Currently, the only option is outgoing-interface , which sets the agent address of each SNMPv1 trap to the address of the outgoing interface of that trap.
Options	<p>outgoing-interface—Value of the agent address of all SNMPv1 traps generated by this router or switch. The outgoing-interface option sets the agent address of each SNMPv1 trap to the address of the outgoing interface of that trap.</p> <p>Default: disabled (the agent address is not specified in SNMPv1 traps).</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Agent Address for SNMP Traps on page 223

alarm-id

Syntax

```
alarm-id id {  
  alarm-state state {  
    description alarm-description;  
    notification-id notification-id-of-alarm;  
    resource-prefix alarm-resource-prefix;  
    varbind-index varbind-index-in-alarm-varbind-list;  
    varbind-subtree alarm-varbind-subtree;  
    varbind-value alarm-varbind-value;  
  }  
}
```

Hierarchy Level [edit snmp alarm-management alarm-list-name]

Release Information Statement introduced in Junos OS Release 14.1.

Description Specify the identifier of the alarm that you need to configure.
The remaining statement is explained separately. See [CLI Explorer](#).

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

Related Documentation

- [alarm-list-name on page 1534](#)
- [alarm-management on page 1535](#)
- [alarm-state on page 1536](#)

alarm (SNMP RMON)

Syntax	<pre>alarm <i>index</i> { description <i>description</i>; falling-event-index <i>index</i>; falling-threshold <i>integer</i>; falling-threshold-interval <i>seconds</i>; interval <i>seconds</i>; request-type (get-next-request get-request walk-request); rising-event-index <i>index</i>; rising-threshold <i>integer</i>; sample-type (absolute-value delta-value); startup-alarm (falling-alarm rising-alarm rising-or-falling alarm); syslog-subtag <i>syslog-subtag</i>; variable <i>oid-variable</i>; }</pre>
Hierarchy Level	[edit snmp rmon]
Release Information	<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 14.1X53-D20 for the OCX Series.</p>
Description	Configure RMON alarm entries.
Options	<p><i>index</i>—Identifies this alarm entry as an integer.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring an RMON Alarm Entry and Its Attributes on page 385 • event on page 1561 • RMON MIB Event, Alarm, Log, and History Control Tables on page 382 • Monitoring RMON MIB Tables on page 264 • Understanding RMON on page 377

alarm-list-name

Syntax

```
alarm-list-name list-name {
  alarm-id id {
    alarm-state state {
      description alarm-description;
      notification-id notification-id-of-alarm;
      resource-prefix alarm-resource-prefix;
      varbind-index varbind-index-in-alarm-varbind-list;
      varbind-subtree alarm-varbind-subtree;
      varbind-value alarm-varbind-value;
    }
  }
}
```

Hierarchy Level [edit snmp alarm-management]

Release Information Statement introduced in Junos OS Release 14.1.

Description Specify the name of the alarm list that you need to configure.
The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [alarm-id on page 1532](#)
- [alarm-management on page 1535](#)
- [alarm-state on page 1536](#)

alarm-management

```
Syntax alarm-management {
  alarm-list-name list-name {
    alarm-id id {
      alarm-state state {
        description alarm-description;
        notification-id notification-id-of-alarm;
        resource-prefix alarm-resource-prefix;
        varbind-index varbind-index-in-alarm-varbind-list;
        varbind-subtree alarm-varbind-subtree;
        varbind-value alarm-varbind-value;
      }
    }
  }
}
```

Hierarchy Level [edit snmp]

Release Information Statement introduced in Junos OS Release 14.1.

Description Configure the alarm management system to monitor and report active alarms as well as the history of alarms through the SNMP MIB tables supported by the *Alarm MIB*.



NOTE: You cannot configure alarms without notifications. It is mandatory to include the notification identifier in the configuration.

The remaining statements are explained separately. See [CLI Explorer](#).

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


Related Documentation

- [alarm-id on page 1532](#)
- [alarm-list-name on page 1534](#)
- [alarm-state on page 1536](#)


alarm-state

Syntax	<pre>alarm-state state { description <i>alarm-description</i>; notification-id <i>notification-id-of-alarm</i>; resource-prefix <i>alarm-resource-prefix</i>; varbind-index <i>varbind-index-in-alarm-varbind-list</i>; varbind-subtree <i>alarm-varbind-subtree</i>; varbind-value <i>alarm-varbind-value</i>; }</pre>
Hierarchy Level	[edit snmp alarm-management alarm-list-name]
Release Information	Statement introduced in Junos OS Release 14.1.
Description	Specify the state of the alarm and the other parameters that you need to monitor.
Options	<p>description <i>alarm-description</i>—Include a brief description of the alarm.</p> <p>notification-id <i>notification-id-of-alarm</i>—Specify the identifier of the notification associated with the alarm.</p> <p>resource-prefix <i>alarm-resource-prefix</i>—Specify the resource prefix of the alarm.</p> <p>varbind-index <i>varbind-index-in-alarm-varbind-list</i>—Specify the varbind index in the alarm varbind list. Range: 0 through 4294967295</p> <p>varbind-subtree <i>alarm-varbind-subtree</i>—Specify the subtree of the varbind.</p> <p>varbind-value <i>alarm-varbind-value</i>—Specify the varbind value of the alarm. Range: 0 through 2147483647</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • alarm-id on page 1532 • alarm-list-name on page 1534 • alarm-management on page 1535

authentication-md5

Syntax	<pre>authentication-md5 { (authentication-key authentication-key authentication-password authentication-password); }</pre>
Hierarchy Level	<pre>[edit snmp v3 usm local-engine user <i>username</i>], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i>]</pre>
Release Information	<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>
Description	<p>Configure MD5 as the authentication type for the SNMPv3 user.</p> <hr/> <div>  <p>NOTE: You can only configure one authentication type for each SNMPv3 user.</p> </div> <hr/> <p>For authentication, you can either enter a password in clear text, which is immediately encrypted, or, if you already have the encrypted version (known as a <i>key</i>), enter the key directly.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring MD5 Authentication on page 288


authentication-none

Syntax	authentication-none;
Hierarchy Level	[edit snmp v3 usm local-engine user <i>username</i>], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i>]
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure that there should be no authentication for the SNMPv3 user. <div> NOTE: You can configure only one authentication type for each SNMPv3 user.</div>
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring No Authentication on page 289


authentication-password

Syntax	<code>authentication-password <i>authentication-password</i>;</code>
Hierarchy Level	<pre>[edit snmp v3 usm local-engine user <i>username</i> authentication-md5], [edit snmp v3 usm local-engine user <i>username</i> authentication-sha], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> authentication-md5], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> authentication-sha]</pre>
Release Information	<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>
Description	Configure the password for user authentication.
Options	<p><i>authentication-password</i>—Password that a user enters. The password is then converted into a key that is used for authentication.</p> <p>SNMPv3 has special requirements when you create plain-text passwords on a router or switch:</p> <ul style="list-style-type: none"> • The password must be at least eight characters long. • The password can include alphabetic, numeric, and special characters, but it cannot include control characters.
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring MD5 Authentication on page 288 • Configuring SHA Authentication on page 289

authentication-sha

Syntax	<pre>authentication-sha { (authentication-key authentication-key authentication-password authentication-password); }</pre>
Hierarchy Level	<pre>[edit snmp v3 usm local-engine user username], [edit snmp v3 usm remote-engine engine-id user username]</pre>
Release Information	<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>
Description	<p>Configure the secure hash algorithm (SHA) as the authentication type for the SNMPv3 user.</p> <hr/> <div>  <p>NOTE: You can configure only one authentication type for each SNMPv3 user.</p> </div> <hr/> <p>For authentication, you can either enter a password in clear text, which is immediately encrypted, or, if you already have the encrypted version (known as a <i>key</i>), enter the key directly.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring SHA Authentication on page 289

authorization

Syntax	<code>authorization <i>authorization</i>;</code>
Hierarchy Level	<code>[edit snmp community <i>community-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.
Description	Set the access authorization for SNMP Get , GetBulk , GetNext , and Set requests.
Options	<p><i>authorization</i>—Access authorization level:</p> <ul style="list-style-type: none"> read-only—Enable Get, GetNext, and GetBulk requests. read-write—Enable all requests, including Set requests. You must configure a view to enable Set requests.
	<p> NOTE: The read-write option is not supported on the QFX3000 QFabric system.</p>
	Default: read-only
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> Configuring the SNMP Community String on page 213

authorization

Syntax	<code>authorization <i>authorization</i>;</code>
Hierarchy Level	<code>[edit snmp community <i>community-name</i>]</code>
Release Information	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 11.1 for the QFX Series.
Description	Set the access authorization for SNMP Get , GetBulk , GetNext , and Set requests.
Options	<p><i>authorization</i>—Access authorization level:</p> <ul style="list-style-type: none">• read-only—Enable Get, GetNext, and GetBulk requests.• read-write—Enable all requests, including Set requests. You must configure a view to enable Set requests. <p>Default: read-only</p>
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring SNMP Communities on page 210

bucket-size

Syntax	bucket-size <i>number</i> ;
Hierarchy Level	[edit snmp rmon history index]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure the sampling of Ethernet statistics for network fault diagnosis, planning, and performance tuning.
Default	50
Options	<i>number</i> —Number of discrete samples of Ethernet statistics requested.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Understanding RMON on page 377• RMON MIB Event, Alarm, Log, and History Control Tables on page 382• Configuring RMON History Sampling on page 391• Monitoring RMON MIB Tables on page 264• Junos OS Network Management Configuration Guide

categories

Syntax	<pre>categories { category; }</pre>
Hierarchy Level	[edit snmp trap-group <i>group-name</i>]
Release Information	<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 14.1X53-D20 for OCX Series switches.</p>
Description	Define the types of traps that are sent to the targets of the named trap group.
Default	If you omit the categories statement, all trap types are included in trap notifications.
Options	<p>Categories</p> <p>authentication—Authentication failures.</p> <p>chassis—Chassis or environment notifications.</p> <p>chassis-cluster—(For SRX Series) Clustering notifications.</p> <p>configuration—Configuration notifications.</p> <p>link—Link up-down transitions.</p> <p>otn-alarms—OTN alarm trap subcategories.</p> <p>remote-operations—Remote operations.</p> <p>rmon-alarm—RMON rising and falling alarms.</p> <p>routing—Routing protocol notifications.</p> <p>services—Services notifications.</p> <p>sonet-alarms—SONET alarm trap subcategories.</p> <p>startup—System warm and cold starts.</p> <p>vrrp-events—VRRP notifications.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>

- Related Documentation**
- [Configuring SNMP Trap Groups on page 224](#)

client-list

Syntax

```
client-list client-list-name {
  ip-addresses;
}
```

Hierarchy Level [edit snmp]

Release Information

Statement introduced in Junos OS Release 8.5 for MX, M, T, ACX, and PTX Series Routers and SRX firewalls.

Statement introduced in Junos OS Release 9.0 for EX Series switches.

Statement introduced in Junos OS Release 11.1 for QFX Series switches.

Statement introduced in Junos OS Release 11.1 for QFX Series switches and EX4600.

Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.

Description Define a list of SNMP clients.

Options

client-list-name—Name of the client list.

ip-addresses—IP addresses of the SNMP clients to be added to the client list,

Required Privilege Level

snmp—To view this statement in the configuration.

snmp-control—To add this statement to the configuration.

- Related Documentation**
- [Adding a Group of Clients to an SNMP Community on page 215](#)

client-list-name

Syntax	<code>client-list-name <i>client-list-name</i>;</code>
Hierarchy Level	<code>[edit snmp community <i>community-name</i>]</code>
Release Information	<p>Statement introduced in Junos OS Release 8.5 for MX, M, T, ACX, and PTX Series Routers and SRX firewalls.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	Add a client list or prefix list to an SNMP community.
Options	<i>client-list-name</i> —Name of the client list or prefix list.
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Adding a Group of Clients to an SNMP Community on page 215


clients

Syntax	<pre>clients { address <restrict>; }</pre>
Hierarchy Level	[edit snmp community <i>community-name</i>]
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX, and PTX Series Routers and SRX firewalls.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	Specify the IPv4 or IPv6 addresses of the SNMP client hosts that are authorized to use this community.
Default	If you omit the clients statement, all SNMP clients using this community string are authorized to access the router.
Options	<p>address—Address of an SNMP client that is authorized to access this router. You must specify an address, not a hostname. To specify more than one client, include multiple address options.</p> <p>restrict—(Optional) Do not allow the specified SNMP client to access the router.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring SNMP Communities on page 210

commit-delay

Syntax	<code>commit-delay <i>seconds</i>;</code>
Hierarchy Level	<code>[edit snmp nonvolatile]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX, and PTX Series Routers and SRX firewalls.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series switches.</p>
Description	Configure the timer for the SNMP Set reply and start of the commit.
Options	<p><i>seconds</i>—Delay between an affirmative SNMP Set reply and start of the commit.</p> <p>Default: 5 seconds</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring the Commit Delay Timer on page 208

community (SNMP)

Syntax	<pre>community <i>community-name</i> { authorization <i>authorization</i>; client-list-name <i>client-list-name</i>; clients { address restrict; } view <i>view-name</i>; }</pre>
Hierarchy Level	[edit snmp]
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX, and PTX Series Routers and SRX firewalls.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	<p>Define an SNMP community. An SNMP community authorizes SNMP clients based on the source IP address of incoming SNMP request packets. A community also defines which MIB objects are available and the operations (read-only or read-write) allowed on those objects.</p>
	<p> NOTE: The authorization read-write option is not supported on the QFX3000 QFabric system.</p> <p>The SNMP client application specifies an SNMP community name in Get, GetBulk, GetNext, and Set SNMP requests.</p>
Default	If you omit the community statement, all SNMP requests are denied.
Options	<p>community-name—Community string. If the name includes spaces, enclose it in quotation marks (" ").</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring SNMP Communities on page 210 • Configuring the SNMP Community String on page 213


community

Syntax	<code>community <i>community-name</i>;</code>
Hierarchy Level	<code>[edit snmp rmon event <i>index</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	The trap group that is used when generating a trap (if eventType is configured to send traps). If that trap group has the rmon-alarm trap category configured, a trap is sent to all the targets configured for that trap group. The community string in the trap matches the name of the trap group (and hence, the value of eventCommunity). If nothing is configured, traps are sent to each group with the rmon-alarm category set.
Options	community-name —Identifies the trap group that is used when generating a trap if the event is configured to send traps.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring an RMON Event Entry and Its Attributes on page 389

community (RMON)

Syntax	<code>community <i>community-name</i>;</code>
Hierarchy Level	<code>[edit snmp rmon event <i>index</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	<p>Configure the SNMP trap group that is used when generating a trap (if the eventType object is configured to send traps). If that trap group has the rmon-alarm trap category configured, a trap is sent to all the targets configured for that trap group. The community string in the trap matches the name of the trap group (and hence, the value of eventCommunity). If nothing is configured, traps are sent to each group that has the rmon-alarm category configured.</p> <p>The event community is not the same as an SNMP community.</p>
Options	<i>community-name</i> —Name of the trap group that is used when generating a trap if the event is configured to send traps.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • RMON MIB Event, Alarm, Log, and History Control Tables on page 382 • Configuring RMON Alarms and Events on page 276 • Monitoring RMON MIB Tables on page 264 • Understanding RMON on page 377 • Junos OS Network Management Configuration Guide

community-name

Syntax	<code>community-name <i>community-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 snmp-community <i>community-index</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	The community name defines an SNMP community. The SNMP community authorizes SNMPv1 or SNMPv2 clients. The access privileges associated with the configured security name define which MIB objects are available and the operations (notify, read, or write) allowed on those objects.
Options	<i>community-name</i> —Community string for an SNMPv1 or SNMPv2c community. If unconfigured, it is the same as the community index. If the name includes spaces, enclose it in quotation marks (" ").
<div>  <p>NOTE: Community names must be unique. You cannot configure the same community name at the <code>[edit snmp community]</code> and <code>[edit snmp v3 snmp-community <i>community-index</i>]</code> hierarchy levels.</p> <p>The community name at the <code>[edit snmp v3 snmp-community <i>community-index</i>]</code> hierarchy level is encrypted and not displayed in the command-line interface (CLI).</p> </div>	
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> Configuring the SNMPv3 Community on page 318

contact (SNMP)

Syntax	<code>contact <i>contact</i>;</code>
Hierarchy Level	<code>[edit snmp]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX, and PTX Series Routers and SRX firewalls.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	Define the value of the MIB II sysContact object, which is the contact person for the managed system.
Options	contact —Name of the contact person. If the name includes spaces, enclose it in quotation marks (" ").
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the System Contact on a Device Running Junos OS on page 203

description

Syntax	<code>description <i>description</i>;</code>
Hierarchy Level	<code>[edit snmp]</code>
Release Information	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 11.1 for the QFX Series.
Description	Define the value of the MIB II sysDescription object, which is the description of the system being managed.
Options	<i>description</i> —System description. If the name includes spaces, enclose it in quotation marks (" ").
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the System Description on a Device Running Junos OS on page 206

description

Syntax	<code>description <i>description</i>;</code>
Hierarchy Level	[edit snmp rmon alarm <i>index</i>], [edit snmp rmon event <i>index</i>]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Text description of alarm or event.
Options	<i>description</i> —Text description of an alarm or event entry. If the description includes spaces, enclose it in quotation marks (" ").
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Description on page 386• Configuring an RMON Event Entry and Its Attributes on page 389


description (RMON)

Syntax	<code>description <i>description</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm <i>index</i>],</code> <code>[edit snmp rmon event <i>index</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Text description of alarm or event.
Options	<i>description</i> —Text description of an alarm or event entry. If the description includes spaces, enclose it in quotation marks (" ").
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• RMON MIB Event, Alarm, Log, and History Control Tables on page 382• Configuring RMON Alarms and Events on page 276• Monitoring RMON MIB Tables on page 264• Understanding RMON on page 377• Junos OS Network Management Configuration Guide

destination-port

Syntax	<code>destination-port <i>port-number</i>;</code>
Hierarchy Level	[edit snmp trap-group]
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX, and PTX Series Routers and SRX firewalls.</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 switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
Description	Assign a trap port number other than the default.
Default	If you omit this statement, the default port is 162.
Options	<i>port-number</i> —SNMP trap port number.
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring SNMP Trap Groups on page 224• <i>Configuring SNMP Trap Groups</i>

engine-id

Syntax	<pre>engine-id { (local <i>engine-id-suffix</i> use-default-ip-address use-mac-address); }</pre>
Hierarchy Level	[edit snmp]
Release Information	<p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
Description	<p>Define a unique identifier for an SNMPv3 engine by configuring the suffix of the engine ID. The engine ID is used for identification only and not for addressing. There are two parts of an engine ID: the prefix and the suffix. The prefix is formatted according to the specifications defined in RFC 3411, <i>An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks</i> and cannot be configured. The suffix is configured here.</p> <p>.....</p> <div>  <p>NOTE: SNMPv3 authentication and encryption keys are generated based on the associated user passwords and the engine ID. If you configure or change the engine ID, you must commit the user passwords and new engine ID before you configure SNMPv3 users, or the authentication will fail.</p> <p>By default, the engine ID suffix is configured with the MAC address of the management interface (the <i>use-mac-address</i> option) on the QFX Series and OCX Series. You can override this configuration by using the local <i>engine-id-suffix</i> or <i>use-default-ip-address</i> option.</p> <p>.....</p> </div>
Default	use-mac-address
Options	<p>local <i>engine-id-suffix</i>—The engine ID suffix is set based on the data entered.</p> <p>use-default-ip-address—The engine ID suffix is generated from the default IP address.</p> <p>use-mac-address—The engine ID suffix is generated from the MAC address of the management interface on the switch.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • SNMPv3 Overview (QFX in Standalone Mode) on page 79 • Configuring SNMP on page 192

- [Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282](#)

enterprise-oid

Syntax	enterprise-oid;
Hierarchy Level	[edit snmp trap-options]
Release Information	Statement introduced in Junos OS Release 10.0
Description	Add the snmpTrapEnterprise object, which shows the association between an enterprise-specific trap and the organization that defined the trap, to standard SNMP traps. By default, the snmpTrapEnterprise object is added only to the enterprise-specific traps. When the enterprise-oid statement is included in the configuration, snmpTrapEnterprise is added to all the traps generated from the device.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	• Configuring SNMP Trap Options on page 220

event

Syntax	<pre>event <i>index</i> { community <i>community-name</i>; description <i>description</i>; type (RMON Notification) <i>type</i>; }</pre>
Hierarchy Level	[edit snmp rmon]
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure RMON event entries.
Options	<p><i>index</i>—Identifier for a specific event entry.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• RMON MIB Event, Alarm, Log, and History Control Tables on page 382• Monitoring RMON MIB Tables on page 264• Understanding RMON on page 377• Junos OS Network Management Configuration Guide

event

Syntax	<pre>event <i>index</i> { community <i>community-name</i>; description <i>description</i>; type <i>type</i>; }</pre>
Hierarchy Level	[edit snmp rmon]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Configure RMON event entries.
Options	<p><i>index</i>—Identifier for a specific event entry.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring an RMON Event Entry and Its Attributes on page 389 • alarm (SNMP RMON) on page 1533

falling-event-index

Syntax	<code>falling-event-index <i>index</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm <i>index</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	The index of the event entry that is used when a falling threshold is crossed. If this value is zero, no event is triggered.
Options	<i>index</i> —Index of the event entry that is used when a falling threshold is crossed. Range: 0 through 65,535 Default: 0
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Falling Event Index or Rising Event Index on page 386• rising-event-index on page 1607

falling-event-index (RMON)

Syntax	<code>falling-event-index <i>index</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm <i>index</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Set the index number of the event entry that is used when a falling threshold is crossed. You specify the falling-event index when you configure an SNMP RMON alarm. If this value is zero, no event is triggered.
Options	<i>index</i> —Index of the event entry that is used when a falling threshold is crossed. Range: 0 through 65,535 Default: 0
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • RMON MIB Event, Alarm, Log, and History Control Tables on page 382 • Configuring RMON Alarms and Events on page 276 • Monitoring RMON MIB Tables on page 264 • Understanding RMON on page 377 • Junos OS Network Management Configuration Guide

falling-threshold (Health Monitor)

Syntax	<code>falling-threshold <i>percentage</i>;</code>
Hierarchy Level	<code>[edit snmp health-monitor]</code>
Release Information	Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Set the lower threshold for the monitored object when you configure a health monitor alarm. By setting a rising and a falling threshold for a monitored variable, you can be alerted whenever the value of the variable falls outside the allowable operational range.
Options	<i>percentage</i> —Lower threshold for the alarm entry. Range: 1 through 100 Default: 70 percent of the maximum possible value
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• rising-threshold on page 1609• Configuring Health Monitoring on page 272

falling-threshold (RMON)

Syntax	<code>falling-threshold <i>integer</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm <i>index</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Set the lower threshold for the sampled variable (monitored object) when you configure an SNMP RMON alarm. By setting a rising and a falling threshold for a variable, you can be alerted whenever the value of the variable falls outside the allowable operational range.
Options	<i>integer</i> —Lower threshold for the alarm entry. Range: -2,147,483,648 through 2,147,483,647 Default: 20 percent less than the rising-threshold value
Required Privilege Level	snmp —To view this statement in the configuration. snmp-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • RMON MIB Event, Alarm, Log, and History Control Tables on page 382 • Configuring RMON Alarms and Events on page 276 • Monitoring RMON MIB Tables on page 264 • Understanding RMON on page 377 • Junos OS Network Management Configuration Guide

falling-threshold

Syntax	<code>falling-threshold <i>integer</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm <i>index</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Set the lower threshold for the sampled variable (monitored object) when you configure an SNMP RMON alarm. By setting a rising and a falling threshold for a variable, you can be alerted whenever the value of the variable falls outside the allowable operational range.
Options	<i>integer</i> —The lower threshold for the alarm entry. Range: -2,147,483,648 through 2,147,483,647 Default: 20 percent less than rising-threshold
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Falling Threshold or Rising Threshold on page 386• rising-threshold on page 1608

falling-threshold-interval

Syntax	<code>falling-threshold-interval <i>seconds</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm index]</code>
Release Information	Statement introduced in Junos OS Release 8.3. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Set the interval between samples after the rising threshold is exceeded and the value of the sample starts to drop. If the value of the sample drops and exceeds the falling threshold, the regular sampling interval is used.
Options	<i>seconds</i> —Time between samples, in seconds. Range: 1 through 2,147,483,647 seconds Default: 60 seconds
Required Privilege Level	snmp —To view this statement in the configuration. snmp-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Falling Threshold Interval on page 387• interval on page 1577

falling-threshold-interval

Syntax	<code>falling-threshold-interval <i>seconds</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm <i>index</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Set the interval between samples after the rising threshold is exceeded and the value of the sample starts to drop. If the value of the sample drops and exceeds the falling threshold, the regular sampling interval is used.
Options	<i>interval</i> —Time between samples, in seconds. Range: 1 through 2,147,483,647 seconds Default: 60 seconds
Required Privilege Level	snmp —To view this statement in the configuration. snmp-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• RMON MIB Event, Alarm, Log, and History Control Tables on page 382• Configuring RMON Alarms and Events on page 276• Monitoring RMON MIB Tables on page 264• Understanding RMON on page 377• Junos OS Network Management Configuration Guide

filter-duplicates

Syntax	filter-duplicates;
Hierarchy Level	[edit snmp]
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX, and PTX Series routers and SRX firewalls.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	Filter duplicate Get , GetNext , or GetBulk SNMP requests.
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Filtering Duplicate SNMP Requests on page 209 • Understanding the Implementation of SNMP on the QFabric System • Example: Configuring SNMP on page 269

filter-interfaces

List of Syntax	Syntax: MX, M, T, ACX, and PTX Series Routers and SRX Firewalls on page 1570 Syntax: QFX Series switches, QFabric, OCX1100 and EX4600 on page 1570
Syntax: MX, M, T, ACX, and PTX Series Routers and SRX Firewalls	<pre>filter-interfaces { interfaces { all-internal-interfaces; interface 1; interface 2; } }</pre>
Syntax: QFX Series switches, QFabric, OCX1100 and EX4600	<pre>filter-interfaces { all-internal-interfaces; interfaces <i>interface</i> }</pre>
Hierarchy Level	[edit snmp]
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX, and PTX Series routers and SRX firewalls.</p> <p>Statement introduced in Junos OS Release 9.4 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 14.1X53-D20 for the OCX Series.</p>
Description	Filter out information related to specific interfaces from the output of SNMP Get and GetNext requests performed on interface-related MIBs.
Options	<p>all-internal-interfaces—Filters out information from SNMP Get and GetNext requests for the specified interfaces.</p> <p>interfaces—Specifies the interfaces to filter out from the output of SNMP Get and GetNext requests.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Filtering Interface Information Out of SNMP Get and GetNext Output on page 240

group (Defining Access Privileges for an SNMPv3 Group)

Syntax	<code>group <i>group-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 vacm security-to-group security-model (usm v1 v2c) <i>security-name security-name</i>]</code>
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Define access privileges granted to a group.
Options	<i>group-name</i> —Identifies a collection of SNMP security names that belong to the same access policy SNMP.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring the Group on page 298

group (Configuring Group Name)

Syntax	<pre> group group-name { (default-context-prefix context-prefix context-prefix){ security-model (any usm v1 v2c) { security-level (authentication none privacy) { notify-view view-name; read-view view-name; write-view view-name; } } } } </pre>
Hierarchy Level	[edit snmp v3 vacm access]
Release Information	<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 14.1X53-D20 for the OCX Series.</p>
Description	<p>Assign the security name to a group, and specify the SNMPv3 context applicable to the group. The default-context-prefix statement, when included, adds all the contexts configured on the device to the group, whereas the context-prefix context-prefix statement enables you to specify a context and to add that particular context to the group.</p> <p>(Not applicable to the QFX Series and OCX Series.) When the context prefix is specified as default (for example, context-prefix default), the context associated with the master routing instance is added to the group. To specify a routing instance that is part of a logical system, specify it as logical system/routing instance. For example, to specify routing instance ri1 in logical system ls1, include context-prefix ls1/ri1.</p> <p>The remaining statements under this hierarchy are explained separately.</p>
Options	group-name —SNMPv3 group name created for the SNMPv3 group.
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Configuring the Group on page 293

health-monitor

Syntax	<pre>health-monitor { falling-threshold <i>percentage</i>; interval <i>seconds</i>; rising-threshold <i>percentage</i>; }</pre>
Hierarchy Level	[edit snmp]
Release Information	Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Configure health monitoring. The remaining statements are explained separately. See CLI Explorer .
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Health Monitoring on page 272• Understanding Health Monitoring

history

Syntax	<pre>history <i>history-index</i> { bucket-size <i>number</i>; interface <i>interface-name</i>; interval <i>seconds</i>; owner <i>owner-name</i>; }</pre>
Hierarchy Level	[edit snmp rmon]
Release Information	<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 14.1X53-D20 for the OCX Series.</p>
Description	<p>Configure RMON history group entries. This RMON feature can be used with the Simple Network Management Protocol (SNMP) agent in the switch to monitor all the traffic flowing among switches on all connected LAN segments. The RMON history feature collects statistics in accordance with user-configurable parameters.</p> <p>The history group controls the periodic statistical sampling of data from various types of networks. This group contains configuration entries that specify an interface, polling period, and other parameters. If you use the history statement, you must also configure the interface <i>interface-name</i> statement.</p>
Default	Not configured.
Options	<p>history-index—Tag the history entries with a number.</p> <p>Range: 1 through 65535 (integer)</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Understanding RMON on page 377 • RMON MIB Event, Alarm, Log, and History Control Tables on page 382 • Configuring RMON History Sampling on page 391 • Monitoring RMON MIB Tables on page 264 • Junos OS Network Management Configuration Guide

interface (SNMP)

Syntax	<code>interface [<i>interface-names</i>];</code>
Hierarchy Level	<code>[edit snmp]</code>
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure the interfaces on which SNMP requests can be accepted.
Default	If you omit this statement, SNMP requests entering the router or switch through any interface are accepted.
Options	<i>interface-names</i> —Names of one or more logical interfaces.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Interfaces on Which SNMP Requests Can Be Accepted on page 239

interface (SNMP RMON History)

Syntax	<code>interface <i>interface-name</i>;</code>
Hierarchy Level	<code>[edit snmp rmon history <i>history-index</i>]</code>
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	<p>Specify the interface to be monitored in the specified RMON history entry.</p> <p>Only one interface can be specified for a particular RMON history index. There is a one-to-one relationship between the interface and the history index. The interface must be specified in order for the RMON history to be created.</p>
Options	<i>interface-name</i> —Specify the interface to be monitored within the specified entry of the RMON history of Ethernet statistics.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Understanding RMON on page 377• RMON MIB Event, Alarm, Log, and History Control Tables on page 382• Configuring RMON History Sampling on page 391• Monitoring RMON MIB Tables on page 264• Junos OS Network Management Configuration Guide

interval

Syntax	<code>interval <i>seconds</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm index]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Interval between samples.
Options	<i>seconds</i> —Time between samples, in seconds. Range: 1 through 2,147,483,647 seconds Default: 60 seconds
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Interval on page 387

interval (Health Monitor)

Syntax	<code>interval <i>seconds</i>;</code>
Hierarchy Level	<code>[edit snmp health-monitor]</code>
Release Information	Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Configure the interval between sampling of the object being monitored by the health monitor.
Options	<i>seconds</i> —Time between samples, in seconds. Range: 1 through 2147483647 seconds Default: 300 seconds
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Health Monitoring on page 272

interval (SNMP RMON)

Syntax	<code>interval <i>seconds</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm index],</code> <code>[edit snmp rmon history]</code>
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure the interval over which data is to be sampled for the specified interface.
Default	60 sec for alarm sampling. 1800 sec for Ethernet packet history sampling.
Options	<i>seconds</i> —Interval at which data is to be sampled for the specified interface.
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Understanding RMON on page 377 • RMON MIB Event, Alarm, Log, and History Control Tables on page 382 • Configuring RMON History Sampling on page 391 • Monitoring RMON MIB Tables on page 264

local-engine

Syntax

```
local-engine {
  user username {
    authentication-md5 {
      (authentication-key authentication-key | authentication-password
        authentication-password);
    }
    authentication-none;
    authentication-sha {
      (authentication-key authentication-key | authentication-password
        authentication-password);
    }
    privacy-aes128 {
      (privacy-key privacy-key | privacy-password privacy-password);
    }
    privacy-des {
      (privacy-key privacy-key | privacy-password privacy-password);
    }
    privacy-3des {
      (privacy-key privacy-key | privacy-password privacy-password);
    }
    privacy-none {
    }
  }
}
```

Hierarchy Level [edit snmp v3 [usm](#)]

Release Information 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 11.1 for the QFX Series.

Description Configure local engine information for the user-based security model (USM).

The remaining statements are explained separately. See [CLI Explorer](#).

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


Related Documentation

- [Creating SNMPv3 Users on page 286](#)

location (SNMP)

Syntax	<code>location <i>location</i>;</code>
Hierarchy Level	<code>[edit snmp]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX, and PTX Series routers and SRX firewalls.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	Define the value of the MIB II sysLocation object, which is the physical location of the managed system.
Options	<i>location</i> —Location of the local system. You must enclose the name within quotation marks (" ").
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the System Location for a Device Running Junos OS on page 205

logical-system

Syntax	<pre>logical-system <i>logical-system-name</i> { routing-instance <i>routing-instance-name</i> { source-address <i>address</i>; } }</pre>
Hierarchy Level	<pre>[edit snmp <i>community</i> <i>community-name</i>], [edit snmp <i>trap-group</i>], [edit snmp <i>trap-options</i>] [edit snmp <i>v3target-address</i> <i>target-address-name</i>]</pre>
Release Information	<p>Statement introduced in Junos OS Release 9.3</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> NOTE: The <code>logical-system</code> statement replaces the <code>logical-router</code> statement, and is backward-compatible with Junos OS Release 8.3 and later.</p>
Description	<p>Specify a logical system name for SNMP v1 and v2c clients.</p> <p>Include at the <code>[edit snmp trap-options]</code> hierarchy level to specify a logical-system address as the source address of an SNMP trap.</p> <p>Include at the <code>[edit snmp v3 target-address]</code> hierarchy level to specify a logical-system name as the destination address for an SNMPv3 trap or inform.</p>
Options	<p><i>logical-system-name</i>—Name of the logical system.</p> <p><i>routing-instance routing-instance-name</i>—Statement to specify a routing instance associated with the logical system.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Specifying a Routing Instance in an SNMPv1 or SNMPv2c Community on page 339 • Configuring the Trap Target Address on page 302

logical-system-trap-filter

Syntax	logical-system-trap-filter;
Hierarchy Level	[edit snmp]
Release Information	Statement introduced in Junos OS Release 8.4.
Description	Restrict the routing instances from receiving traps that are not related to the logical system networks to which they belong.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • SNMP Traps Supported for Routing Instances on page 337

message-processing-model

Syntax	message-processing-model (v1 v2c v3);
Hierarchy Level	[edit snmp v3 target-parameters <i>target-parameter-name</i> parameters]
Release Information	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 11.1 for the QFX Series.
Description	Configure the message processing model to be used when generating SNMP notifications.
Options	v1—SNMPv1 message process model. v2c—SNMPv2c message process model. v3—SNMPv3 message process model.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring the Message Processing Model on page 308

name

Syntax	<code>name <i>name</i>;</code>
Hierarchy Level	<code>[edit snmp]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX, and PTX Series routers and SRX firewalls.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	Set the system name from the command-line interface.
Options	<i>name</i> —System name override.
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring a Different System Name on page 208

nonvolatile

Syntax	<pre>nonvolatile { commit-delay <i>seconds</i>; }</pre>
Hierarchy Level	[edit snmp]
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX, and PTX Series routers and SRX firewalls.</p> <p>The commit-delay 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 14.1X53-D20 for the OCX Series.</p>
Description	<p>Configure options for SNMP Set requests.</p> <p>The remaining statement is explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Commit Delay Timer on page 208 • commit-delay on page 1548

notify

Syntax	<pre>notify <i>name</i> { tag <i>tag-name</i>; type (trap inform); }</pre>
Hierarchy Level	[edit snmp v3]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>type inform option added in 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 14.1X53-D20 for the OCX Series.</p>
Description	Select management targets for SNMPv3 notifications as well as the type of notifications. Notifications can be either traps or informs.
Options	<p>name—Name assigned to the notification.</p> <p>tag-name—Notifications are sent to all targets configured with this tag.</p> <p>type—Notification type is trap or inform. Traps are unconfirmed notifications. Informs are confirmed notifications.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring the Inform Notification Type and Target Address on page 310• Configuring the SNMPv3 Trap Notification on page 300

notify-filter (Applying to the Management Target)

Syntax	<code>notify-filter <i>profile-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-parameters <i>target-parameters-name</i>]</code>
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Specify the notify filter to be used by a specific set of target parameters.
Options	<i>profile-name</i> —Name of the notify filter to apply to notifications.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Applying the Trap Notification Filter on page 307

notify-filter (Configuring the Profile Name)

Syntax	<pre>notify-filter <i>profile-name</i> { <i>oid oid</i> (include exclude); }</pre>
Hierarchy Level	[edit snmp v3]
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Specify a group of MIB objects for which you define access. The notify filter limits the type of traps or informs sent to the network management system.
Options	<i>profile-name</i> —Name assigned to the notify filter. The remaining statement is explained separately. See CLI Explorer .
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Trap Notification Filter on page 301• oid on page 1686

notify-view

Syntax	<code>notify-view <i>view-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 vacm access group <i>group-name</i> (default-context-prefix context-prefix <i>context-prefix</i>) security-model (any usm v1 v2c) security-level (authentication none privacy)]</code>
Release Information	<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 14.1X53-D20 for the OCX Series.</p>
Description	Associate the notify view with a community (for SNMPv1 or SNMPv2c clients) or a group name (for SNMPv3 clients).
Options	<i>view-name</i> —Name of the view to which the SNMP user group has access.
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring MIB Views on page 241 • Configuring the Notify View on page 295

oid (SNMPv3)

Syntax	<code>oid <i>oid</i> (include exclude);</code>
Hierarchy Level	<code>[edit snmp v3 notify-filter <i>profile-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Specify an object identifier (OID) used to represent a subtree of MIB objects. This OID is a prefix that the represented MIB objects have in common.
Options	exclude —Exclude the subtree of MIB objects represented by the specified OID. include —Include the subtree of MIB objects represented by the specified OID. oid —Object identifier used to represent a subtree of MIB objects. All MIB objects represented by this statement have the specified OID as a prefix. You can specify the OID using either a sequence of dotted integers or a subtree name.
Required Privilege Level	snmp —To view this statement in the configuration. snmp-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• SNMPv3 Overview (QFX in Stanalone Mode) on page 79• Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282• Configuring SNMP on page 192• Configuring the SNMPv3 Trap Notification on page 300

oid

Syntax	<code>oid <i>object-identifier</i> (exclude include);</code>
Hierarchy Level	<code>[edit snmp view <i>view-name</i>]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX and PTX Series routers, OCX switches and SRX devices.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	Specify an object identifier (OID) used to represent a subtree of MIB objects.
Options	<p>exclude—Exclude the subtree of MIB objects represented by the specified OID.</p> <p>include—Include the subtree of MIB objects represented by the specified OID.</p> <p><i>object-identifier</i>—OID used to represent a subtree of MIB objects. All MIB objects represented by this statement have the specified OID as a prefix. You can specify the OID using either a sequence of dotted integers or a subtree name.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring MIB Views on page 241

owner

Syntax	<code>owner <i>owner-name</i>;</code>
Hierarchy Level	[edit snmp rmon history]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Specify the user or group responsible for this RMON history configuration.
Options	<i>owner-name</i> —The user or group responsible for this configuration. Range: 0 through 32 alphanumeric characters
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Understanding RMON on page 377• RMON MIB Event, Alarm, Log, and History Control Tables on page 382• Configuring RMON History Sampling on page 391• Monitoring RMON MIB Tables on page 264

parameters

Syntax	<pre>parameters { message-processing-model (v1 v2c v3); security-level (none authentication privacy); security-model (usm v1 v2c); security-name security-name; }</pre>
Hierarchy Level	[edit snmp v3 target-parameters <i>target-parameters-name</i>]
Release Information	<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>
Description	<p>Configure a set of target parameters for message processing and security.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Defining and Configuring the Trap Target Parameters on page 306

port

Syntax	<code>port <i>port-number</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-address <i>target-address-name</i>]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure a UDP port number for an SNMP target.
Default	If you omit this statement, the default port is 162.
Options	<i>port-number</i> —Port number for the SNMP target.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Port on page 304

privacy-3des

Syntax	<pre>privacy-3des { (privacy-key <i>privacy-key</i> privacy-password <i>privacy-password</i>); }</pre>
Hierarchy Level	<pre>[edit snmp v3 usm local-engine user <i>username</i>], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i>]</pre>
Release Information	<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>
Description	<p>Configure the triple Data Encryption Standard (3DES) as the privacy type for the SNMPv3 user.</p> <p>For privacy encryption, you can either enter a password in clear text, which is immediately encrypted, or, if you already have the encrypted version (known as a <i>key</i>), enter the key directly.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the SNMPv3 Encryption Type on page 289

privacy-aes128

Syntax	<pre>privacy-aes128 { (privacy-key <i>privacy-key</i> privacy-password <i>privacy-password</i>); }</pre>
Hierarchy Level	<pre>[edit snmp v3 usm local-engine user <i>username</i>], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i>]</pre>
Release Information	<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>
Description	<p>Configure the Advanced Encryption Standard encryption algorithm (CFB128-AES-128 Privacy Protocol) for the SNMPv3 user.</p> <p>For privacy encryption, you can either enter a password in clear text, which is immediately encrypted, or, if you already have the encrypted version (known as a <i>key</i>), enter the key directly.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring the SNMPv3 Encryption Type on page 289

privacy-des

Syntax	<pre>privacy-des { (privacy-key <i>privacy-key</i> privacy-password <i>privacy-password</i>); }</pre>
Hierarchy Level	<pre>[edit snmp v3 usm local-engine user <i>username</i>], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i>]</pre>
Release Information	<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>
Description	<p>Configure the Data Encryption Standard (DES) as the privacy type for the SNMPv3 user.</p> <p>For privacy encryption, you can either enter a password in clear text, which is immediately encrypted, or, if you already have the encrypted version (known as a <i>key</i>), enter the key directly.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the SNMPv3 Encryption Type on page 289

privacy-none

Syntax	privacy-none;
Hierarchy Level	[edit snmp v3 usm local-engine user <i>username</i>], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i>]
Release Information	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 11.1 for the QFX Series.
Description	Configure that no encryption be used for the SNMPv3 user.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the SNMPv3 Encryption Type on page 289

privacy-password

Syntax	<code>privacy-password <i>privacy-password</i>;</code>
Hierarchy Level	<pre>[edit snmp v3 usm local-engine user <i>username</i> privacy-3des], [edit snmp v3 usm local-engine user <i>username</i> privacy-aes128], [edit snmp v3 usm local-engine user <i>username</i> privacy-des], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> privacy-3des], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> privacy-aes128], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> privacy-des]</pre>
Release Information	<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>
Description	Configure a privacy password for the SNMPv3 user.
Options	<p><i>privacy-password</i>—Password that a user enters. The password is then converted into a key that is used for encryption.</p> <p>SNMPv3 has special requirements when you create plain-text passwords on a router or switch:</p> <ul style="list-style-type: none"> • The password must be at least eight characters long. • The password can include alphabetic, numeric, and special characters, but it cannot include control characters.
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the SNMPv3 Encryption Type on page 289

proxy (snmp)

Syntax

```

proxy proxy-name {
    device-name device-name;
    logical-system logical-system {
        routing-instance routing-instance;
    }
    routing-instance routing-instance;
    (version-v1 | version-v2c) {
        snmp-community community-name;
        no-default-comm-to-v3-config;
    }
    version-v3 {
        security-name security-name;
        context context-name;
    }
}

```

Hierarchy Level [edit snmp]

Release Information Statement introduced in Junos OS Release 12.3.

Description Configure a device to act as a proxy SNMP agent, and specify a name for the proxy.

Options **context *context-name***—Specify the SNMPv3 context name as configured on the device specified at **edit snmp proxy *proxy-name* device-name *device-name***.

For more information about this statement, see [context](#).

device-name *device-name*—Specify the name of the device to be managed through the proxy SNMP agent.

no-default-comm-to-v3-config—(Optional) Specify whether you have to manually configure the statements at the **[edit snmp v3 snmp-community *community-name*]** and **[edit snmp v3 vacm]** hierarchy levels.

If this statement is not included in the configuration, the **[edit snmp v3 snmp-community *community-name*]** and **[edit snmp v3 vacm]** hierarchy level configurations are automatically initialized.

proxy-name—Specify the name of the proxy.

security-name *security-name*—Specify the SNMPv3 security name as configured on the device specified at **edit snmp proxy *proxy-name* device-name *device-name***.

For more information about this statement, see [security-name](#).

snmp-community *community-name*—Specify the name of the SNMP community. The community name you configure should match the **snmp-community** configuration

on the device specified at **edit snmp proxy *proxy-name* device-name *device-name***. For more information about this statement, see [snmp-community](#).

(version-v1 | version-v2c)—Specify the SNMP version, and add the relevant configuration.

version-v3—Add the SNMPv3 configuration.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Configuring a Proxy SNMP Agent on page 216](#)

read-view

Syntax read-view *view-name*;

Hierarchy Level [edit snmp v3 vacm access group *group-name* (default-context-prefix | context-prefix *context-prefix*) security-model (any | usm | v1 | v2c) security-level (authentication | none | privacy)]

Release Information 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 11.1 for the QFX Series.

Description Associate the read-only view with a community (for SNMPv1 or SNMPv2c clients) or a group name (for SNMPv3 clients).

Options ***view-name***—The name of the view to which the SNMP user group has access.

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

Related Documentation

- [Configuring the Read View on page 295](#)
- [Configuring MIB Views on page 241](#)

remote-engine

Syntax	<pre> remote-engine engine-id { user username { authentication-md5 { (authentication-key authentication-key authentication-password authentication-password); } authentication-none; authentication-sha { (authentication-key authentication-key authentication-password authentication-password); } privacy-aes128 (privacy-key privacy-key privacy-password privacy-password); } privacy-des { (privacy-key privacy-key privacy-password privacy-password); } privacy-3des { (privacy-key privacy-key privacy-password privacy-password); } privacy-none { } } </pre>
Hierarchy Level	[edit snmp v3 usm]
Release Information	<p>Statement introduced in 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 14.1X53-D20 for the OCX Series.</p>
Description	<p>Configure the remote engine information for the user-based security model (USM). To send inform messages to an SNMPv3 user on a remote device, you must configure the engine identifier for the SNMP agent on the remote device where the user resides.</p>
Options	<p>engine-id—Specify engine identifier in hexadecimal format. Used to compute the security digest for authenticating and encrypting packets sent to a user on the remote host.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Configuring the Remote Engine and Remote User on page 313

request-type

Syntax	<code>request-type (get-next-request get-request walk-request);</code>
Hierarchy Level	<code>[edit snmp rmon alarm <i>index</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Extend monitoring to a specific SNMP object instance (get-request), to all object instances belonging to a MIB branch (walk-request), or to the next object instance after the instance specified in the configuration (get-next-request).
Default	walk-request
Options	<p>get-next-request—Perform an SNMP get next request.</p> <p>get-request—Perform an SNMP get request.</p> <p>walk-request—Perform an SNMP walk request.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • RMON MIB Event, Alarm, Log, and History Control Tables on page 382 • Configuring RMON Alarms and Events on page 276 • Monitoring RMON MIB Tables on page 264 • Understanding RMON on page 377 • Junos OS Network Management Configuration Guide

request-type

Syntax	<code>request-type (get-next-request get-request walk-request);</code>
Hierarchy Level	<code>[edit snmp rmon alarm index]</code>
Release Information	Statement introduced in Junos OS Release 8.3. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Extend monitoring to a specific SNMP object instance (get-request), or extend monitoring to all object instances belonging to a MIB branch (walk-request), or extend monitoring to the next object instance after the instance specified in the configuration (get-next-request).
Options	get-next-request —Performs an SNMP get next request. get-request —Performs an SNMP get request. walk-request —Performs an SNMP walk request. Default: walk-request
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Request Type on page 387• variable on page 1660

retry-count

Syntax	<code>retry-count <i>number</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-address <i>target-address-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 7.4.
Description	Configure the retry count for SNMP informs.
Options	<i>number</i> —Maximum number of times the inform is transmitted if no acknowledgment is received. If no acknowledgment is received after the inform is transmitted the maximum number of times, the inform message is discarded. Default: 3 times
Required Privilege Level	snmp —To view this statement in the configuration. snmp-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring SNMP Informs on page 309• timeout on page 1679

rising-event-index

Syntax	<code>rising-event-index <i>index</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm index]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Set the index of the event entry that is used when a rising alarm threshold is exceeded. The rising-event index is specified when you configure an SNMP RMON alarm. If this value is zero, no event is triggered.
Options	<i>index</i> —Index of the event entry that is used when a rising threshold is exceeded. Range: 0 through 65,535 Default: 0
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• RMON MIB Event, Alarm, Log, and History Control Tables on page 382• Configuring RMON Alarms and Events on page 276• Monitoring RMON MIB Tables on page 264• Understanding RMON on page 377• Junos OS Network Management Configuration Guide

rising-event-index

Syntax	<code>rising-event-index <i>index</i>;</code>
Hierarchy Level	<code>[edit snmp rmon <i>alarm index</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Index of the event entry that is used when a rising threshold is crossed. If this value is zero, no event is triggered.
Options	<i>index</i> —Index of the event entry that is used when a rising threshold is crossed. Range: 0 through 65,535 Default: 0
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Falling Event Index or Rising Event Index on page 386• falling-event-index on page 1562

rising-threshold

Syntax	<code>rising-threshold <i>integer</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm <i>index</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Set the upper threshold for the sampled variable (monitored object) when you configure an SNMP RMON alarm. By setting a rising and a falling threshold for a variable, you can be alerted whenever the value of the variable falls outside the allowable operational range.
Options	<i>integer</i> —The lower threshold for the alarm entry. Range: –2,147,483,648 through 2,147,483,647
Required Privilege Level	snmp —To view this statement in the configuration. snmp-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Falling Threshold or Rising Threshold on page 386• falling-threshold on page 1566

rising-threshold (Health Monitor)

Syntax	<code>rising-threshold <i>percentage</i>;</code>
Hierarchy Level	<code>[edit snmp health-monitor]</code>
Release Information	Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Set the upper threshold for the monitored object when you configure a health monitor alarm. By setting a rising and a falling threshold for a monitored object, you can be alerted whenever the value of the variable falls outside the allowable operational range.
Options	<p><i>percentage</i>—Upper threshold for the alarm entry.</p> <p>Range: 1 through 100</p> <p>Default: 80 percent of the maximum possible value</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Health Monitoring on page 272 • falling-threshold on page 1564

rising-threshold (RMON)

Syntax	<code>rising-threshold <i>integer</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm <i>index</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Set the upper threshold for the sampled variable (monitored object) when you configure an SNMP RMON alarm. By setting a rising and a falling threshold for a variable, you can be alerted whenever the value of the variable falls outside the allowable operational range.
Options	<i>integer</i> —Upper threshold for the alarm entry. Range: -2,147,483,648 through 2,147,483,647
Required Privilege Level	snmp —To view this statement in the configuration. snmp-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• RMON MIB Event, Alarm, Log, and History Control Tables on page 382• Configuring RMON Alarms and Events on page 276• Monitoring RMON MIB Tables on page 264• Understanding RMON on page 377• Junos OS Network Management Configuration Guide

rmon

```

Syntax  rmon {
        alarm index {
            description description;
            falling-event-index index;
            falling-threshold integer;
            falling-threshold-interval seconds;
            interval seconds;
            request-type;
            rising-event-index index;
            rising-threshold integer;
            sample-type (absolute-value | delta-value);
            startup-alarm (falling-alarm | rising-alarm | rising-or-falling alarm);
            syslog-subtag syslog-subtag;
            variable oid-variable;
        }
        event index {
            community community-name;
            description description;
            type (RMON Notification) type;
        }
        history history-index {
            bucket-size number;
            interface interface-name;
            interval seconds;
            owner owner-name;
        }
    }

```

Hierarchy Level [edit snmp]

Release Information Statement introduced in Junos OS Release 11.1 for the QFX Series.
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

Description Provide comprehensive network fault diagnosis, planning, and performance tuning information. RMON delivers this information in nine groups of monitoring elements, each providing specific sets of data to meet common network monitoring requirements. Each group is optional, so that vendors do not need to support all the groups within the MIB.

Junos OS supports the RMON statistics, history, alarm, and event groups.

The remaining statements are explained separately. See [CLI Explorer](#).

Default Disabled.

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

- Related Documentation**
- [RMON MIB Event, Alarm, Log, and History Control Tables on page 382](#)
 - [Monitoring RMON MIB Tables on page 264](#)
 - [Understanding RMON on page 377](#)
 - [Junos OS Network Management Configuration Guide](#)

rmon

Syntax	<code>rmon { ... }</code>
Hierarchy Level	<code>[edit snmp]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure Remote Monitoring.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring an RMON Alarm Entry and Its Attributes on page 385

routing-instance

Syntax	<pre>routing-instance <i>routing-instance-name</i> { source-address <i>address</i>; }</pre>
Hierarchy Level	[edit snmp community <i>community-name</i>], [edit snmp community <i>community-name</i> logical-system <i>logical-system-name</i>], [edit snmp trap-group <i>group</i>], [edit snmp trap-options]
Release Information	Statement introduced in Junos OS Release 8.3. Added to the [edit snmp community <i>community-name</i>] hierarchy level in Junos OS Release 8.4. Added to the [edit snmp community <i>community-name</i> logical-system <i>logical-system-name</i>] hierarchy level in Junos OS Release 9.1. Statement introduced in Junos OS Release 9.1 for EX Series switches.
Description	Specify a routing instance for SNMPv1 and SNMPv2 trap targets. All targets configured in the trap group use this routing instance. If the routing instance is defined within a logical system, include the logical-system <i>logical-system-name</i> statement at the [edit snmp community <i>community-name</i>] hierarchy level and specify the routing-instance statement under the [edit snmp community <i>community-name</i> logical-system <i>logical system-name</i>] hierarchy level.
Options	<i>routing-instance-name</i> —Name of the routing instance.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring SNMP Trap Groups on page 224 • Configuring the Source Address for SNMP Traps on page 221 • Specifying a Routing Instance in an SNMPv1 or SNMPv2c Community on page 339

routing-instance-access

Syntax

```
[edit snmp]
  routing-instance-access {
    access-list {
      routing-instance;
      routing-instance restrict;
    }
  }
```

Hierarchy Level [edit snmp]

Release Information Statement introduced in Junos OS Release 8.4.

Description Enable SNMP managers in routing instances other than the default routing instance to access SNMP information. For information about the **access-list** option, see [access-list](#).

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

Related Documentation

- [Enabling SNMP Access over Routing Instances on page 339](#)

sample-type

Syntax	<code>sample-type (absolute-value delta-value);</code>
Hierarchy Level	<code>[edit snmp rmon alarm <i>index</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure the method of sampling the selected variable (monitored object). When you configure an SNMP RMON alarm, you can specify the sample type.
Options	<p>absolute-value—Actual value of the selected variable is used when comparing against the thresholds.</p> <p>delta-value—Difference between samples of the selected variable is used when comparing against the thresholds.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • RMON MIB Event, Alarm, Log, and History Control Tables on page 382 • Configuring RMON Alarms and Events on page 276 • Monitoring RMON MIB Tables on page 264 • Understanding RMON on page 377 • Junos OS Network Management Configuration Guide

sample-type

Syntax	<code>sample-type (absolute-value delta-value);</code>
Hierarchy Level	<code>[edit snmp rmon alarm index]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Method of sampling the selected variable.
Options	absolute-value —Actual value of the selected variable is used when comparing against the thresholds. delta-value —Difference between samples of the selected variable is used when comparing against the thresholds.
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Sample Type on page 388

startup-alarm

Syntax	<code>startup-alarm (falling-alarm rising-alarm rising-or-falling-alarm);</code>
Hierarchy Level	<code>[edit snmp rmon alarm index]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	The alarm that can be sent upon entry startup.
Options	<p>falling-alarm—Generated if the first sample after the alarm entry becomes active is less than or equal to the falling threshold.</p> <p>rising-alarm—Generated if the first sample after the alarm entry becomes active is greater than or equal to the rising threshold.</p> <p>rising-or-falling-alarm—Generated if the first sample after the alarm entry becomes active satisfies either of the corresponding thresholds.</p> <p>Default: rising-or-falling-alarm</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Startup Alarm on page 388

security-level (Defining Access Privileges)

Syntax	<pre>security-level (authentication none privacy) { notify-view view-name; read-view view-name; write-view view-name; }</pre>
Hierarchy Level	<pre>[edit snmp v3 vacm access group group-name (default-context-prefix context-prefix context-prefix) security-model (any usm v1 v2c)]</pre>
Release Information	<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>
Description	Define the security level used for access privileges.
Default	none
Options	<p>authentication—Provide authentication but no encryption.</p> <p>none—No authentication and no encryption.</p> <p>privacy—Provide authentication and encryption.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring the Security Level on page 293

security-level (Generating SNMP Notifications)

Syntax	<code>security-level (authentication none privacy);</code>
Hierarchy Level	<code>[edit snmp v3 target-parameters <i>target-parameters-name</i> parameters]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure the security level to use when generating SNMP notifications.
Default	<code>none</code>
Options	<code>authentication</code> —Provide authentication but no encryption. <code>none</code> —No authentication and no encryption. <code>privacy</code> —Provide authentication and encryption.
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring the Security Level on page 308

security-model (Access Privileges)

Syntax	<code>security-model (usm v1 v2c);</code>
Hierarchy Level	<code>[edit snmp v3 vacm access group <i>group-name</i> (default-context-prefix context-prefix <i>context-prefix</i>)]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure the security model for an SNMPv3 group. The security model is used to determine access privileges for the group.
Options	<code>usm</code> —SNMPv3 security model. <code>v1</code> —SNMPv1 security model. <code>v2c</code> —SNMPv2c security model.
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Security Model on page 293


security-model (Group)

Syntax	<pre>security-model (usm v1 v2c) { security-name security-name { group group-name; } }</pre>
Hierarchy Level	[edit snmp v3 vacm security-to-group]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Define a security model for a group.
Options	<p>usm—SNMPv3 security model.</p> <p>v1—SNMPv1 security model.</p> <p>v2c—SNMPv2c security model.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Security Model on page 297

security-model (SNMP Notifications)

Syntax	<code>security-model (usm v1 v2c);</code>
Hierarchy Level	<code>[edit snmp v3 target-parameters <i>target-parameters-name</i> parameters]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure the security model for an SNMPv3 group. The security model is used for SNMP notifications.
Options	usm —SNMPv3 security model. v1 —SNMPv1 security model. v2c —SNMPv2c security model.
Required Privilege Level	snmp —To view this statement in the configuration. snmp-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Security Model on page 308


security-name (Community String)

Syntax	<code>security-name <i>security-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 snmp-community <i>community-index</i>]</code>
Release Information	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 11.1 for the QFX Series.
Description	Associate a community string with the security name of a user. The community string, which is used for SNMPv1 and SNMPv2c clients in an SNMPv3 system, is configured at the <code>[edit snmp v3 snmp-community <i>community-index</i>]</code> hierarchy level.
Options	<i>security-name</i> —Name that is used for messaging security and user access control.
<div>  <p>NOTE: The security name must match the configured security name at the <code>[edit snmp v3 target-parameters <i>target-parameters-name</i> parameters]</code> hierarchy level when you configure traps or informs.</p> </div>	
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> Configuring the Security Names on page 320

security-name (Security Group)

Syntax	<pre>security-name <i>security-name</i> { <i>group</i> <i>group-name</i>; }</pre>
Hierarchy Level	[edit snmp v3 vacm security-to-group <i>security-model</i> (usm v1 v2c)]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Associate a group or a community string with a configured security group.
Options	<i>security-name</i> —Username configured at the [edit snmp v3 usm local-engine user <i>username</i>] hierarchy level. For SNMPv1 and SNMPv2c, the security name is the community string configured at the [edit snmp v3 snmp-community <i>community-index</i>] hierarchy level.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Assigning Security Names to Groups on page 297

security-name (SNMP Notifications)

Syntax	<code>security-name <i>security-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-parameters <i>target-parameters-name</i> parameters]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure the security name used when generating SNMP notifications.
Options	<i>security-name</i> —If the SNMPv3 USM security model is used, identify the user when generating the SNMP notification. If the v1 or v2c security models are used, identify the SNMP community used when generating the notification.
<div>  <p>NOTE: The access privileges for the group associated with this security name must allow this notification to be sent.</p> <p>If you are using the v1 or v2 security models, the security name at the <code>[edit snmp v3 vacm security-to-group]</code> hierarchy level must match the security name at the <code>[edit snmp v3 snmp-community <i>community-index</i>]</code> hierarchy level.</p> </div>	
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring the Security Name on page 309

security-to-group

Syntax	<pre>security-to-group { security-model (usm v1 v2c) { group group-name; security-name security-name; } }</pre>
Hierarchy Level	[edit snmp v3 vacm]
Release Information	<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>
Description	<p>Configure the group to which a specific SNMPv3 security name belongs. The security name is used for messaging security.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Assigning Security Model and Security Name to a Group on page 297

snmp

List of Syntax Syntax: MX, M, T, ACX, PTX Series Routers and EX Series Switches on page 1627
 Syntax: QFX Series Switches, QFabric, OCX1100 and EX4600 on page 1627

Syntax: MX, M, T, ACX,
 PTX Series Routers
 and EX Series Switches

```
snmp { ... }
```

Syntax: QFX Series
 Switches, QFabric,
 OCX1100 and EX4600

```
snmp {
  client-list client-list-name {
    ip-addresses;
  }
  community community-name {
    authorization authorization;
    client-list-name client-list-name;
    clients {
      address restrict;
    }
    logical-system logical-system-name {
      routing-instance routing-instance-name {
        clients {
          addresses;
        }
      }
    }
    routing-instance routing-instance-name {
      clients {
        addresses;
      }
    }
    view view-name;
  }
  contact contact;
  description description;
  filter-duplicates;
  filter-interfaces;
  health-monitor {
    falling-threshold integer;
    interval seconds;
    rising-threshold integer;
  }
  interface [ interface-names ];
  location location;
  name name;
  nonvolatile {
    commit-delay seconds;
  }
  rmon {
    alarm index {
      description description;
      falling-event-index index;
    }
  }
}
```

```

    falling-threshold integer;
    falling-threshold-interval seconds;
    interval seconds;
    request-type;
    rising-event-index index;
    rising-threshold integer;
    sample-type (absolute-value | delta-value);
    startup-alarm (falling-alarm | rising-alarm | rising-or-falling alarm);
    syslog-subtag syslog-subtag;
    variable oid-variable;
}
event index {
    community community-name;
    description description;
    type type;
}
history history-index {
    bucket-size number;
    interface interface-name;
    interval seconds;
    owner owner-name;
}
}
traceoptions {
    file filename <files number> <size size> <world-readable | no-world-readable> <match
        regular-expression>;
    flag flag;
}
trap-group group-name {
    categories {
        category;
    }
    destination-port port-number;
    routing-instance routing-instance-name;
    targets {
        address;
    }
    version (all | v1 | v2);
}
trap-options {
    agent-address outgoing-interface;
    source-address address;
}
v3 {
    notify name {
        tag tag-name;
        type trap;
    }
    notify-filter profile-name {
        oid object-identifier (include | exclude);
    }
    snmp-community community-index {
        community-name community-name;
        security-name security-name;
        tag tag-name;
    }
}

```

```

}
target-address target-address-name {
    address address;
    address-mask address-mask;
    logical-system logical-system;
    port port-number;
    retry-count number;
    routing-instance routing-instance-name;
    tag-list tag-list;
    target-parameters target-parameters-name;
    timeout seconds;
}
target-parameters target-parameters-name {
    notify-filter profile-name;
    parameters {
        message-processing-model (v1 | v2c | V3);
        security-level (authentication | none | privacy);
        security-model (usm | v1 | v2c);
        security-name security-name;
    }
}
}
usm {
    local-engine {
        user username {
            authentication-sha {
                authentication-password authentication-password;
            }
            authentication-md5 {
                authentication-password authentication-password;
            }
            authentication-none;
            privacy-aes128 {
                privacy-password privacy-password;
            }
            privacy-des {
                privacy-password privacy-password;
            }
            privacy-3des {
                privacy-password privacy-password;
            }
            privacy-none;
        }
    }
    remote-engine engine-id {
        user username {
            authentication-sha {
                authentication-password authentication-password;
            }
            authentication-md5 {
                authentication-password authentication-password;
            }
            authentication-none;
            privacy-aes128 {
                privacy-password privacy-password;
            }
        }
    }
}

```

```

    privacy-des {
        privacy-password privacy-password;
    }
    privacy-3des {
        privacy-password privacy-password;
    }
    privacy-none {
        privacy-password privacy-password;
    }
}
}
}
}
vacm {
    access {
        group group-name {
            (default-context-prefix | context-prefix context-prefix) {
                security-model (any | usm | v1 | v2c) {
                    security-level (authentication | none | privacy) {
                        notify-view view-name;
                        read-view view-name;
                        write-view view-name;
                    }
                }
            }
        }
    }
}
security-to-group {
    security-model (usm | v1 | v2c) {
        security-name security-name {
            group group-name;
        }
    }
}
}
}
view view-name {
    oid object-identifier (include | exclude);
}
}
}

```

Hierarchy Level [\[edit\]](#)

Release Information Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX and PTX Series Routers.
Statement introduced in Junos OS Release 9.0 for EX Series switches.
Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.
Statement introduced in Junos OS Release 11.1 for the QFX Series.

Description Configure SNMP.

SNMP modules cannot have the slash (/) character or the @ character in the name.

Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring SNMP on a Device Running Junos OS on page 203 • Understanding SNMP Implementation in Junos OS on page 75 • Configuring SNMP on page 192

snmp-community

Syntax	<pre>snmp-community <i>community-index</i> { <i>community-name</i> <i>community-name</i>; <i>security-name</i> <i>security-name</i>; <i>tag</i> <i>tag-name</i>; }</pre>
Hierarchy Level	[edit snmp v3]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure the SNMP community.
Options	<p><i>community-index</i>—(Optional) String that identifies an SNMP community.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring the SNMPv3 Community on page 318

snmp-value-match-msmic (Services NAT Options)

Syntax	snmp-value-match-msmic;
Hierarchy Level	[edit services service-set <i>service-set-name</i> nat-options]
Release Information	Statement introduced with Junos OS Release 13.3R7
Description	Match the values for MS-MIC-specific objects in the jnxNatObjects MIB table with the values for MS-DPC objects. Use the deactivate services service-set <i>service-set-name</i> nat-options snmp-value-match-msmic configuration mode command to disable this feature. By default, this feature is disabled.
Required Privilege Level	control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• <i>Configuring Service Rules</i>• Troubleshooting the Mismatch of jnxNatObjects Values for MS-DPC and MS-MIC on page 1185

source-address

Syntax	<code>source-address <i>address</i>;</code>
Hierarchy Level	<code>[edit snmp trap-options]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX and PTX Series routers, SRX devices.</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 14.1X53-D20 for the OCX Series.</p>
Description	Set the source address of every SNMP trap packet sent by this router to a single address regardless of the outgoing interface. If the source address is not specified, the default is to use the address of the outgoing interface as the source address.
Options	<p>address—Source address of SNMP traps. You can configure the source address of trap packets two ways: lo0 or a valid IPv4 address configured on one of the router interfaces. The value lo0 indicates that the source address of all SNMP trap packets is set to the lowest loopback address configured at interface lo0.</p> <p>Default: Disabled. (The source address is the address of the outgoing interface.)</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Source Address for SNMP Traps on page 221

startup-alarm

Syntax	startup-alarm (falling-alarm rising-alarm rising-or-falling-alarm);
Hierarchy Level	[edit snmp rmon alarm <i>index</i>]
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Set an initial alarm that is sent after the configured SNMP RMON alarm becomes active.
Default	rising-or-falling-alarm
Options	<p>falling-alarm—Generated if the first sample after the alarm becomes active is equal to or greater than the falling threshold.</p> <p>rising-alarm—Generated if the first sample after the alarm becomes active is equal to or greater than the rising threshold.</p> <p>rising-or-falling-alarm—Generated if the first sample after the alarm entry becomes active is equal to or greater than either the rising threshold or the falling threshold.</p>
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• RMON MIB Event, Alarm, Log, and History Control Tables on page 382• Configuring RMON Alarms and Events on page 276• Monitoring RMON MIB Tables on page 264• Understanding RMON on page 377• Junos OS Network Management Configuration Guide

syslog-subtag

Syntax	<code>syslog-subtag <i>syslog-subtag</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm <i>index</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Add the syslog-subtag tag to the system log message. The tag should not exceed 80 uppercase characters.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • RMON MIB Event, Alarm, Log, and History Control Tables on page 382 • Monitoring RMON MIB Tables on page 264 • Understanding RMON on page 377 • Junos OS Network Management Configuration Guide

syslog-subtag

Syntax	<code>syslog-subtag <i>syslog-subtag</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm <i>index</i>]</code>
Release Information	Statement introduced in Junos OS Release 8.5. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Add a tag to the system log message.
Options	syslog-subtag <i>syslog-subtag</i> —Tag of not more than 80 uppercase characters to be added to syslog messages. Default: None
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring the System Log Tag on page 389

tag (Configuring Notification Targets)

Syntax	<code>tag tag-name;</code>
Hierarchy Level	<code>[edit snmp v3 notify name]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure a set of target addresses to receive SNMP traps or informs (for IPv4 packets only).
Options	tag-name —Define the target addresses to which an SNMP notification is sent. Target addresses containing the same tag in their tag list are sent the same notification. The tag-name is not included in the notification.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• SNMPv3 Overview (QFX in Standalone Mode) on page 79• Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282• Configuring SNMP on page 192• Configuring the SNMPv3 Trap Notification on page 300

tag-list

Syntax	<code>tag-list <i>tag-list</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-address <i>target-address-name</i>]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure an SNMP tag list used to select target addresses.
Options	<i>tag-list</i> —Define sets of target addresses (tags). To specify more than one tag, specify the tag names as a space-separated list enclosed within double quotes.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Trap Target Address on page 304

target-address

Syntax	<pre>target-address <i>target-address-name</i> { address <i>address</i>; address-mask <i>address-mask</i>; port <i>port-number</i>; retry-count <i>number</i>; tag-list <i>tag-list</i>; target-parameters <i>target-parameters-name</i>; timeout <i>seconds</i>; }</pre>
Hierarchy Level	[edit snmp v3]
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure the address of an SNMP management application and the parameters to be used in sending notifications.
Options	<p><i>target-address-name</i>—String that identifies the target address.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• SNMP MIBs Support on page 245• SNMP Traps Support on page 227• snmp on page 1627• Configuring SNMP on page 192• Show SNMP on page 82• Example: Configuring SNMP on page 269

target-parameters

Syntax At the `[edit snmp v3]` hierarchy level:

```
target-parameters target-parameters-name {
  profile-name;
  parameters {
    message-processing-model (v1 | v2c | V3);
    security-level (authentication | none | privacy);
    security-model (usm | v1 | v2c);
    security-name security-name;
  }
}
```

At the `[edit snmp v3 target-address target-address-name]` hierarchy level:

```
target-parameters target-parameters-name;
```

Hierarchy Level `[edit snmp v3]`
`[edit snmp v3 target-address target-address-name]`

Release Information 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 11.1 for the QFX Series.

Description Configure the message processing and security parameters for sending notifications to a particular management target. The target parameters are configured at the `[edit snmp v3]` hierarchy level. The remaining statements at this level are explained separately.

Then apply the target parameters configured at the `[edit snmp v3 target-parameters target-parameters-name]` hierarchy level to the target address configuration at the `[edit snmp v3]` hierarchy level.

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

Related Documentation

- [Defining and Configuring the Trap Target Parameters on page 306](#)
- [Applying Target Parameters on page 305](#)

targets

Syntax	<pre>targets { address; }</pre>
Hierarchy Level	[edit snmp trap-group <i>group-name</i>]
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX and PTX Series routers and SRX firewalls.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	Configure one or more systems to receive SNMP traps.
Options	address —IPv4 or IPv6 address of the system to receive traps. You must specify an address, not a hostname.
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring SNMP Trap Groups on page 224 <p><i>Configuring SNMP Trap Groups</i></p>

timeout

Syntax	<code>timeout <i>seconds</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-address <i>target-address-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure the timeout period (in seconds) for SNMP informs.
Default	15 seconds
Options	<i>seconds</i> —Number of seconds to wait for an inform acknowledgment. If no acknowledgment is received within the timeout period, the inform is retransmitted.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Understanding SNMP Implementation in Junos OS on page 75• Configuring SNMP Informs on page 309• retry-count on page 1605

traceoptions (SNMP)

Syntax

```
traceoptions {
  file filename <files number> <match regular-expression> <size size> <world-readable |
    no-world-readable>;
  flag flag;
  no-remote-trace;
}
```

Hierarchy Level [edit snmp]

Release Information Statement introduced in Junos OS Release 11.1 for the QFX Series.
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

Description Track the activities of SNMP agents on the switch and record the information in log files.



NOTE: The **traceoptions** statement is not supported on the QFabric system.

The output of the tracing operations is placed into log files in the **/var/log** directory. Each log file is named after the SNMP agent that generates it. The following logs are created in the **/var/log** directory when the **traceoptions** statement is used:

- chassisd
- craftd
- ilmid
- mib2d
- rmopd
- serviced
- snmpd

Options **file *filename***—By default, the name of the log file that records trace output is the name of the process being traced (for example, mib2d or snmpd). Use this option to specify another name.

files *number*—(Optional) Maximum number of trace files per SNMP subagent. When a trace file (for example, snmpd) reaches its maximum size, it is archived by being renamed to snmpd.0. The previous snmpd.1 is renamed to snmpd.2, and so on. The oldest archived file is deleted.

Range: 2 through 1000 files

Default: 10 files

flag *flag*—Tracing operation to perform. To specify more than one tracing operation, include multiple **flag** statements:

- **all**—Log all SNMP events.
- **configuration**—Log reading of configuration at the **[edit snmp]** hierarchy level.
- **database**—Log events involving storage and retrieval in the events database.
- **events**—Log important events.
- **general**—Log general events.
- **interface-stats**—Log physical and logical interface statistics.
- **nonvolatile-sets**—Log nonvolatile SNMP set request handling.
- **pdu**—Log SNMP request and response packets.
- **policy**—Log policy processing.
- **protocol-timeouts**—Log SNMP response timeouts.
- **routing-socket**—Log routing socket calls.
- **server**—Log communication with processes that are generating events.
- **subagent**—Log subagent restarts.
- **timer-events**—Log internally generated events.
- **varbind-error**—Log variable binding errors.

match *regular-expression*—(Optional) Refine the output to include lines that contain the regular expression.

size *size*—(Optional) Maximum size, in kilobytes (KB), of each trace file before it is closed and archived.

Range: 10 KB through 1 GB

Default: 1000 KB

world-readable | no-world-readable—(Optional) By default, log files can be accessed only by the user who configures the tracing operation. The **world-readable** option enables any user to read the file. To explicitly set the default behavior, use the **no-world-readable** option.

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

Related Documentation

- [Understanding Tracing and Logging Operations on page 9](#)
- [Tracing SNMP Activity on a Device Running Junos OS on page 369](#)

traceoptions (SNMP)

Syntax	<pre> traceoptions { file <i>filename</i> <files <i>number</i>> <match <i>regular-expression</i>> <size <i>size</i>> <world-readable no-world-readable>; flag <i>flag</i>; no-remote-trace; } </pre>
Hierarchy Level	[edit snmp]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>file <i>filename</i> option added in Junos OS Release 8.1.</p> <p>world-readable no-world-readable option added in Junos OS Release 8.1.</p> <p>match <i>regular-expression</i> option added in Junos OS Release 8.1.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	<p>The output of the tracing operations is placed into log files in the /var/log directory. Each log file is named after the SNMP agent that generates it. Currently, the following logs are created in the /var/log directory when the traceoptions statement is used:</p> <ul style="list-style-type: none"> • chassisd • craftd • ilmid • mib2d • rmopd • serviced • snmpd
Options	<p>file <i>filename</i>—By default, the name of the log file that records trace output is the name of the process being traced (for example, mib2d or snmpd). Use this option to specify another name.</p> <p>files <i>number</i>—(Optional) Maximum number of trace files per SNMP subagent. When a trace file (for example, snmpd) reaches its maximum size, it is archived by being renamed to snmpd.0. The previous snmpd.1 is renamed to snmpd.2, and so on. The oldest archived file is deleted.</p> <p>Range: 2 through 1000 files</p> <p>Default: 10 files</p> <p>flag <i>flag</i>—Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements:</p> <ul style="list-style-type: none"> • all—Log all SNMP events.

- **general**—Log general events.
- **interface-stats**—Log physical and logical interface statistics.
- **nonvolatile-sets**—Log nonvolatile SNMP set request handling.
- **pdu**—Log SNMP request and response packets.
- **protocol-timeouts**—Log SNMP response timeouts.
- **routing-socket**—Log routing socket calls.
- **subagent**—Log subagent restarts.
- **timer**—Log internally generated events.
- **varbind-error**—Log variable binding errors.

match *regular-expression*—(Optional) Refine the output to include lines that contain the regular expression.

size *size*—(Optional) Maximum size, in kilobytes (KB), of each trace file before it is closed and archived.

Range: 10 KB through 1 GB

Default: 1000 KB

world-readable | no-world-readable—(Optional) By default, log files can be accessed only by the user who configures the tracing operation. The **world-readable** option enables any user to read the file. To explicitly set the default behavior, use the **no-world-readable** option.

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

Related Documentation	<ul style="list-style-type: none"> • Tracing SNMP Activity on a Device Running Junos OS on page 369
------------------------------	--

trap-group

List of Syntax Syntax: MX, M, T, ACX and PTX Series routers, OCX1100, EX and QFX Series Switches and SRX and vSRX firewalls on page 1646
 Syntax: QFX and EX Series Switches and OCX1100 on page 1646

Syntax: MX, M, T, ACX and PTX Series routers, OCX1100, EX and QFX Series Switches and SRX and vSRX firewalls

```
trap-group group-name {
  categories {
    category;
  }
  destination-port port-number;
  routing-instance instance;
  targets {
    address;
  }
  version (all | v1 | v2);
}
```

Syntax: QFX and EX Series Switches and OCX1100

```
trap-group group-name {
  categories {
    category;
  }
  destination-port port-number;
  targets {
    address;
  }
}
```

Hierarchy Level [edit snmp]

Release Information Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX and PTX Series routers, and SRX and vSRX firewalls.
 Statement introduced in Junos OS Release 9.0 for EX Series switches.
 Statement introduced in Junos OS Release 11.1 for QFX Series switches.
 Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.

Description Create a named group of hosts to receive the specified trap notifications. The name of the trap group is embedded in SNMP trap notification packets as one variable binding (varbind) known as the community name. At least one trap group must be configured for SNMP traps to be sent.

Options *group-name*—Name of the trap group. If the name includes spaces, enclose it in quotation marks (" ").

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Configuring SNMP Trap Groups on page 224](#)
- *Configuring SNMP Trap Groups*

trap-options

List of Syntax	<p>Syntax: MX, M, T, ACX and PTX Series Routers, EX Series Switches and SRX Firewalls on page 1648</p> <p>QFX Series Switches, EX4600, OCX1100 on page 1648</p>
Syntax: MX, M, T, ACX and PTX Series Routers, EX Series Switches and SRX Firewalls	<pre> trap-options { agent-address outgoing-interface; context-oid; enterprise-oid; logical-system logical-system-name { routing-instance routing-instance-name { source-address address; } } routing-instance routing-instance-name { source-address address; } } </pre>
QFX Series Switches, EX4600, OCX1100	<pre> trap-options { agent-address outgoing-interface; source-address address; } </pre>
Hierarchy Level	[edit snmp]
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX and PTX Series Routers, and SRX Firewalls.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>context-oid option introduced in Junos OS Release 17.1.</p>
Description	<p>Using SNMP trap options, you can set the source address of every SNMP trap packet sent by the router or switch to a single address, regardless of the outgoing interface. In addition, you can set the agent address of each SNMPv1 trap. For more information about the contents of SNMPv1 traps, see RFC 1157.</p>
Default	Disabled
Options	<p>context-oid—Add context oid in varbind of all traps originating from non-default logical system and routing instance. If your network management system is not able to handle prefixes such as <routing-instance name>@<trap-group-name> or <logical-system name>/<routing-instance name>@<trap-group-name>, setting the</p>

context-oid configuration statement will send only the **<trap-group-name>** and add **<logical-system name>/<routing-instance name>** as an additional varbind.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Configuring SNMP Trap Options on page 220](#)

type (RMON Notification)

Syntax	type <i>type</i> ;
Hierarchy Level	[edit snmp rmon event <i>index</i>]
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure the type of notification generated when a rising or falling threshold is crossed.
Default	log-and-trap
Options	<p>type—Type of notification. It can be one of the following:</p> <ul style="list-style-type: none"> • log—Add an entry to the logTable object. • log-and-trap—Send an SNMP trap and add a log entry. • none—No notifications are sent. • snmptrap—Send an SNMP trap.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • RMON MIB Event, Alarm, Log, and History Control Tables on page 382 • Configuring RMON Alarms and Events on page 276 • Monitoring RMON MIB Tables on page 264 • Understanding RMON on page 377 • Junos OS Network Management Configuration Guide

type

Syntax	<code>type type;</code>
Hierarchy Level	<code>[edit snmp rmon event index]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Type of notification generated when a threshold is crossed.
Options	<p>type—Type of notification:</p> <ul style="list-style-type: none">• log—Add an entry to logTable.• log-and-trap—Send an SNMP trap and make a log entry.• none—No notifications are sent.• snmptrap—Send an SNMP trap. <p>Default: log-and-trap</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring an RMON Event Entry and Its Attributes on page 389

type

Syntax	<code>type (inform trap);</code>
Hierarchy Level	<code>[edit snmp v3 notify <i>name</i>]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>inform option added in 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>
Description	Configure the type of SNMP notification.
Options	<p>inform—Defines the type of notification as an inform. SNMP informs are confirmed notifications.</p> <p>trap—Defines the type of notification as a trap. SNMP traps are unconfirmed notifications.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring SNMP Informs on page 309• Configuring the SNMPv3 Trap Notification on page 300

user

Syntax	<code>user <i>username</i>;</code>
Hierarchy Level	[edit snmp v3 usm local-engine], [edit snmp v3 usm remote-engine <i>engine-id</i>]
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Specify a user associated with an SNMPv3 group on a local or remote SNMP engine.
Options	<i>username</i> —SNMPv3 user-based security model (USM) username.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Creating SNMPv3 Users on page 286

usm

```

Syntax  usm {
        local-engine {
            user username {
                authentication-md5 {
                    authentication-password authentication-password;
                }
                authentication-none;
                authentication-sha {
                    authentication-password authentication-password;
                }
                privacy-aes128 {
                    privacy-password privacy-password;
                }
                privacy-des {
                    privacy-password privacy-password;
                }
                privacy-3des {
                    privacy-password privacy-password;
                }
                privacy-none {
                    privacy-password privacy-password;
                }
            }
        }
        remote-engine engine-id {
            user username {
                authentication-md5 {
                    authentication-password authentication-password;
                }
                authentication-none;
                authentication-sha {
                    authentication-password authentication-password;
                }
                privacy-aes128 {
                    privacy-password privacy-password;
                }
                privacy-des {
                    privacy-password privacy-password;
                }
                privacy-3des {
                    privacy-password privacy-password;
                }
                privacy-none {
                    privacy-password privacy-password;
                }
            }
        }
    }
}

```

Hierarchy Level [edit snmp v3]

Release Information	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 11.1 for the QFX Series.
Description	Configure user-based security model (USM) information. The remaining statements are explained separately. See CLI Explorer .
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Creating SNMPv3 Users on page 286• Configuring the Remote Engine and Remote User on page 313

v3

```

Syntax v3 {
  notify name {
    tag tag-name;
    type trap;
  }
  notify-filter profile-name {
    oid object-identifier (include | exclude);
  }
  snmp-community community-index {
    community-name community-name;
    security-name security-name;
    tag tag-name;
  }
  target-address target-address-name {
    address address;
    address-mask address-mask;
    port port-number;
    retry-count number;
    tag-list tag-list;
    target-parameters target-parameters-name;
    timeout seconds;
  }
  target-parameters target-parameters-name {
    notify-filter profile-name;
    parameters {
      message-processing-model (v1 | v2c | V3);
      security-level (authentication | none | privacy);
      security-model (usm | v1 | v2c);
      security-name security-name;
    }
  }
  usm {
    local-engine {
      user username {
        authentication-md5 {
          authentication-password authentication-password;
        }
        authentication-sha {
          authentication-password authentication-password;
        }
        authentication-none;
        privacy-aes128 {
          privacy-password privacy-password;
        }
        privacy-des {
          privacy-password privacy-password;
        }
        privacy-3des {
          privacy-password privacy-password;
        }
        privacy-none;
      }
    }
  }
}

```

```

    }
  }
  remote-engine engine-id {
    user username {
      authentication-md5 {
        authentication-password authentication-password;
      }
      authentication-sha {
        authentication-password authentication-password;
      }
      authentication-none;
      privacy-aes128 {
        privacy-password privacy-password;
      }
      privacy-des {
        privacy-password privacy-password;
      }
      privacy-3des {
        privacy-password privacy-password;
      }
      privacy-none {
        privacy-password privacy-password;
      }
    }
  }
}
vacm {
  access {
    group group-name {
      (default-context-prefix | context-prefix context-prefix) {
        security-model (any | usm | v1 | v2c) {
          security-level (authentication | none | privacy) {
            notify-view view-name;
            read-view view-name;
            write-view view-name;
          }
        }
      }
    }
  }
  security-to-group {
    security-model (usm | v1 | v2c) {
      security-name security-name {
        group group-name;
      }
    }
  }
}
}

```

Hierarchy Level [edit snmp]

Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure SNMPv3. The remaining statements are explained separately. See CLI Explorer .
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282

vacm

```

Syntax vacm {
  access {
    group group-name {
      (default-context-prefix | context-prefix context-prefix){
        security-model (any | usm | v1 | v2c) {
          security-level (authentication | none | privacy) {
            notify-view view-name;
            read-view view-name;
            write-view view-name;
          }
        }
      }
    }
  }
  security-to-group {
    security-model (usm | v1 | v2c);
    security-name security-name {
      group group-name;
    }
  }
}

```

Hierarchy Level [edit snmp v3]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure view-based access control model (VACM) information.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Defining Access Privileges for an SNMP Group on page 291](#)

variable

Syntax	<code>variable <i>oid-variable</i>;</code>
Hierarchy Level	<code>[edit snmp rmon alarm <i>index</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Set the object identifier (OID) of the MIB object (also called variable) to be monitored when you configure an SNMP RMON alarm. If the value of the monitored variable exceeds the configured rising threshold or falling threshold, an alarm is triggered and a corresponding event may be generated.
Options	<i>oid-variable</i> —OID of the MIB variable that is being monitored. The OID can be a dotted decimal (for example, 1.3.6.1.2.1.2.1.2.1.10.1) or the name of the MIB object—for example, <code>ifInOctets.1</code> .
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • RMON MIB Event, Alarm, Log, and History Control Tables on page 382 • Configuring RMON Alarms and Events on page 276 • Monitoring RMON MIB Tables on page 264 • Understanding RMON on page 377 • Junos OS Network Management Configuration Guide

variable

Syntax	<code>variable <i>oid-variable</i>;</code>
Hierarchy Level	[edit snmp rmon alarm <i>index</i>]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Object identifier (OID) of MIB variable to be monitored.
Options	<i>oid-variable</i> —OID of the MIB variable that is being monitored. The OID can be a dotted decimal (for example, 1.3.6.1.2.1.2.1.2.1.10.1). Alternatively, use the MIB object name (for example, <code>ifInOctets.1</code>).
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Variable on page 389


version (SNMP)

Syntax	<code>version (all v1 v2);</code>
Hierarchy Level	<code>[edit snmp trap-group <i>group-name</i>]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX and PTX Series routers, EX Series switches and SRX firewalls.</p> <p>Statement introduced in Junos OS Release 9.0 for EX4600 switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX1100 switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	Specify the version number of SNMP traps.
Default	<code>all</code> —Send an SNMPv1 and SNMPv2 trap for every trap condition.
Options	<p><code>all</code>—Send an SNMPv1 and SNMPv2 trap for every trap condition.</p> <p><code>v1</code>—Send SNMPv1 traps only.</p> <p><code>v2</code>—Send SNMPv2 traps only.</p>
Required Privilege Level	<p><code>snmp</code>—To view this statement in the configuration.</p> <p><code>snmp-control</code>—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring SNMP Trap Groups on page 224 • <i>Configuring SNMP Trap Groups</i>

view (Associating a MIB View with a Community)

Syntax	<code>view <i>view-name</i>;</code>
Hierarchy Level	<code>[edit snmp community <i>community-name</i>]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX and PTX Series routers and SRX firewalls.</p> <p>Statement introduced in Junos OS Release 9.0 for EX4600 switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX1100.</p>
Description	Associate a view with a community. A view represents a group of MIB objects.
Options	<i>view-name</i> —Name of the view. You must use a view name already configured in the view statement at the [edit snmp] hierarchy level.
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring SNMP Communities on page 210

view (Configuring a MIB View)

Syntax	<pre>view view-name { oid object-identifier (include exclude); }</pre>
Hierarchy Level	[edit snmp]
Release Information	<p>Statement introduced before Junos OS Release 7.4 for MX, M, T, ACX and PTX Series routers and SRX firewalls.</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 14.1X53-D20 for the OCX Series.</p>
Description	<p>Define a MIB view. A MIB view identifies a group of MIB objects. Each MIB object in a view has a common OID prefix. Each object identifier represents a subtree of the MIB object hierarchy. The view statement uses a view to specify a group of MIB objects on which to define access. To enable a view, you must associate the view with a community by including the view statement at the [edit snmp community <i>community-name</i>] hierarchy level.</p>
	<p> NOTE: To remove an OID completely, use the <code>delete view all oid oid-number</code> command but omit the <code>include</code> parameter.</p>
Options	<p>view-name—Name of the view.</p> <p>The remaining statement is explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring MIB Views on page 241 • Associating MIB Views with an SNMP User Group on page 294 • community on page 1549

write-view

Syntax	<code>write-view view-name;</code>
Hierarchy Level	<code>[edit snmp v3 vacm access group <i>group-name</i> (default-context-prefix context-prefix <i>context-prefix</i>) security-model (any usm v1 v2c) security-level (authentication none privacy)]</code>
Release Information	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 11.1 for the QFX Series switches. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Associate the write view with a community (for SNMPv1 or SNMPv2c clients) or a group name (for SNMPv3 clients).
Options	<i>view-name</i> —Name of the view for which the SNMP user group has write permission.
Required Privilege Level	snmp —To view this statement in the configuration. snmp-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring MIB Views on page 241• Configuring the Write View on page 295

CHAPTER 69

Configuration Statements: SNMPv3

- [address](#) on page 1667
- [address-mask](#) on page 1667
- [authentication-key](#) on page 1668
- [authentication-md5](#) on page 1669
- [authentication-none](#) on page 1670
- [authentication-password](#) on page 1671
- [authentication-sha](#) on page 1672
- [community-name](#) on page 1673
- [context \(SNMPv3\)](#) on page 1674
- [engine-id](#) on page 1675
- [group \(Configuring Group Name\)](#) on page 1676
- [group \(Defining Access Privileges for an SNMPv3 Group\)](#) on page 1677
- [retry-count](#) on page 1678
- [timeout](#) on page 1679
- [local-engine](#) on page 1680
- [message-processing-model](#) on page 1681
- [notify](#) on page 1682
- [notify-filter \(Applying to the Management Target\)](#) on page 1683
- [notify-filter \(Configuring the Profile Name\)](#) on page 1684
- [notify-view](#) on page 1685
- [oid](#) on page 1686
- [parameters](#) on page 1687
- [port](#) on page 1688
- [privacy-3des](#) on page 1689
- [privacy-aes128](#) on page 1690
- [privacy-des](#) on page 1691
- [privacy-key](#) on page 1692
- [privacy-none](#) on page 1693

- [privacy-password on page 1694](#)
- [read-view on page 1695](#)
- [remote-engine on page 1696](#)
- [routing-instance on page 1697](#)
- [security-level \(Defining Access Privileges\) on page 1698](#)
- [security-level \(Generating SNMP Notifications\) on page 1699](#)
- [security-model \(Access Privileges\) on page 1700](#)
- [security-model \(Group\) on page 1701](#)
- [security-model \(SNMP Notifications\) on page 1702](#)
- [security-name \(Community String\) on page 1703](#)
- [security-name \(Security Group\) on page 1704](#)
- [security-name \(SNMP Notifications\) on page 1705](#)
- [security-to-group on page 1706](#)
- [snmp-community on page 1707](#)
- [tag on page 1708](#)
- [tag-list on page 1709](#)
- [target-address on page 1710](#)
- [target-parameters on page 1711](#)
- [type on page 1712](#)
- [user on page 1713](#)
- [usm on page 1714](#)
- [v3 on page 1716](#)
- [vacm on page 1719](#)
- [write-view on page 1720](#)

address

Syntax	<code>address <i>address</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-address <i>target-address-name</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Specify the SNMP target address.
Options	<i>address</i> —IPv4 address of the system to receive traps or informs. You must specify an address, not a hostname.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring the Address on page 303


address-mask

Syntax	<code>address-mask <i>address-mask</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-address <i>target-address-name</i>]</code>
Release Information	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 11.1 on the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Verify the source addresses for a group of target addresses.
Options	<i>address-mask</i> combined with the address defines a range of addresses.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring the Address Mask on page 303


authentication-key

Syntax	<code>authentication-key <i>authentication-key</i>;</code>
Hierarchy Level	<code>[edit snmp v3 usm local-engine user <i>username</i> authentication-md5],</code> <code>[edit snmp v3 usm local-engine user <i>username</i> authentication-sha],</code> <code>[edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> authentication-md5],</code> <code>[edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> authentication-sha]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure the key for user authentication, if you know it, instead of entering a cleartext password. The encrypted version of a password is known as a key.
Options	<i>authentication-key</i> —The encrypted version from the cleartext password.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring MD5 Authentication on page 288• Configuring SHA Authentication on page 289

authentication-md5

Syntax	<pre>authentication-md5 { (authentication-key authentication-key authentication-password authentication-password); }</pre>
Hierarchy Level	<pre>[edit snmp v3 usm local-engine user username], [edit snmp v3 usm remote-engine engine-id user username]</pre>
Release Information	<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>
Description	<p>Configure MD5 as the authentication type for the SNMPv3 user.</p> <hr/> <div>  <p>NOTE: You can only configure one authentication type for each SNMPv3 user.</p> </div> <hr/> <p>For authentication, you can either enter a password in clear text, which is immediately encrypted, or, if you already have the encrypted version (known as a <i>key</i>), enter the key directly.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring MD5 Authentication on page 288


authentication-none

Syntax	authentication-none;
Hierarchy Level	[edit snmp v3 usm local-engine user <i>username</i>], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i>]
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure that there should be no authentication for the SNMPv3 user. <div> NOTE: You can configure only one authentication type for each SNMPv3 user.</div>
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring No Authentication on page 289


authentication-password

Syntax	<code>authentication-password <i>authentication-password</i>;</code>
Hierarchy Level	<pre>[edit snmp v3 usm local-engine user <i>username</i> authentication-md5], [edit snmp v3 usm local-engine user <i>username</i> authentication-sha], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> authentication-md5], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> authentication-sha]</pre>
Release Information	<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>
Description	Configure the password for user authentication.
Options	<p><i>authentication-password</i>—Password that a user enters. The password is then converted into a key that is used for authentication.</p> <p>SNMPv3 has special requirements when you create plain-text passwords on a router or switch:</p> <ul style="list-style-type: none"> • The password must be at least eight characters long. • The password can include alphabetic, numeric, and special characters, but it cannot include control characters.
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring MD5 Authentication on page 288 • Configuring SHA Authentication on page 289

authentication-sha

Syntax	<pre>authentication-sha { (authentication-key authentication-key authentication-password authentication-password); }</pre>
Hierarchy Level	<pre>[edit snmp v3 usm local-engine user username], [edit snmp v3 usm remote-engine engine-id user username]</pre>
Release Information	<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>
Description	<p>Configure the secure hash algorithm (SHA) as the authentication type for the SNMPv3 user.</p> <hr/> <div>  <p>NOTE: You can configure only one authentication type for each SNMPv3 user.</p> </div> <hr/> <p>For authentication, you can either enter a password in clear text, which is immediately encrypted, or, if you already have the encrypted version (known as a <i>key</i>), enter the key directly.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring SHA Authentication on page 289


community-name

Syntax	<code>community-name <i>community-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 snmp-community <i>community-index</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	The community name defines an SNMP community. The SNMP community authorizes SNMPv1 or SNMPv2 clients. The access privileges associated with the configured security name define which MIB objects are available and the operations (notify, read, or write) allowed on those objects.
Options	<i>community-name</i> —Community string for an SNMPv1 or SNMPv2c community. If unconfigured, it is the same as the community index. If the name includes spaces, enclose it in quotation marks (" ").
<div>  <p>NOTE: Community names must be unique. You cannot configure the same community name at the <code>[edit snmp community]</code> and <code>[edit snmp v3 snmp-community <i>community-index</i>]</code> hierarchy levels.</p> <p>The community name at the <code>[edit snmp v3 snmp-community <i>community-index</i>]</code> hierarchy level is encrypted and not displayed in the command-line interface (CLI).</p> </div>	
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring the SNMPv3 Community on page 318

context (SNMPv3)

Syntax	<code>context <i>context-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 snmp-community <i>community-index</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4.
Description	Specify the SNMPv3 context for access control. A context identifies a collection of information accessible for an SNMP entity.
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the SNMPv3 Community on page 318

engine-id

Syntax	<pre>engine-id { (local <i>engine-id-suffix</i> use-default-ip-address use-mac-address); }</pre>
Hierarchy Level	[edit snmp]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.1 for EX Series switches.</p>
Description	<p>The local engine ID is defined as the administratively unique identifier of an SNMPv3 engine, and is used for identification, not for addressing. There are two parts of an engine ID: prefix and suffix. The prefix is formatted according to the specifications defined in RFC 3411, <i>An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks</i>. You can configure the suffix here.</p>
	<div>  <p>NOTE: SNMPv3 authentication and encryption keys are generated based on the associated passwords and the engine ID. If you configure or change the engine ID, you must commit the new engine ID before you configure SNMPv3 users. Otherwise the keys generated from the configured passwords are based on the previous engine ID.</p> <p>For the engine ID, we recommend using the MAC address of the management port.</p> </div>
Options	<p>local <i>engine-id-suffix</i>—Explicit setting for the engine ID suffix.</p> <p>use-default-ip-address—The engine ID suffix is generated from the default IP address.</p> <p>use-mac-address—The SNMP engine identifier is generated from the MAC address of the management interface on the router.</p> <p>Default: use-default-ip-address</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Configuring the Local Engine ID on page 317

group (Configuring Group Name)

Syntax	<pre> group group-name { (default-context-prefix context-prefix context-prefix){ security-model (any usm v1 v2c) { security-level (authentication none privacy) { notify-view view-name; read-view view-name; write-view view-name; } } } } </pre>
Hierarchy Level	[edit snmp v3 vacm access]
Release Information	<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 14.1X53-D20 for the OCX Series.</p>
Description	<p>Assign the security name to a group, and specify the SNMPv3 context applicable to the group. The default-context-prefix statement, when included, adds all the contexts configured on the device to the group, whereas the context-prefix context-prefix statement enables you to specify a context and to add that particular context to the group.</p> <p>(Not applicable to the QFX Series and OCX Series.) When the context prefix is specified as default (for example, context-prefix default), the context associated with the master routing instance is added to the group. To specify a routing instance that is part of a logical system, specify it as logical system/routing instance. For example, to specify routing instance ri1 in logical system ls1, include context-prefix ls1/ri1.</p> <p>The remaining statements under this hierarchy are explained separately.</p>
Options	group-name —SNMPv3 group name created for the SNMPv3 group.
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Group on page 293

group (Defining Access Privileges for an SNMPv3 Group)

Syntax	<code>group <i>group-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 vacm security-to-group security-model (usm v1 v2c) <i>security-name security-name</i>]</code>
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Define access privileges granted to a group.
Options	<i>group-name</i> —Identifies a collection of SNMP security names that belong to the same access policy SNMP.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring the Group on page 298

retry-count

Syntax	<code>retry-count <i>number</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-address <i>target-address-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 7.4.
Description	Configure the retry count for SNMP informs.
Options	<i>number</i> —Maximum number of times the inform is transmitted if no acknowledgment is received. If no acknowledgment is received after the inform is transmitted the maximum number of times, the inform message is discarded. Default: 3 times
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring SNMP Informs on page 309• timeout on page 1679

timeout

Syntax	timeout <i>seconds</i> ;
Hierarchy Level	[edit snmp v3 target-address <i>target-address-name</i>]
Release Information	Statement introduced in Junos OS Release 7.4.
Description	Configure the timeout period (in seconds) for SNMP informs.
Options	<i>seconds</i> —Number of seconds to wait for an inform acknowledgment. If no acknowledgment is received within the timeout period, the inform is retransmitted. Default: 15
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring SNMP Informs on page 309• retry-count on page 1605

local-engine

Syntax

```

local-engine {
  user username {
    authentication-md5 {
      (authentication-key authentication-key | authentication-password
        authentication-password);
    }
    authentication-none;
    authentication-sha {
      (authentication-key authentication-key | authentication-password
        authentication-password);
    }
    privacy-aes128 {
      (privacy-key privacy-key | privacy-password privacy-password);
    }
    privacy-des {
      (privacy-key privacy-key | privacy-password privacy-password);
    }
    privacy-3des {
      (privacy-key privacy-key | privacy-password privacy-password);
    }
    privacy-none {
    }
  }
}

```

Hierarchy Level [edit snmp v3 [usm](#)]

Release Information 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 11.1 for the QFX Series.

Description Configure local engine information for the user-based security model (USM).

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Creating SNMPv3 Users on page 286](#)

message-processing-model

Syntax	<code>message-processing-model (v1 v2c v3);</code>
Hierarchy Level	<code>[edit snmp v3 target-parameters <i>target-parameter-name</i> parameters]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure the message processing model to be used when generating SNMP notifications.
Options	<p>v1—SNMPv1 message process model.</p> <p>v2c—SNMPv2c message process model.</p> <p>v3—SNMPv3 message process model.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Message Processing Model on page 308

notify

Syntax	<pre>notify <i>name</i> { tag <i>tag-name</i>; type (trap inform); }</pre>
Hierarchy Level	[edit snmp v3]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>type inform option added in 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 14.1X53-D20 for the OCX Series.</p>
Description	Select management targets for SNMPv3 notifications as well as the type of notifications. Notifications can be either traps or informs.
Options	<p>name—Name assigned to the notification.</p> <p>tag-name—Notifications are sent to all targets configured with this tag.</p> <p>type—Notification type is trap or inform. Traps are unconfirmed notifications. Informs are confirmed notifications.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring the Inform Notification Type and Target Address on page 310• Configuring the SNMPv3 Trap Notification on page 300

notify-filter (Applying to the Management Target)

Syntax	<code>notify-filter <i>profile-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-parameters <i>target-parameters-name</i>]</code>
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Specify the notify filter to be used by a specific set of target parameters.
Options	<i>profile-name</i> —Name of the notify filter to apply to notifications.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Applying the Trap Notification Filter on page 307

notify-filter (Configuring the Profile Name)

Syntax	<pre>notify-filter <i>profile-name</i> { <i>oid oid</i> (include exclude); }</pre>
Hierarchy Level	[edit snmp v3]
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Specify a group of MIB objects for which you define access. The notify filter limits the type of traps or informs sent to the network management system.
Options	<i>profile-name</i> —Name assigned to the notify filter. The remaining statement is explained separately. See CLI Explorer .
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Trap Notification Filter on page 301• oid on page 1686

notify-view

Syntax	<code>notify-view <i>view-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 vacm access group <i>group-name</i> (default-context-prefix context-prefix <i>context-prefix</i>) security-model (any usm v1 v2c) security-level (authentication none privacy)]</code>
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Associate the notify view with a community (for SNMPv1 or SNMPv2c clients) or a group name (for SNMPv3 clients).
Options	<i>view-name</i> —Name of the view to which the SNMP user group has access.
Required Privilege Level	snmp —To view this statement in the configuration. snmp-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring MIB Views on page 241 • Configuring the Notify View on page 295

oid

Syntax	<code>oid <i>oid</i> (include exclude);</code>
Hierarchy Level	<code>[edit snmp v3 notify-filter <i>profile-name</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Specify an object identifier (OID) used to represent a subtree of MIB objects. This OID is a prefix that the represented MIB objects have in common.
Options	exclude —Exclude the subtree of MIB objects represented by the specified OID. include —Include the subtree of MIB objects represented by the specified OID. oid —Object identifier used to represent a subtree of MIB objects. All MIB objects represented by this statement have the specified OID as a prefix. You can specify the OID using either a sequence of dotted integers or a subtree name.
Required Privilege Level	snmp —To view this statement in the configuration. snmp-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Trap Notification Filter on page 301

parameters

Syntax	<pre>parameters { message-processing-model (v1 v2c v3); security-level (none authentication privacy); security-model (usm v1 v2c); security-name security-name; }</pre>
Hierarchy Level	[edit snmp v3 target-parameters <i>target-parameters-name</i>]
Release Information	<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>
Description	<p>Configure a set of target parameters for message processing and security.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Defining and Configuring the Trap Target Parameters on page 306

port

Syntax	<code>port <i>port-number</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-address <i>target-address-name</i>]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure a UDP port number for an SNMP target.
Default	If you omit this statement, the default port is 162.
Options	<i>port-number</i> —Port number for the SNMP target.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Port on page 304

privacy-3des

Syntax	<pre>privacy-3des { (privacy-key <i>privacy-key</i> privacy-password <i>privacy-password</i>); }</pre>
Hierarchy Level	<pre>[edit snmp v3 usm local-engine user <i>username</i>], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i>]</pre>
Release Information	<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>
Description	<p>Configure the triple Data Encryption Standard (3DES) as the privacy type for the SNMPv3 user.</p> <p>For privacy encryption, you can either enter a password in clear text, which is immediately encrypted, or, if you already have the encrypted version (known as a <i>key</i>), enter the key directly.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the SNMPv3 Encryption Type on page 289

privacy-aes128

Syntax	<pre>privacy-aes128 { (privacy-key <i>privacy-key</i> privacy-password <i>privacy-password</i>); }</pre>
Hierarchy Level	<pre>[edit snmp v3 usm local-engine user <i>username</i>], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i>]</pre>
Release Information	<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>
Description	<p>Configure the Advanced Encryption Standard encryption algorithm (CFB128-AES-128 Privacy Protocol) for the SNMPv3 user.</p> <p>For privacy encryption, you can either enter a password in clear text, which is immediately encrypted, or, if you already have the encrypted version (known as a <i>key</i>), enter the key directly.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring the SNMPv3 Encryption Type on page 289

privacy-des

Syntax	<pre>privacy-des { (privacy-key <i>privacy-key</i> privacy-password <i>privacy-password</i>); }</pre>
Hierarchy Level	<pre>[edit snmp v3 usm local-engine user <i>username</i>], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i>]</pre>
Release Information	<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>
Description	<p>Configure the Data Encryption Standard (DES) as the privacy type for the SNMPv3 user.</p> <p>For privacy encryption, you can either enter a password in clear text, which is immediately encrypted, or, if you already have the encrypted version (known as a <i>key</i>), enter the key directly.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the SNMPv3 Encryption Type on page 289

privacy-key

Syntax	<code>privacy-key <i>privacy-key</i>;</code>
Hierarchy Level	<code>[edit snmp v3 usm local-engine user <i>username</i> privacy-3des],</code> <code>[edit snmp v3 usm local-engine user <i>username</i> privacy-aes128],</code> <code>[edit snmp v3 usm local-engine user <i>username</i> privacy-des],</code> <code>[edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> privacy-3des],</code> <code>[edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> privacy-aes128],</code> <code>[edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> privacy-des]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure a privacy key for the SNMPv3 user, if you know it. The encrypted version of a password is known as a key.
Options	<i>privacy-key</i> —The encrypted version from the cleartext password. It is an alternative to entering a password.
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the SNMPv3 Encryption Type on page 289

privacy-none

Syntax	privacy-none;
Hierarchy Level	[edit snmp v3 usm local-engine user <i>username</i>], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i>]
Release Information	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 11.1 for the QFX Series.
Description	Configure that no encryption be used for the SNMPv3 user.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the SNMPv3 Encryption Type on page 289

privacy-password

Syntax	<code>privacy-password <i>privacy-password</i>;</code>
Hierarchy Level	<pre>[edit snmp v3 usm local-engine user <i>username</i> privacy-3des], [edit snmp v3 usm local-engine user <i>username</i> privacy-aes128], [edit snmp v3 usm local-engine user <i>username</i> privacy-des], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> privacy-3des], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> privacy-aes128], [edit snmp v3 usm remote-engine <i>engine-id</i> user <i>username</i> privacy-des]</pre>
Release Information	<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>
Description	Configure a privacy password for the SNMPv3 user.
Options	<p><i>privacy-password</i>—Password that a user enters. The password is then converted into a key that is used for encryption.</p> <p>SNMPv3 has special requirements when you create plain-text passwords on a router or switch:</p> <ul style="list-style-type: none"> • The password must be at least eight characters long. • The password can include alphabetic, numeric, and special characters, but it cannot include control characters.
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the SNMPv3 Encryption Type on page 289

read-view

Syntax	<code>read-view <i>view-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 vacm access group <i>group-name</i> (default-context-prefix context-prefix <i>context-prefix</i>) security-model (any usm v1 v2c) security-level (authentication none privacy)]</code>
Release Information	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 11.1 for the QFX Series.
Description	Associate the read-only view with a community (for SNMPv1 or SNMPv2c clients) or a group name (for SNMPv3 clients).
Options	<i>view-name</i> —The name of the view to which the SNMP user group has access.
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring the Read View on page 295 • Configuring MIB Views on page 241

remote-engine

Syntax	<pre> remote-engine engine-id { user username { authentication-md5 { (authentication-key authentication-key authentication-password authentication-password); } authentication-none; authentication-sha { (authentication-key authentication-key authentication-password authentication-password); } privacy-aes128 (privacy-key privacy-key privacy-password privacy-password); } privacy-des { (privacy-key privacy-key privacy-password privacy-password); } privacy-3des { (privacy-key privacy-key privacy-password privacy-password); } privacy-none { } } </pre>
Hierarchy Level	[edit snmp v3 usm]
Release Information	<p>Statement introduced in 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 14.1X53-D20 for the OCX Series.</p>
Description	<p>Configure the remote engine information for the user-based security model (USM). To send inform messages to an SNMPv3 user on a remote device, you must configure the engine identifier for the SNMP agent on the remote device where the user resides.</p>
Options	<p>engine-id—Specify engine identifier in hexadecimal format. Used to compute the security digest for authenticating and encrypting packets sent to a user on the remote host.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Configuring the Remote Engine and Remote User on page 313

routing-instance

Syntax	<code>routing-instance <i>routing-instance-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 <i>target-address</i> <i>target-address-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 8.3. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Specify a routing instance for an SNMPv3 trap target.
Options	<p><i>routing-instance-name</i>—Name of the routing instance.</p> <p>To configure a routing instance within a logical system, specify the logical system name followed by the routing instance name. Use a slash (/) to separate the two names (for example, test-ls/test-ri). To configure the default routing instance on a logical system, specify the logical system name followed by default (for example, test-ls/default).</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Trap Target Address on page 302

security-level (Defining Access Privileges)

Syntax	<pre>security-level (authentication none privacy) { notify-view <i>view-name</i>; read-view <i>view-name</i>; write-view <i>view-name</i>; }</pre>
Hierarchy Level	[edit snmp v3 vacm access group <i>group-name</i> (default-context-prefix context-prefix <i>context-prefix</i>) security-model (any usm v1 v2c)]
Release Information	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 11.1 for the QFX Series.
Description	Define the security level used for access privileges.
Default	none
Options	authentication —Provide authentication but no encryption. none —No authentication and no encryption. privacy —Provide authentication and encryption.
Required Privilege Level	snmp —To view this statement in the configuration. snmp-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Security Level on page 293

security-level (Generating SNMP Notifications)

Syntax	<code>security-level (authentication none privacy);</code>
Hierarchy Level	<code>[edit snmp v3 target-parameters <i>target-parameters-name</i> parameters]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure the security level to use when generating SNMP notifications.
Default	<code>none</code>
Options	<p><code>authentication</code>—Provide authentication but no encryption.</p> <p><code>none</code>—No authentication and no encryption.</p> <p><code>privacy</code>—Provide authentication and encryption.</p>
Required Privilege Level	<p><code>snmp</code>—To view this statement in the configuration.</p> <p><code>snmp-control</code>—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Security Level on page 308

security-model (Access Privileges)

Syntax	<code>security-model (usm v1 v2c);</code>
Hierarchy Level	<code>[edit snmp v3 vacm access group <i>group-name</i> (default-context-prefix context-prefix <i>context-prefix</i>)]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure the security model for an SNMPv3 group. The security model is used to determine access privileges for the group.
Options	<code>usm</code> —SNMPv3 security model. <code>v1</code> —SNMPv1 security model. <code>v2c</code> —SNMPv2c security model.
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Security Model on page 293


security-model (Group)

Syntax	<pre>security-model (usm v1 v2c) { security-name security-name { group group-name; } }</pre>
Hierarchy Level	[edit snmp v3 vacm security-to-group]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Define a security model for a group.
Options	<p>usm—SNMPv3 security model.</p> <p>v1—SNMPv1 security model.</p> <p>v2c—SNMPv2c security model.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Security Model on page 297

security-model (SNMP Notifications)

Syntax	<code>security-model (usm v1 v2c);</code>
Hierarchy Level	<code>[edit snmp v3 target-parameters <i>target-parameters-name</i> parameters]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure the security model for an SNMPv3 group. The security model is used for SNMP notifications.
Options	<code>usm</code> —SNMPv3 security model. <code>v1</code> —SNMPv1 security model. <code>v2c</code> —SNMPv2c security model.
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Security Model on page 308


security-name (Community String)

Syntax	<code>security-name <i>security-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 snmp-community <i>community-index</i>]</code>
Release Information	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 11.1 for the QFX Series.
Description	Associate a community string with the security name of a user. The community string, which is used for SNMPv1 and SNMPv2c clients in an SNMPv3 system, is configured at the <code>[edit snmp v3 snmp-community <i>community-index</i>]</code> hierarchy level.
Options	<i>security-name</i> —Name that is used for messaging security and user access control.
<div>  <p>NOTE: The security name must match the configured security name at the <code>[edit snmp v3 target-parameters <i>target-parameters-name</i> parameters]</code> hierarchy level when you configure traps or informs.</p> </div>	
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> Configuring the Security Names on page 320

security-name (Security Group)

Syntax	<pre>security-name <i>security-name</i> { <i>group</i> <i>group-name</i>; }</pre>
Hierarchy Level	[edit snmp v3 vacm security-to-group <i>security-model</i> (usm v1 v2c)]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Associate a group or a community string with a configured security group.
Options	<i>security-name</i> —Username configured at the [edit snmp v3 usm local-engine user <i>username</i>] hierarchy level. For SNMPv1 and SNMPv2c, the security name is the community string configured at the [edit snmp v3 snmp-community <i>community-index</i>] hierarchy level.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Assigning Security Names to Groups on page 297

security-name (SNMP Notifications)

Syntax	<code>security-name <i>security-name</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-parameters <i>target-parameters-name</i> parameters]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure the security name used when generating SNMP notifications.
Options	<i>security-name</i> —If the SNMPv3 USM security model is used, identify the user when generating the SNMP notification. If the v1 or v2c security models are used, identify the SNMP community used when generating the notification.
<div>  <p>NOTE: The access privileges for the group associated with this security name must allow this notification to be sent.</p> <p>If you are using the v1 or v2 security models, the security name at the <code>[edit snmp v3 vacm security-to-group]</code> hierarchy level must match the security name at the <code>[edit snmp v3 snmp-community <i>community-index</i>]</code> hierarchy level.</p> </div>	
Required Privilege Level	<code>snmp</code> —To view this statement in the configuration. <code>snmp-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring the Security Name on page 309

security-to-group

Syntax	<pre>security-to-group { security-model (usm v1 v2c) { group group-name; security-name security-name; } }</pre>
Hierarchy Level	[edit snmp v3 vacm]
Release Information	<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>
Description	<p>Configure the group to which a specific SNMPv3 security name belongs. The security name is used for messaging security.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Assigning Security Model and Security Name to a Group on page 297

snmp-community

Syntax	<pre>snmp-community <i>community-index</i> { <i>community-name</i> <i>community-name</i>; <i>security-name</i> <i>security-name</i>; <i>tag</i> <i>tag-name</i>; }</pre>
Hierarchy Level	[edit snmp v3]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Configure the SNMP community.
Options	<p><i>community-index</i>—(Optional) String that identifies an SNMP community.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the SNMPv3 Community on page 318

tag

Syntax	<code>tag tag-name;</code>
Hierarchy Level	<code>[edit snmp v3 notify name],</code> <code>[edit snmp v3 snmp-community community-index]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure a set of targets to receive traps or informs (for IPv4 packets only).
Options	tag-name —Identifies the address of managers that are allowed to use a community string.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Tag on page 320• Configuring the SNMPv3 Trap Notification on page 300

tag-list

Syntax	<code>tag-list <i>tag-list</i>;</code>
Hierarchy Level	<code>[edit snmp v3 target-address <i>target-address-name</i>]</code>
Release Information	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 11.1 for the QFX Series.
Description	Configure an SNMP tag list used to select target addresses.
Options	<i>tag-list</i> —Define sets of target addresses (tags). To specify more than one tag, specify the tag names as a space-separated list enclosed within double quotes.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Trap Target Address on page 304

target-address

Syntax	<pre>target-address <i>target-address-name</i> { address <i>address</i>; address-mask <i>address-mask</i>; logical-system <i>logical-system</i>; port <i>port-number</i>; retry-count <i>number</i>; routing-instance <i>instance</i>; tag-list <i>tag-list</i>; target-parameters <i>target-parameters-name</i>; timeout <i>seconds</i>; }</pre>
Hierarchy Level	[edit snmp v3]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Configure the address of an SNMP management application and the parameters to be used in sending notifications.
Options	<p><i>target-address-name</i>—String that identifies the target address.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Configuring the Trap Target Address on page 302

target-parameters

Syntax At the `[edit snmp v3]` hierarchy level:

```
target-parameters target-parameters-name {
  profile-name;
  parameters {
    message-processing-model (v1 | v2c | V3);
    security-level (authentication | none | privacy);
    security-model (usm | v1 | v2c);
    security-name security-name;
  }
}
```

At the `[edit snmp v3 target-address target-address-name]` hierarchy level:

```
target-parameters target-parameters-name;
```

Hierarchy Level `[edit snmp v3]`
`[edit snmp v3 target-address target-address-name]`

Release Information 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 11.1 for the QFX Series.

Description Configure the message processing and security parameters for sending notifications to a particular management target. The target parameters are configured at the `[edit snmp v3]` hierarchy level. The remaining statements at this level are explained separately.

Then apply the target parameters configured at the `[edit snmp v3 target-parameters target-parameters-name]` hierarchy level to the target address configuration at the `[edit snmp v3]` hierarchy level.

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

Related Documentation

- [Defining and Configuring the Trap Target Parameters on page 306](#)
- [Applying Target Parameters on page 305](#)

type

Syntax	<code>type (inform trap);</code>
Hierarchy Level	<code>[edit snmp v3 notify <i>name</i>]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>inform option added in 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>
Description	Configure the type of SNMP notification.
Options	<p>inform—Defines the type of notification as an inform. SNMP informs are confirmed notifications.</p> <p>trap—Defines the type of notification as a trap. SNMP traps are unconfirmed notifications.</p>
Required Privilege Level	<p>snmp—To view this statement in the configuration.</p> <p>snmp-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring SNMP Informs on page 309• Configuring the SNMPv3 Trap Notification on page 300

user

Syntax	<code>user <i>username</i>;</code>
Hierarchy Level	[edit snmp v3 usm local-engine], [edit snmp v3 usm remote-engine <i>engine-id</i>]
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Specify a user associated with an SNMPv3 group on a local or remote SNMP engine.
Options	<i>username</i> —SNMPv3 user-based security model (USM) username.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Creating SNMPv3 Users on page 286

usm

```

Syntax  usm {
        local-engine {
            user username {
                authentication-md5 {
                    authentication-password authentication-password;
                }
                authentication-none;
                authentication-sha {
                    authentication-password authentication-password;
                }
                privacy-aes128 {
                    privacy-password privacy-password;
                }
                privacy-des {
                    privacy-password privacy-password;
                }
                privacy-3des {
                    privacy-password privacy-password;
                }
                privacy-none {
                    privacy-password privacy-password;
                }
            }
        }
        remote-engine engine-id {
            user username {
                authentication-md5 {
                    authentication-password authentication-password;
                }
                authentication-none;
                authentication-sha {
                    authentication-password authentication-password;
                }
                privacy-aes128 {
                    privacy-password privacy-password;
                }
                privacy-des {
                    privacy-password privacy-password;
                }
                privacy-3des {
                    privacy-password privacy-password;
                }
                privacy-none {
                    privacy-password privacy-password;
                }
            }
        }
    }
}

```

Hierarchy Level [edit snmp v3]

Release Information	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 11.1 for the QFX Series.
Description	Configure user-based security model (USM) information. The remaining statements are explained separately. See CLI Explorer .
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Creating SNMPv3 Users on page 286• Configuring the Remote Engine and Remote User on page 313

v3

```

Syntax v3 {
    notify name {
        tag tag-name;
        type trap;
    }
    notify-filter profile-name {
        oid object-identifier (include | exclude);
    }
    snmp-community community-index {
        community-name community-name;
        security-name security-name;
        tag tag-name;
    }
    target-address target-address-name {
        address address;
        address-mask address-mask;
        logical-system logical-system;
        port port-number;
        retry-count number;
        routing-instance instance;
        tag-list tag-list;
        target-parameters target-parameters-name;
        timeout seconds;
    }
    target-parameters target-parameters-name {
        notify-filter profile-name;
        parameters {
            message-processing-model (v1 | v2c | V3);
            security-level (authentication | none | privacy);
            security-model (usm | v1 | v2c);
            security-name security-name;
        }
    }
    usm {
        local-engine {
            user username {
                authentication-md5 {
                    authentication-password authentication-password;
                }
                authentication-sha {
                    authentication-password authentication-password;
                }
                authentication-none;
                privacy-aes128 {
                    privacy-password privacy-password;
                }
                privacy-des {
                    privacy-password privacy-password;
                }
                privacy-des {
                    privacy-password privacy-password;
                }
            }
        }
    }
}

```

```

    }
    privacy-none;
  }
}
remote-engine engine-id {
  user username {
    authentication-md5 {
      authentication-password authentication-password;
    }
    authentication-sha {
      authentication-password authentication-password;
    }
    authentication-none;
    privacy-aes128 {
      privacy-password privacy-password;
    }
    privacy-des {
      privacy-password privacy-password;
    }
    privacy-3des {
      privacy-password privacy-password;
    }
    privacy-none {
      privacy-password privacy-password;
    }
  }
}
}
}
vacm {
  access {
    group group-name {
      (default-context-prefix | context-prefix context-prefix){
        security-model (any | usm | v1 | v2c) {
          security-level (authentication | none | privacy) {
            notify-view view-name;
            read-view view-name;
            write-view view-name;
          }
        }
      }
    }
  }
}
security-to-group {
  security-model (usm | v1 | v2c) {
    security-name security-name {
      group group-name;
    }
  }
}
}
}
}
}

```

Hierarchy Level [\[edit snmp\]](#)

Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure SNMPv3. The remaining statements are explained separately. See CLI Explorer .
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Minimum SNMPv3 Configuration on a Device Running Junos OS on page 282

vacm

```

Syntax vacm {
    access {
        group group-name {
            (default-context-prefix | context-prefix context-prefix){
                security-model (any | usm | v1 | v2c) {
                    security-level (authentication | none | privacy) {
                        notify-view view-name;
                        read-view view-name;
                        write-view view-name;
                    }
                }
            }
        }
    }
    security-to-group {
        security-model (usm | v1 | v2c);
        security-name security-name {
            group group-name;
        }
    }
}

```

Hierarchy Level [edit snmp v3]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure view-based access control model (VACM) information.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Defining Access Privileges for an SNMP Group on page 291](#)

write-view

Syntax	<code>write-view view-name;</code>
Hierarchy Level	<code>[edit snmp v3 vacm access group <i>group-name</i> (default-context-prefix context-prefix <i>context-prefix</i>) security-model (any usm v1 v2c) security-level (authentication none privacy)]</code>
Release Information	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 11.1 for the QFX Series switches. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Associate the write view with a community (for SNMPv1 or SNMPv2c clients) or a group name (for SNMPv3 clients).
Options	<i>view-name</i> —Name of the view for which the SNMP user group has write permission.
Required Privilege Level	snmp—To view this statement in the configuration. snmp-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring MIB Views on page 241• Configuring the Write View on page 295

CHAPTER 70

Configuration Statements: Uplink Failure Detection

- [action \(Uplink Failure Detection\) on page 1721](#)
- [group \(Uplink Failure Detection\) on page 1722](#)
- [link-to-disable on page 1722](#)
- [link-to-monitor on page 1723](#)
- [traceoptions \(Uplink Failure Detection\) on page 1724](#)
- [uplink-failure-detection on page 1725](#)

[action \(Uplink Failure Detection\)](#)

Syntax

```
action {  
  log;  
}
```

Hierarchy Level [\[edit protocols uplink-failure-detection\]](#)

Release Information Statement introduced in Junos OS Release 12.1 for EX Series switches.

Description Define an action on uplink-failure-detection group state change.

Options **log**—Generate a system log message.

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

Related Documentation

- [Configuring Interfaces for Uplink Failure Detection \(CLI Procedure\) on page 69](#)

group (Uplink Failure Detection)

Syntax	<pre>group <i>group-name</i> { link-to-monitor <i>interface-name</i>; link-to-disable <i>interface-name</i>; }</pre>
Hierarchy Level	[edit protocols uplink-failure-detection]
Release Information	Statement introduced in Junos OS Release 11.1 for EX Series switches.
Description	Configure a group of uplink and downlink interfaces for uplink failure detection.
Options	<p><i>group-name</i>—Name of the uplink-failure-detection group.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Interfaces for Uplink Failure Detection (CLI Procedure) on page 69

link-to-disable

Syntax	<pre>link-to-disable <i>interface-name</i>;</pre>
Hierarchy Level	[edit protocols uplink-failure-detection group <i>group-name</i>]
Release Information	Statement introduced in Junos OS Release 11.1 for EX Series switches.
Description	Configure the downlink interfaces to be disabled when the switch detects an uplink failure. The switch can monitor a maximum of 48 downlink interfaces in a group.
Options	<p><i>interface-name</i>—Name of the downlink interface or interface range in the group. The interface can be a physical interface or a logical interface.</p>
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring Interfaces for Uplink Failure Detection (CLI Procedure) on page 69

link-to-monitor

Syntax	<code>link-to-monitor <i>interface-name</i>;</code>
Hierarchy Level	<code>[edit protocols uplink-failure-detection group <i>group-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for EX Series switches.
Description	<p>Configure the uplink interfaces to be monitored for uplink failure detection. The switch can monitor a maximum of 48 uplink interfaces in a group.</p> <p>An interface can be configured as link-to-monitor in multiple groups.</p>
Options	<i>interface-name</i> —Name of the uplink interface or interface range in the group. The interface can be a physical interface or a logical interface.
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring Interfaces for Uplink Failure Detection (CLI Procedure) on page 69

traceoptions (Uplink Failure Detection)

Syntax	<pre> traceoptions { file <i>filename</i> <files <i>number</i>> <no-stamp> <replace> <size <i>size</i>> <world-readable no-world-readable>; flag <i>flag</i>; } </pre>
Hierarchy Level	[edit protocols uplink-failure-detection]
Release Information	Statement introduced in Junos OS Release 12.1 for EX Series switches.
Description	Define tracing operations for uplink failure detection.
Default	The traceoptions feature is disabled by default.
Options	<p>file <i>filename</i> —Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks.</p> <p>files <i>number</i> —(Optional) Maximum number of trace files. When a trace file named trace-file reaches its maximum size, it is renamed trace-file.0, then trace-file.1, and so on, until the maximum number of trace files is reached (xk to specify KB, xm to specify MB, or xg to specify gigabytes), at which point the oldest trace file is overwritten. If you specify a maximum number of files, you also must specify a maximum file size with the size option.</p> <p>Range: 2 through 1000</p> <p>Default: 3 files</p> <p>flag <i>flag</i> —Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements. You can include the following flags:</p> <ul style="list-style-type: none"> • all—Trace everything. • dcd—Trace ufd interaction with dcd. • groups—Trace uplink-failure-detection group handling. • interface—Trace interface notification handlers of ufd. • parse—Trace configuration parsing. <p>no-stamp—(Optional) Do not place a timestamp on any trace file.</p> <p>no-world-readable—(Optional) Restricted file access to the user who created the file.</p> <p>size <i>size</i> —(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named trace-file reaches its maximum size, it is renamed trace-file.0, then trace-file.1, and so on, until the maximum number of</p>

trace files is reached. Then the oldest trace file is overwritten. If you specify a maximum number of files, you also must specify a maximum file size with the **files** option.

Syntax: **xk** to specify KB, **xm** to specify MB, or **xg** to specify gigabytes

Range: 10 KB through 1 GB

Default: 128 KB

world-readable—(Optional) Enable unrestricted file access.

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

Related Documentation

- [Configuring Interfaces for Uplink Failure Detection \(CLI Procedure\) on page 69](#)

uplink-failure-detection

Syntax

```
uplink-failure-detection {
  action {
    log;
  }
  group group-name {
    link-to-monitor interface-name;
    link-to-disable interface-name;
  }
  traceoptions {
    file filename <files number> <no-stamp> <replace> <size size> <world-readable |
    no-world-readable>;
    flag flag;
  }
}
```

Hierarchy Level [edit protocols]

Release Information Statement introduced in Junos OS Release 11.1 for EX Series switches.

Description Configure uplink and downlink interfaces in a group to monitor uplink failures and to propagate uplink failures to the downlink interfaces.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Configuring Interfaces for Uplink Failure Detection \(CLI Procedure\) on page 69](#)

CHAPTER 71

Configuration Statements: Port Mirroring and Analyzers

- analyzer (Port Mirroring) on page 1729
- analyzer on page 1731
- bridge-domain (Analyzer) on page 1733
- disable (Forwarding Options) on page 1734
- disable-all-instances on page 1735
- ethernet-switching (Port Mirroring) on page 1735
- egress on page 1736
- egress (Analyzer) on page 1737
- ethernet-switching-options on page 1738
- family (Port Mirroring) on page 1744
- family (Port Mirroring) on page 1746
- forwarding-options on page 1748
- inet (Port Mirroring) on page 1754
- ingress (Analyzer) on page 1755
- ingress (Port Mirroring) on page 1756
- ingress (vlans) on page 1756
- input on page 1757
- input (Analyzer) on page 1758
- input (Port Mirroring) on page 1759
- instance on page 1760
- instance (Port Mirroring) on page 1761
- interface (Analyzer) on page 1763
- interface (Next-Hop Group) on page 1764
- interface (Port Mirroring) on page 1765
- interface (Port Mirroring) on page 1766
- ip-address (Port Mirroring) on page 1767

- [maximum-packet-length](#) on page 1768
- [mirror-once](#) on page 1770
- [next-hop-group \(Analyzer\)](#) on page 1770
- [next-hop-group \(Port Mirroring\)](#) on page 1771
- [no-tag](#) on page 1772
- [no-tag](#) on page 1772
- [no-tag](#) on page 1773
- [no-filter-check](#) on page 1773
- [no-filter-check](#) on page 1774
- [output](#) on page 1775
- [output \(Mirroring\)](#) on page 1776
- [output \(Port Mirroring\)](#) on page 1777
- [output \(Port Mirroring\)](#) on page 1778
- [port-mirroring](#) on page 1779
- [rate \(Forwarding Options\)](#) on page 1783
- [routing-instance](#) on page 1784
- [routing-instance \(Port Mirroring\)](#) on page 1784
- [run-length](#) on page 1785
- [vlan \(Mirroring\)](#) on page 1786
- [vlan \(Port Mirroring\)](#) on page 1787
- [vlan \(Port Mirroring\)](#) on page 1788

analyzer (Port Mirroring)

```
Syntax analyzer {
    analyzer-name {
        input {
            egress {
                bridge-domain bridge-domain-name;
                interface (all | interface-name);
                routing-instance {
                    instance-name {
                        bridge-domain bridge-domain-name;
                    }
                }
            }
        }
        ingress {
            bridge-domain bridge-domain-name;
            interface (all | interface-name);
            routing-instance {
                instance-name {
                    bridge-domain bridge-domain-name;
                }
            }
            vlan (vlan-id | vlan-name);
        }
        vlan (vlan-id | vlan-name);
    }
    maximum-packet-length bytes;
    rate number;
}
output {
    bridge-domain bridge-domain-name;
    interface interface-name;
    next-hop-group next-hop-group-name;
    routing-instance {
        instance-name {
            bridge-domain {
                bridge-domain-name;
            }
        }
    }
    vlan (vlan-id | vlan-name);
}
vlan (vlan-id | vlan-name);
}
```

Hierarchy Level [edit forwarding-options]

Release Information Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Statement introduced in Junos OS Release 14.1 for MX Series routers.

Description Configure port mirroring.

Default Port mirroring is disabled and Junos OS creates no default analyzers.

Options *analyzer-name*—Name that identifies the analyzer. The name can be up to 125 characters long, must begin with a letter, and can include uppercase letters, lowercase letters, numbers, dashes, and underscores. No other special characters are allowed.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Understanding Port Mirroring Analyzers on page 834](#)
- [Example: Configuring Port Mirroring Analyzers for Local Monitoring of Employee Resource Use on page 855](#)
- [Example: Configuring Port Mirroring for Remote Monitoring of Employee Resource Use on page 859](#)

analyzer

Syntax

```

analyzer {
  name {
    input {
      egress {
        interface (all | interface-name);
        vlan (vlan-id | vlan-name);
      }
      ingress {
        interface (all | interface-name);
        vlan (vlan-id | vlan-name);
      }
    }
    output {
      interface interface-name;
      ip-address ip-address;
      routing-instance
      vlan (vlan-id | vlan-name);
    }
  }
}

```

Hierarchy Level For platforms without ELS:

[edit [ethernet-switching-options](#)]

For platforms with ELS:

[edit [forwarding-options](#)]

Release Information Statement introduced in Junos OS Release 11.1 for the QFX Series.
 Option **output vlan** added in Junos OS Release 12.1 for the QFX Series.
 Option **output ip-address** added in Junos OS Release 12.3 for the QFX Series for non-ELS platforms and added in 14.1X53-D10 for ELS platforms.

Description Configure port mirroring. You can create a total of four port-mirroring configurations on the QFX Series, subject to the following limits:

- There can be no more than two configurations that mirror ingress traffic.
- There can be no more than two configurations that mirror egress traffic.

Default Port mirroring is disabled, and Junos OS creates no default analyzers.

Options **all**—Mirror all the access interfaces. Using this option does not cause the QSFP+ or management interfaces to be mirrored.



.....

CAUTION: Configuring the `all` option in a QFabric system causes all the access interfaces on all the nodes to be mirrored. Be cautious about using this option on a QFabric system.

.....

name—Name of the analyzer. The name can include as many as 125 characters; must begin with a letter; and can include uppercase letters, lowercase letters, numbers, dashes, and underscores. No other special characters are allowed.

The remaining statements are explained separately. See [CLI Explorer](#).



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

Related Documentation	<ul style="list-style-type: none">• Understanding Port Mirroring on page 814• Configuring Port Mirroring on page 1017• Examples: Configuring Port Mirroring for Local Analysis on page 1020
------------------------------	---

bridge-domain (Analyzer)

Syntax	<code>bridge-domain <i>bridge-domain-name</i>;</code>
Hierarchy Level	<code>[edit forwarding-options analyzer <i>analyzer-name</i> input egress],</code> <code>[edit forwarding-options analyzer <i>analyzer-name</i> input egress routing-instance <i>instance-name</i>],</code> <code>[edit forwarding-options analyzer <i>analyzer-name</i> input ingress],</code> <code>[edit forwarding-options analyzer <i>analyzer-name</i> input ingress routing-instance <i>instance-name</i>],</code> <code>[edit forwarding-options analyzer <i>analyzer-name</i> output],</code> <code>[edit forwarding-options analyzer <i>analyzer-name</i> output routing-instance <i>instance-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 14.1.
Description	Configure the bridge domain to monitor outgoing traffic.
Options	<i>bridge-domain-name</i> —Name of the bridge domain that monitors outgoing 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"> • Example: Configuring Port Mirroring for Remote Monitoring of Employee Resource Use on page 859 • Example: Configuring Mirroring to Multiple Interfaces for Remote Monitoring of Employee Resource Use on EX9200 Switches on page 870

disable (Forwarding Options)

Syntax	disable;
Hierarchy Level	[edit forwarding-options port-mirror], [edit forwarding-options port-mirror instance <i>instance-name</i>], [edit forwarding-options sampling], [edit forwarding-options sampling instance <i>instance-name</i>], [edit forwarding-options sampling family (inet inet6 mpls vpls)], [edit forwarding-options sampling family (inet inet6 mpls vpls) output file]
Release Information	Statement introduced before Junos OS Release 7.4. Statement added to port-mirror hierarchy in Junos OS Release 9.6.
	<p> NOTE: Beginning in Junos OS Release 15.1F5 and later 15.1 releases and Junos OS Release 16.1 and later, the disable option has been deprecated at the forwarding-options sampling instance <i>instance-name</i> family (inet inet6 mpls) hierarchy level on PTX3000 Series routers. When configured, the option does not take effect, so packets continue to be sampled. Instead of the disable option, use the deactivate forwarding-options sampling instance <i>instance-name</i> family (inet inet6 mpls) command to prevent sampling.</p>
Description	Disable traffic accounting, port mirroring, or sampling.
	<p> NOTE: The disable statement at the [edit forwarding-options sampling] hierarchy level disables only Routing Engine-based sampling. To disable PIC-based sampling and inline sampling, include the disable statement at the [edit forwarding-options sampling instance <i>instance-name</i>] 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	<ul style="list-style-type: none"> <i>Disabling Traffic Sampling</i> <i>Configuring Traffic Sampling on MX, M and T Series Routers</i> <i>Configuring Port Mirroring on M, T MX, and PTX Series Routers</i>

disable-all-instances

Syntax	<code>disable-all-instances;</code>
Hierarchy Level	<code>[edit forwarding-options port-mirror]</code>
Release Information	Statement introduced in Junos OS Release 9.6.
Description	Disable all port mirroring instances globally.
Usage Guidelines	See <i>Configuring Port Mirroring on M, T MX, and PTX Series Routers</i> .
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

ethernet-switching (Port Mirroring)

Syntax	<pre> ethernet-switching; output { interface interface-name { } no-filter-check; } vlan vlan-name { no-tag; } </pre>
Hierarchy Level	<code>[edit forwarding-options port-mirroring [instance name] family]</code>
Release Information	Statement introduced in Junos OS Release 13.2 for the QFX Series.
Description	Specify that the output interface for the port mirror will be configured as an ethernet-switching interface.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Understanding Port Mirroring on page 814 • Configuring Port Mirroring on page 1017 • Examples: Configuring Port Mirroring for Local Analysis on page 1020

egress

Syntax

```
egress {
  interface (all | interface-name);
}
vlan (vlan-id | vlan-name);
```

Hierarchy Level For platforms without ELS:

```
[edit ethernet-switching-options analyzer name input]
```

For platforms with ELS:

```
[edit forwarding-options analyzer name input]
```

Release Information Statement introduced in Junos OS Release 11.2 for the QFX Series.

Description Specify interface or VLAN for which egressing traffic is mirrored. (The `vlan` statement is not supported on all switches.)

The remaining statement is explained separately. See [CLI Explorer](#).



NOTE: If you configure Junos OS to mirror egress packets, do not configure more than 2000 VLANs. If you do so, some of the mirrored packets might contain incorrect VLAN IDs.

Required Privilege Level

routing—To view this statement in the configuration.
routing-control—To add this statement to the configuration.

Related Documentation

- [Understanding Port Mirroring on page 814](#)
- [Configuring Port Mirroring on page 1017](#)
- [Examples: Configuring Port Mirroring for Local Analysis on page 1020](#)

egress (Analyzer)

Syntax	<pre>egress { bridge-domain <i>bridge-domain-name</i>; interface (all <i>interface-name</i>); routing-instance { instance-name { bridge-domain <i>bridge-domain-name</i>; } } }</pre>
Hierarchy Level	[edit forwarding-options analyzer <i>analyzer-name</i> input]
Release Information	Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches. Statement introduced in Junos OS Release 14.1 for MX Series routers.
Description	<p>Specify ports where traffic exiting the interface is to be mirrored in a mirroring configuration.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use Through a Transit Switch on EX9200 Switches on page 879

ethernet-switching-options

List of Syntax [EX Series on page 1738](#)
[QFX Series, QFabric, EX4600 on page 1741](#)

EX Series

```

ethernet-switching-options {
  analyzer (Port Mirroring) {
    name {
      loss-priority priority;
      ratio number;
      input {
        ingress {
          interface (all | interface-name);
          vlan (vlan-id | vlan-name);
        }
        egress {
          interface (all | interface-name);
        }
      }
      output {
        interface interface-name;
        vlan (vlan-id | vlan-name) {
          no-tag;
        }
      }
    }
  }
  bpdu-block {
    disable-timeout timeout;
    interface (all | [interface-name]) {
      (disable | drop | shutdown);
    }
  }
  dot1q-tunneling {
    ether-type (0x8100 | 0x88a8 | 0x9100);
  }
  interfaces interface-name {
    no-mac-learning;
  }
  mac-lookup-length number-of-entries;
}
  mac-notification {
    notification-interval seconds;
  }
  mac-table-aging-time seconds;
  nonstop-bridging;
  port-error-disable {
    disable-timeout timeout;
  }
  redundant-trunk-group {
    group name {
      interface interface-name <primary>;
      interface interface-name;
    }
  }
}

```



```

    }
}
secure-access-port {
  dhcp-snooping-file {
    location local_pathname | remote_URL;
    timeout seconds;
    write-interval seconds;
  }
  dhcpv6-snooping-file {
    location local_pathname | remote_URL;
    timeout seconds;
    write-interval seconds;
  }
}
interface (all | interface-name) {
  allowed-mac {
    mac-address-list;
  }
  (dhcp-trusted | no-dhcp-trusted);
  fcoe-trusted;
  mac-limit limit action (drop | log | none | shutdown);
  no-allowed-mac-log;
  persistent-learning;
  static-ip ip-address {
    vlan vlan-name;
    mac mac-address;
  }
  static-ipv6 ip-address {
    vlan vlan-name;
    mac mac-address;
  }
}
vlan (all | vlan-name) {
  (arp-inspection | no-arp-inspection) [
    forwarding-class class-name;
  ]
  dhcp-option82 {
    circuit-id {
      prefix hostname;
      use-interface-description;
      use-vlan-id;
    }
    remote-id {
      prefix hostname | mac | none;
      use-interface-description;
      use-string string;
    }
    vendor-id [string];
  }
  (examine-dhcp | no-examine-dhcp) {
    forwarding-class class-name;
  }
  (examine-dhcpv6 | no-examine-dhcpv6) {
    forwarding-class class-name;
  }
  examine-fip {

```

```
    fc-map fc-map-value;
  }
  (ip-source-guard | no-ip-source-guard);
  (ipv6-source-guard | no-ipv6-source-guard);
  mac-move-limit limit action (drop | log | none | shutdown);
  }
  (neighbor-discovery-inspection | no-neighbor-discovery-inspection);
no-option-37;
static {
  vlan name {
    mac mac-address {
      next-hop interface-name;
    }
  }
}
storm-control {
  action-shutdown;
  interface (all | interface-name) {
    bandwidth bandwidth;
    level level;
    multicast;
    no-broadcast;
    no-multicast;
    no-registered-multicast;
    no-unknown-unicast;
    no-unregistered-multicast;
  }
}
traceoptions {
  file filename <files number> <no-stamp> <replace> <size size> <world-readable |
    no-world-readable>;
  flag flag <disable>;
}
unknown-unicast-forwarding {
  vlan (all | vlan-name) {
    interface interface-name;
  }
}
voip {
  interface (all | [interface-name | access-ports]) {
    vlan vlan-name;
    forwarding-class (assured-forwarding | best-effort | expedited-forwarding |
      network-control);
  }
}
}
```

QFX Series, QFabric,
EX4600

```

ethernet-switching-options {
  analyzer {
    name {
      input {
        egress {
          interface (all | interface-name);
        }
        ingress {
          interface (all | interface-name);
          vlan (vlan-id | vlan-name);
        }
        output {
          interface interface-name;
          ip-address ip-address;
          vlan (vlan-id | vlan-name);
        }
      }
    }
  }
  bpdu-block {
    interface (all | [interface-name]);
    disable-timeout timeout;
  }
  dot1q-tunneling {
    ether-type (0x8100 | 0x88a8 | 0x9100)
  }
  interfaces interface-name {
    no-mac-learning;
  }
  mac-table-aging-time seconds {
  }
  port-error-disable {
    disable-timeout timeout;
  }
  secure-access-port {
    dhcp-snooping-file {
      location local_pathname | remote_URL;
      timeout seconds;
      write-interval seconds;
    }
    interface (all | interface-name) {
      allowed-mac {
        mac-address-list;
      }
      (dhcp-trusted | no-dhcp-trusted);
      fcoe-trusted;
      mac-limit limit action action;
      no-allowed-mac-log;
    }
    vlan (all | vlan-name) {
      (arp-inspection | no-arp-inspection) [
        forwarding-class (for DHCP Snooping or DAI Packets) class-name;
      ]
      dhcp-option82 {
        circuit-id {
          prefix (Circuit ID for Option 82) hostname;
        }
      }
    }
  }
}

```

```

        use-interface-description;
        use-vlan-id;
    }
    remote-id {
        prefix (Remote ID for Option 82) hostname | mac | none;
        use-interface-description;
        use-string string;
    }
    vendor-id <string>;
}
(examine-dhcp | no-examine-dhcp) {
    forwarding-class (for DHCP Snooping or DAI Packets) class-name;
}
examine-fip {
    examine-vn2vn {
        beacon-period milliseconds;
    }
    fc-map fc-map-value;
}
mac-move-limit limit <fabric-limit limit action action>;
}
}
static {
    vlan vlan-id {
        mac mac-address next-hop interface-name;
    }
}
storm-control {
    interface (all | interface-name) {
        bandwidth bandwidth;
        no-broadcast;
        no-multicast;
        no-unknown-unicast;
    }
}
traceoptions {
    file filename <files number> <no-stamp> <replace> <size size> <world-readable |
    no-world-readable>;
    flag flag <disable>;
}
}

```

Hierarchy Level [\[edit\]](#)

Release Information Statement introduced in Junos OS Release 9.0 for EX Series switches.
Statement introduced in Junos OS Release 11.1 for the QFX Series.

Description Configure Ethernet switching options.

The remaining statements are explained separately. See [CLI Explorer](#).

Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Understanding Port Mirroring on page 814• <i>Understanding How to Protect Access Ports from Common Attacks</i>• <i>Port Security Features Overview</i>• <i>Understanding BPDU Protection for STP, RSTP, and MSTP</i>• <i>Understanding Redundant Trunk Links (Legacy RTG Configuration)</i>• <i>Understanding Storm Control</i>• <i>Understanding Storm Control on EX Series Switches</i>• <i>Understanding 802.1X and VoIP on EX Series Switches</i>• <i>Understanding Q-in-Q Tunneling and VLAN Translation</i>• <i>Understanding Unknown Unicast Forwarding</i>• <i>Understanding MAC Notification on EX Series Switches</i>• <i>Understanding FIP Snooping</i>• <i>Understanding Nonstop Bridging on EX Series Switches</i>

family (Port Mirroring)

List of Syntax	MX, M, T Series Routers, EX Series Switches and SRX Series Firewalls on page 1744 Syntax: QFX Series Switches, EX4600 and NFX Series Devices on page 1744
MX, M, T Series Routers, EX Series Switches and SRX Series Firewalls	<pre>family (inet inet6) { output { interface <i>interface-name</i> { next-hop <i>address</i>; } no-filter-check; } }</pre>
Syntax: QFX Series Switches, EX4600 and NFX Series Devices	<pre>family ethernet-switching { output { interface <i>interface-name</i> { } no-filter-check; } vlan <i>vlan-name</i> { no-tag; } } inet output { ip-address <i>address</i> { } routing-instance <i>instance-name</i> { ip-address <i>address</i> { } } } }</pre>
Hierarchy Level	[edit forwarding-options port-mirroring]
Release Information	Statement introduced before Junos OS Release 7.4 for MX, M, T Series routers, EX Series switches and SRX Series firewalls. Statement introduced in Junos OS Release 13.2 for the QFX Series and EX4600.
Description	Specify the type of interface that will be used to forward port mirrored packet to an analyzer device. Configure the protocol family to be sampled. Only IPv4 (inet) and IPv6 (inet6) are supported. The remaining statements are explained separately. See CLI Explorer .
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

routing—To view this statement in the configuration.

routing-control—To add this statement to the configuration.

**Related
Documentation**

- *Configuring Port Mirroring on M, T MX, and PTX Series Routers*
- [Understanding Port Mirroring on page 814](#)
- [Configuring Port Mirroring on page 1017](#)
- [Examples: Configuring Port Mirroring for Local Analysis on page 1020](#)

family (Port Mirroring)

Syntax

```
family (ccc | inet | inet6 | vpls) {
  output {
    interface interface-name {
      next-hop address;
    }
    next-hop-group group-name{
      group-type inet6;
      interface interface-name {
        next-hop ipv6-address;
      }
      next-hop-subgroup group-name{
        interface interface-name {
          next-hop ipv6-address;
        }
      }
    }
  }
  no-filter-check;
  server-profile server-profile-name;
}
```

Hierarchy Level [\[edit forwarding-options port-mirroring\]](#),
[\[edit forwarding-options port-mirroring instance *instance-name*\]](#)

Release Information Statement introduced before Junos OS Release 7.4.
vpls and **ccc** options introduced in Junos OS Release 9.3 for MX Series routers only.
vpls support extended to M7i, M10i, M120, and M320 routers in Junos OS Release 9.5.
ccc option introduced in Junos OS Release 9.6 for M120 and M320 routers only.
Statement introduced in Junos OS Release 12.1 for PTX Series Packet Transport Switches.
ccc option introduced in Junos OS Release 12.3R2 for EX Series switches.
next-hop-group option for **family inet6** introduced in Junos OS Release 14.2 for MX Series routers only.

Description Configure the address type family to sample for port mirroring.

Options **ccc**—Sample Layer 2 VPN traffic.

inet—Sample IPv4 traffic.

inet6—Sample IPv6 traffic.

vpls—Sample VPLS traffic.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- *Configuring Port Mirroring*
- *Configuring Active Flow Monitoring on PTX Series Packet Transport Routers*

forwarding-options

```
Syntax forwarding-options {
    dhcp-security {
        arp-inspection;
        group group-name {
            interface interface-name {
                static-ip ip-address {
                    mac mac-address;
                }
            }
        }
        overrides {
            no-option82;
            (trusted | untrusted);
        }
    }
    ip-source-guard;
    no-dhcp-snooping;
    option-82 {
        circuit-id {
            prefix {
                host-name;
                logical-system-name;
                routing-instance-name;
            }
            use-interface-description (device | logical);
            use-vlan-id;
        }
        remote-id {
            host-name hostname;
            use-interface-description (device | logical);
            use-string string;
        }
        vendor-id {
            use-string string;
        }
    }
    filter (VLANs) {
        input filter-name;
        output filter-name;
    }
    flood {
        input filter-name;
    }
}
```

Chassis: EX4600 and
QFX Series

```
forwarding options profile-name {
    num-65-127-prefix number;
}
```

Chassis: EX4600 and
QFX Series

```
forwarding-options lpm-profile {
  prefix-65-127-disable;
  unicast-in-lpm;
}
```

Chassis: EX4600 and
QFX Series

```
forwarding-options custom-profile {
  l2-entries | l3-entries | lpm-entries {
    num-banks number;
  }
}
```

Hierarchy Level

```
[edit],
[edit bridge-domains bridge-domain-name],
[edit vlans vlan-name]
```

```
[edit chassis (QFX Series)]
```

Release Information

Statement introduced before Junos OS Release 7.4.

Statement introduced in Junos OS Release 11.3 for QFX Series switches.

Hierarchy level **[edit vlans *vlan-name*]** introduced in Junos OS Release 13.2X50-D10 for EX Series switches.

Hierarchy level **[edit bridge-domains *bridge-domain-name*]** introduced in Junos OS Release 14.1 for MX Series routers.

custom-profile option introduced in Junos OS Release 15.1x53-D30 for QFX5200 Series switches only.

Description Configure a unified forwarding table profile to allocate the amount of memory available for the following:

- MAC addresses.
- Layer 3 host entries.
- Longest prefix match table entries.

This feature enables you to select a profile that optimizes the amount of memory available for various types of forwarding-table entries based on the needs of your network. For example, for a switch that handles a great deal of Layer 2 traffic, such as a virtualized network with many servers and virtualized machines, you would choose the **l2-profile-one**, which allocates the highest amount of memory to MAC addresses.

You configure the memory allocation for LPM table entries differently, depending on whether you are using Junos OS Release 13.2X51-D10 or Junos OS Release 13.2X51-D15 and later. For more information about configuring memory allocation for LPM table entries, see *Configuring the Unified Forwarding Table on Switches*.

The **num-65-127-prefix *number*** statement is not supported on the **custom-profile** and the **lpm-profile**. The **prefix-65-127-disable** and **unicast-in-lpm** statements are supported only on the **lpm-profile**.

When you commit a configuration with a forwarding table profile change, in most cases the Packet Forwarding Engine restarts automatically to apply the new parameters, which brings the data interfaces down and then up again.

However, starting with Junos OS Releases 14.1X53-D40, 15.1R5, and 16.1R3, for a Virtual Chassis or Virtual Chassis Fabric (VCF) comprised of EX4600 or QFX5100 switches, the Packet Forwarding Engine in member switches does not automatically restart upon configuring and committing a unified forwarding table profile change. This behavior avoids having Virtual Chassis or VCF instability and a prolonged convergence period if a profile change is propagated to member switches and multiple Packet Forwarding Engines all restart at the same time. In this environment, instead of automatically restarting when you initially commit a profile configuration change, the message **Reboot required for configuration to take effect** is displayed at the master switch CLI prompt, notifying you that the profile change does not take effect until the next time you restart the Virtual Chassis or VCF. The profile configuration change is propagated to member switches that support this feature, and a reminder that a reboot is required to apply this pending configuration change appears in the system log of the master switch and applicable member switches. You then enable the profile change subsequently during a planned downtime period using the **request system reboot** command, which quickly establishes a stable Virtual Chassis or VCF with the new configuration.



NOTE: You should plan to make unified forwarding table profile changes only when you are ready to perform a Virtual Chassis or VCF system reboot *immediately* after committing the configuration update. Otherwise, in the intervening period between committing the configuration change and rebooting the Virtual Chassis or VCF, the system can become inconsistent if

a member experiences a problem and restarts. In that case, the new configuration takes effect on the member that was restarted, while the change is not yet activated on all the other members.

The remaining statements are explained separately. See [CLI Explorer](#).

Options **profile-name**—name of the profile to use for memory allocation in the unified forwarding table. [Table 220 on page 1752](#) lists the profiles you can choose that have set values and the associated values for each type of entry.

On QFX5200 Series switches only, you can also select **custom-profile**. This profile enables you to allocate from one to four banks of shared hash memory to a specific type of forwarding-table entry. Each shared hash memory bank can store a maximum of the equivalent of 32,000 IPv4 unicast addresses.

Table 220: Unified Forwarding Table Profiles

Profile Name	MAC Table	Host Table (unicast and multicast addresses)					
	MAC Addresses	IPv4 unicast	IPv6 unicast	IPv4 (*, G)	IPv4 (S, G)	IPv6 (*, G)	IPv6 (S, G)
l2-profile-one	288K	16K	8K	8K	8K	4K	4K
l2-profile-two	224K	80K	40K	40K	40K	20K	20K
l2-profile-three (default)	160K	144K	72K	72K	72K	36K	36K
l3-profile	96K	208K	104K	104K	104K	52K	52K
lpm-profile*	32K	16K	8K	8K	8K	4K	4K

* This profile supports only IPv4 in Junos OS Release 13.2X51-D10. Starting in Junos OS Release 13.2X51-D15, the **lpm-profile** supports IPv4 and IPv6 entries.



NOTE: If the host stores the maximum number of entries for any given type, the entire table is full and is unable to accommodate *any* entries of any other type. For information about valid combinations of table entries see *Understanding the Unified Forwarding Table*.

l2-entries | l3-entries | lpm-entries—(custom-profile only) Select a type of forwarding-table entry—Layer 2, Layer 3, or LPM—to allocate a specific number of shared memory banks. You configure the amount of memory to allocate for each type of entry separately.

num-banks *number*—(custom-profile only) Specify the number of shared memory banks to allocate for a specific type of forwarding-table entry. Each shared memory bank stores the equivalent of 32,000 IPv4 unicast addresses.

Range: 0 through 4.





NOTE: There are four shared memory banks, which can be allocated flexibly among the three types of forwarding-table entries. To allocate

no shared memory for a particular entry type, specify the number 0. When you commit the configuration, the system issues a commit check to ensure that you have not configured more than four memory banks. You do not have to configure all four shared memory banks. By default, each entry type is allocated the equivalent of 32,000 IPv4 unicast addresses in shared memory.

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

Related Documentation	<ul style="list-style-type: none">• <i>Understanding the Unified Forwarding Table</i>• <i>Example: Configuring a Unified Forwarding Table Custom Profile</i>• <i>Configuring Traffic Forwarding and Monitoring</i>
------------------------------	--

inet (Port Mirroring)

Syntax	<pre> inet { output { ip-address address { } routing-instance instance-name { ip-address address { } } } } </pre>
Hierarchy Level	[edit forwarding-options port-mirroring [instance <i>name</i>] family]
Release Information	Statement introduced in Junos OS Release 14.1X53 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	<p>Specify that the output interface will be of type inet. Use this statement so that you can send the mirrored packets to the IP address of the device running an analyzer application. The device can be on a remote network. When you use this feature, the mirrored packets are GRE-encapsulated. The analyzer device must be able to de-encapsulate GRE-encapsulated packets, or the GRE-encapsulated packets must be de-encapsulated before reaching the analyzer device. (You can use a network sniffer to de-encapsulate the packets.)</p>
	<p> NOTE: An output IP address cannot be in the same subnetwork as any of the switch's management interfaces.</p>
	<p> NOTE: If you create virtual routing instances and also create an analyzer configuration that includes an output IP address, the output address belongs to the default virtual routing instance (inet.0 routing table).</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>

ingress (Analyzer)

Syntax	<pre> ingress { bridge-domain <i>bridge-domain-name</i>; interface (all <i>interface-name</i>); routing-instance { instance-name { bridge-domain <i>bridge-domain-name</i>; } vlan (<i>vlan-id</i> <i>vlan-name</i>); } vlan (<i>vlan-id</i> <i>vlan-name</i>); } </pre>
Hierarchy Level	[edit forwarding-options analyzer <i>analyzer-name</i> input]
Release Information	<p>Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1 for MX Series routers.</p>
Description	<p>Configure ports, routing instances, VLANs, or bridge domains for which the entering traffic is mirrored as part of a mirroring configuration.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use Through a Transit Switch on EX9200 Switches on page 879

ingress (Port Mirroring)

Syntax	<pre>ingress { interface (all <i>interface-name</i>); vlan (<i>vlan-id</i> <i>vlan-name</i>); }</pre>
Hierarchy Level	<p>For platforms without ELS:</p> <pre>[edit ethernet-switching-options analyzer <i>name</i> input]</pre> <p>For platforms with ELS:</p> <pre>[edit forwarding-options analyzer <i>name</i> input]</pre>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	<p>Specify the interfaces or VLANs for which incoming traffic is mirrored as part of a port mirroring configuration.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	routing—To view this statement in the configuration.routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Understanding Port Mirroring on page 814• Configuring Port Mirroring on page 1017• Examples: Configuring Port Mirroring for Local Analysis on page 1020

ingress (vlans)

Syntax	<pre>ingress;</pre>
Hierarchy Level	<pre>[edit vlans <i>vlan-name</i> vlan-id <i>number</i> interface <i>interface-name</i>]</pre>
Release Information	Statement introduced in Junos OS Release 10.0 for EX Series switches.
Description	Specify that the member interface of the VLAN allows only ingress traffic.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

input

Syntax

```
input {
  ingress {
    interface (all | interface-name);
    vlan (vlan-id | vlan-name);
  }
  egress {
    interface (all | interface-name);
  }
}
```

Hierarchy Level For platforms without ELS:

```
[edit ethernet-switching-options analyzer name]
```

For platforms with ELS:

```
[edit forwarding-options analyzer name]
```

Release Information Statement introduced in Junos OS Release 11.1 for the QFX Series.

Description Define the traffic to be mirrored. The definition can be a combination of traffic entering or exiting specific ports or VLANs.

The remaining statements are explained separately. See [CLI Explorer](#).

Default No default.

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

Related Documentation

- [Understanding Port Mirroring on page 814](#)
- [Configuring Port Mirroring on page 1017](#)
- [Examples: Configuring Port Mirroring for Local Analysis on page 1020](#)

input (Analyzer)

```
Syntax input {
    egress {
        bridge-domain bridge-domain-name;
        interface (all | interface-name);
        routing-instance {
            instance-name {
                bridge-domain bridge-domain-name;
            }
        }
    }
    ingress {
        bridge-domain bridge-domain-name;
        interface (all | interface-name);
        routing-instance {
            instance-name {
                bridge-domain bridge-domain-name;
            }
        }
        vlan (vlan-id | vlan-name);
    }
    vlan (vlan-id | vlan-name);
}
maximum-packet-length bytes;
rate number;
}
```

Hierarchy Level [edit forwarding-options analyzer *analyzer-name*]

Release Information Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Statement introduced in Junos OS Release 14.1 for MX Series routers.

Description Define the traffic to be mirrored in a mirroring configuration—the definition can be a combination of:

- Packets entering or exiting a port
- Packets entering or exiting a VLAN
- Packets entering or exiting a bridge domain

The remaining statements are explained separately. See [CLI Explorer](#).

Native analyzer sessions (that is, the [edit forwarding-options analyzer *analyzer-name* **input**] hierarchy level for MX Series routers) can be configured without specifying input parameters, which would mean that the instance uses default input values: rate = 1 and maximum-packet-length = 0.

Default No default.

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"> • Example: Configuring Port Mirroring Analyzers for Local Monitoring of Employee Resource Use on page 855 • Example: Configuring Port Mirroring for Remote Monitoring of Employee Resource Use on page 859 • Understanding Port Mirroring Analyzers on page 834

input (Port Mirroring)

Syntax	<pre>input { maximum-packet-length bytes; rate number; run-length number; }</pre>
Hierarchy Level	<pre>[edit forwarding-options port-mirroring], [edit forwarding-options port-mirroring instance instance-name]</pre>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>maximum-packet-length option introduced in Junos OS Release 9.6 for M120 and M320 routers only.</p> <p>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.</p>
Description	<p>Configure input packet properties for port mirroring.</p> <p>The remaining statements are explained separately. See CLI Explorer.</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"> • Configuring Port Mirroring

instance

Syntax

```
instance {
  instance-name {
    input {
      maximum-packet-length bytes;
      rate number;
      run-length number;
    }
    family (ccc| inet | inet6 | mpls | vpls) {
      output {
        interface interface-name {
          next-hop address;
        }
        no-filter-check;
        server-profile server-profile-name;
      }
    }
  }
}
```

Hierarchy Level [edit [forwarding-options port-mirroring](#)],
[edit routing-instances *routing-instance-name* [forwarding-options port-mirroring](#)]

Release Information Statement introduced in Junos OS Release 9.3 (MX Series routers only).
Support extended to M120 and M320 routers in Junos OS Release 9.5.
maximum-packet-length and **ccc** options introduced in Junos OS Release 9.6 for M120 and M320 routers only.
server-profile option introduced in Junos OS Release 13.2 for PTX Series Packet Transport Routers only.

Description Configure a port-mirroring instance.

Options *port-mirroring-instance-name*—Name of the port-mirroring instance.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- *Configuring Port Mirroring*
- *Configuring Active Flow Monitoring on PTX Series Packet Transport Routers*

instance (Port Mirroring)

List of Syntax [Syntax: MX, M and T Series Routers and SRX Series Firewalls on page 1761](#)
[Syntax: QFX Series Switches, EX4600 and NFX Series Devices on page 1761](#)

Syntax: MX, M and T Series Routers and SRX Series Firewalls

```
instance instance-name {
  disable;
  input {
    rate number;
    maximum-packet-length bytes
  }
  family (any | inet | inet6 | vpls) {
    output {
      (next-hop-group group-name | interface interface-name);
    }
  }
}
```

Syntax: QFX Series Switches, EX4600 and NFX Series Devices

```
instance instance-name{
  family
    ethernet-switching {
      output {
        interface interface-name {
        }
        no-filter-check;
      }
      vlan vlan-name {
        no-tag;
      }
    }
  inet
    output {
      ip-address address {
      }
      routing-instance instance-name {
        ip-address address {
        }
      }
    }
}
```

Hierarchy Level [edit forwarding-options port-mirroring]

Release Information Statement introduced in Junos OS Release 9.6 for MX, M and T Series routers and SRX Series firewalls.
 Statement introduced in Junos OS Release 13.2 for the QFX Series.

Description	<p>Specify a port-mirroring configuration (instance). You do not specify an input for this instance. Instead, you, create a firewall filter that specifies the required traffic and directs it to the mirror. This is useful for controlling which types of traffic should be mirrored.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Usage Guidelines	<p>See <i>Configuring Sampling Instance on MX, M and T Series Routers or QFX Series Switches</i>.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration. interface-control—To add this statement to the configuration. routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Understanding Port Mirroring on page 814• Configuring Port Mirroring on page 1017• Examples: Configuring Port Mirroring for Local Analysis on page 1020• Example: Mirroring Employee Web Traffic with a Firewall Filter on page 1023

interface (Analyzer)

Syntax	<code>interface (all <i>interface-name</i>);</code>
Hierarchy Level	[edit forwarding-options analyzer <i>analyzer-name</i> input egress], [edit forwarding-options analyzer <i>analyzer-name</i> input ingress], [edit forwarding-options analyzer <i>analyzer-name</i> output]
Release Information	Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches. Statement introduced in Junos OS Release 14.1 for MX Series routers.
Description	Configure the interfaces for which traffic is mirrored.
Options	<p>all—Apply mirroring to all interfaces on the network device. Mirroring a high volume of traffic can be performance intensive for the device. Therefore, you should generally select specific input interfaces in preference to using the all keyword, or use the all keyword in combination with setting a ratio for statistical sampling. The all keyword is not available for the [edit forwarding-options analyzer <i>analyzer-name</i> output] hierarchy level.</p> <p><i>interface-name</i>—Apply mirroring to the specified interface only.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Example: Configuring Port Mirroring Analyzers for Local Monitoring of Employee Resource Use on page 855 • Example: Configuring Port Mirroring for Remote Monitoring of Employee Resource Use on page 859 • Understanding Port Mirroring Analyzers on page 834


interface (Next-Hop Group)

Syntax	<pre>interface <i>interface-name</i> { next-hop <i>address</i>; }</pre>
Hierarchy Level	[edit forwarding-options next-hop-group <i>group-name</i>]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	<p>Specify the output interface for sending copies of packets elsewhere to be analyzed.</p> <p>The commit operation fails when a next-hop group has only one interface configured. It is implicitly assumed that a subgroup is up only if more than one interface in the subgroup is up.</p>
Options	<p><i>interface-name</i>—Name of the interface.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• <i>Configuring Next-Hop Groups to Use Multiple Interfaces to Forward Packets Used in Port Mirroring</i>



interface (Port Mirroring)

Syntax	<pre>interface <i>interface-name</i> { next-hop <i>address</i>; }</pre>
Hierarchy Level	[edit forwarding-options port-mirroring family (inet inet6) output]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	Specify the output interface for sending copies of packets elsewhere to be analyzed.
Options	<p><i>interface-name</i>—Name of the interface.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Usage Guidelines	See <i>Configuring Port Mirroring on M, T MX, and PTX Series Routers</i> .
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

interface (Port Mirroring)

Syntax	<code>interface (all <i>interface-name</i>);</code>
Hierarchy Level	<p>For platforms without ELS:</p> <pre>[edit ethernet-switching-options analyzer <i>name</i> input (egress ingress)], [edit ethernet-switching-options analyzer <i>name</i> output]</pre> <p>For platforms with ELS:</p> <pre>[edit forwarding-options analyzer <i>name</i> input (egress ingress)] [edit forwarding-options analyzer <i>name</i> output] [edit forwarding-options port-mirroring [instance <i>name</i>] family ethernet-switching output]</pre>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Specify the interfaces for which ingressing traffic is mirrored. Specify the interface that mirrored traffic should be copied to (the output interface).
Options	<p>all—Apply port mirroring to all interfaces on the switch (except the output interface). Mirroring a high volume of traffic can cause performance issues, so you should generally select specific input interfaces.</p>
	<p> CAUTION: Configuring all in a QFabric system causes all the access interfaces on all the nodes to be mirrored. Be cautious about using this option on a QFabric system.</p>
	<p><i>interface-name</i>—Apply port mirroring to the specified interface only.</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Understanding Port Mirroring on page 814 • Configuring Port Mirroring on page 1017 • Examples: Configuring Port Mirroring for Local Analysis on page 1020

ip-address (Port Mirroring)

Syntax	<code>ip-address <i>ip-address</i>;</code>
Hierarchy Level	<code>[edit forwarding-options] analyzer <i>name</i> output]</code> <code>[edit forwarding-options port-mirroring [instance <i>name</i>] family ethernet-switching output interface <i>name</i>]</code>
Release Information	Statement introduced in Junos OS Release 14.1X53 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Specify the IP address to which traffic should be mirrored (the IP address of the analyzer system). The device can be on a remote network. The analyzer device must be able to de-encapsulate GRE-encapsulated packets, or the GRE-encapsulated packets must be de-encapsulated before reaching the analyzer device. (You can use a network sniffer to de-encapsulate the packets.) This statement is not supported on QFabric systems.
	<div>  <p>NOTE: An output IP address cannot be in the same subnetwork as any of the switch's management interfaces.</p> </div>
	<div>  <p>NOTE: If you create virtual routing instances and also create an analyzer configuration that includes an output IP address, the output address belongs to the default virtual routing instance (inet.0 routing table).</p> </div>
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.

maximum-packet-length

Syntax	<code>maximum-packet-length bytes;</code>
Hierarchy Level	<code>[edit forwarding-options analyzer analyzer-name input],</code> <code>[edit forwarding-options port-mirroring input],</code> <code>[edit forwarding-options port-mirroring instance instance-name input],</code> <code>[edit forwarding-options sampling input],</code> <code>[edit forwarding-options sampling instance instance-name input]</code>
Release Information	<p>Statement introduced in Junos OS Release 9.6.</p> <p>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport routers.</p> <p>Support at the <code>[edit forwarding-options analyzer analyzer-name input]</code> hierarchy level introduced in Junos OS Release 14.1 for MX Series routers.</p> <p>Statement introduced in Junos OS Release 17.2R1 for QFX10002 switches.</p> <p>Statement introduced in Junos OS Release 17.4R1 for QFX10008 and QFX10016 switches.</p>
Description	Set the maximum length of the packet used for port mirroring or traffic sampling. Packets with lengths greater than the specified maximum are truncated.



NOTE: The `maximum-packet-length` statement is not supported when you configure inline flow monitoring (by including the `inline-jflow` statement at the `[edit forwarding-options sampling instance instance-name family (inet | inet6) output]` hierarchy level).



NOTE: The `maximum-packet-length` statement is not supported on MX80 Series routers.



NOTE: For MX Series routers with Modular Port Interface Concentrators (MPCs), when `maximum-packet-length` (clip length) is configured for port-mirrored packets and the mirror-destination interface is a next-hop-group, the clip length is effective only for the first member interface of the next-hop-group. The mirrored packet copy sent to the rest of the interfaces is not clipped.

Native analyzer sessions (that is, the `[edit forwarding-options analyzer analyzer-name input]` hierarchy level for MX Series routers) can be configured without specifying input parameters, which means that the instance uses default input values: `rate = 1` and `maximum-packet-length = 0`.



NOTE: For PTX Series routers with third-generation FPCs installed, the `maximum-packet-length` statement at the `[edit forwarding-options sampling input]` and `[edit forwarding-options sampling instance instance-name input]` hierarchy levels is not supported.

Options `bytes`—Maximum length (in bytes) of the mirrored packet or the sampled packet.



BEST PRACTICE: Juniper Networks recommends that you configure the packet length equal to or greater than the IP header. For IPv4, set the maximum length to at least 20, and for IPv6, set the maximum length to at least 40.

Range: 0 through 9216

Default: 0

For MX Series routers with Modular Port Concentrators (MPCs) and EX9200 switches, port-mirrored or sampled packets can be truncated (or clipped) to any length in the range of 1 through 255 bytes.

For other devices, the range is from 0 through 9216. A maximum-packet-length value of zero represents that truncation is disabled, and the entire packet is mirrored or sampled.

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

Related Documentation

- *Configuring Port Mirroring*
- *Configuring Traffic Sampling on MX, M and T Series Routers*

mirror-once

Syntax	<code>mirror-once;</code>
Hierarchy Level	[edit forwarding-options port-mirroring]
Release Information	Statement introduced in Junos OS Release 9.3 (MX Series routers only). Support extended to M120 routers in Junos OS Release 9.5. Statement introduced in Junos OS Release 12.1X48 for PTX Packet Transport Routers.
Description	Configure the router to mirror packets only once. This feature is useful if you configure port mirroring on both ingress and egress interfaces, which could result in the same packet being mirrored twice.
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">• Configuring Port Mirroring

next-hop-group (Analyzer)

Syntax	<code>next-hop-group <i>next-hop-group-name</i>;</code>
Hierarchy Level	[edit forwarding-options analyzer <i>analyzer-name</i> output]
Release Information	Statement introduced in Junos OS Release 14.1 for MX Series routers.
Description	Configure next-hop group through which the port-mirrored traffic is sent.
Options	<i>next-hop-group-name</i> —Name of the next-hop group through which the port-mirrored traffic is sent.
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">• Example: Configuring Mirroring to Multiple Interfaces for Remote Monitoring of Employee Resource Use on EX9200 Switches on page 870

next-hop-group (Port Mirroring)

Syntax	<code>next-hop-group <i>group-name</i>;</code>
Hierarchy Level	[edit forwarding-options port-mirroring family (inet vpls) output], [edit forwarding-options port-mirroring instance <i>instance-name</i> family (inet vpls) output]
Release Information	Statement introduced in Junos OS Release 9.6.
Description	<p>Specify the next-hop address for sending copies of packets to an analyzer. This configuration enables multipacket port mirroring on MX Series routers and EX Series switches without the use of a Tunnel PIC.</p> <p>The commit operation fails when a next-hop group has only one interface configured. It is implicitly assumed that a subgroup is up only if more than one interface in the subgroup is up.</p>
Options	<i>group-name</i> —Name of next-hop group.
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"> • <i>Port Mirroring with Next-Hop Groups</i>

no-tag

Syntax	no-tag;
Hierarchy Level	[edit ethernet-switching-options analyzer name output vlan (vlan-id vlan-name)] [edit forwarding-options port-mirroring family ethernet-switching output vlan (vlan-name vlan-id)] [edit forwarding-options port-mirroring instance instance-name family ethernet-switching output vlan (vlan-name vlan-id)]
Release Information	Statement introduced in Junos OS Release 11.3 for EX Series switches. Hierarchy [edit forwarding-options port-mirroring family ethernet-switching output vlan] introduced in Junos OS Release 13.2. Hierarchy [edit forwarding-options port-mirroring instance instance-name family ethernet-switching output vlan] introduced in Junos OS Release 13.2.
Description	Specify that remote port-mirroring packets are not tagged.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • <i>Example: Configuring Port Mirroring for Local Monitoring of Employee Resource Use on EX Series Switches</i>

no-tag

Syntax	no-tag;
Hierarchy Level	[edit forwarding-options analyzer name output vlan] [edit forwarding-options port-mirroring [instance <i>name</i>] family ethernet-switching output vlan]
Release Information	Statement introduced in Junos OS Release 15.1X53-D10 for QFX10000 switches.
Description	Specify that remote mirrored packets are not tagged with the tag of the output (analyzer) VLAN.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Example: Configuring Port Mirroring for Remote Analysis on page 1032

no-tag

Syntax	no-tag;
Hierarchy Level	[edit [edit forwarding-options analyzer] Configuration Statement Hierarchy <i>analyzer-name</i> output vlan (<i>vlan-id</i> <i>vlan-name</i>)]
Release Information	Statement introduced in Junos OS Release 11.3 for EX Series switches. Hierarchy level [edit forwarding-options] introduced in Junos OS Release 13.2X50-D10 (ELS).
Description	Specify that remote mirroring packets are not tagged.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use on EX4300 Switches on page 893

no-filter-check

Syntax	no-filter-check;
Hierarchy Level	[edit forwarding-options port-mirroring family (inet inet6) output]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	<p>Disable filter checking on the port-mirroring interface.</p> <p>This statement is required when you send port-mirrored traffic to a Tunnel PIC that has a filter applied to it.</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"> • Configuring Port Mirroring on M, T MX, and PTX Series Routers

no-filter-check

Syntax	no-filter-check;
Hierarchy Level	[edit forwarding-options port-mirroring output], [edit forwarding-options port-mirroring family (inet inet6 ccc vpls) output]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.
Description	Disable filter checking on the port-mirroring interface. This statement is required when you send port-mirrored traffic to a Tunnel Services PIC that has a filter applied to it.
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">• Configuring Port Mirroring

output

Syntax	<pre>output { interface <i>interface-name</i>; ip-address <i>ip-address</i>; vlan (<i>vlan-id</i> <i>vlan-name</i>); routing-instance <i>instance-name</i> { ip-address <i>address</i> { </pre>
Hierarchy Level	<p>For platforms without ELS:</p> <pre>[edit ethernet-switching-options analyzer <i>name</i>]</pre> <p>For platforms with ELS:</p> <pre>[edit forwarding-options analyzer <i>name</i>] [edit forwarding-options port-mirroring [instance <i>name</i>] family ethernet-switching]</pre>
Release Information	<p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Option output vlan added in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
Description	<p>Configure the destination for mirrored traffic, either an interface on the switch (for local monitoring) or a VLAN (for remote monitoring).</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>

output (Mirroring)

Syntax	<pre> output { bridge-domain <i>bridge-domain-name</i>; interface <i>interface-name</i>; next-hop-group <i>next-hop-group-name</i>; routing-instance { instance-name { bridge-domain { bridge-domain-name; } } } vlan (<i>vlan-id</i> <i>vlan-name</i>); } vlan (<i>vlan-id</i> <i>vlan-name</i>); } </pre>
Hierarchy Level	[edit forwarding-options analyzer <i>analyzer-name</i>]
Release Information	Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches. Statement introduced in Junos OS Release 14.1 for MX Series routers.
Description	<p>Configure the destination for mirrored traffic, either an interface on the network device for local monitoring, or a VLAN or bridge domain, for remote monitoring.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Example: Configuring Port Mirroring Analyzers for Local Monitoring of Employee Resource Use on page 855 • Example: Configuring Port Mirroring for Remote Monitoring of Employee Resource Use on page 859

output (Port Mirroring)

Syntax

```
output {  
  interface interface-name {  
    next-hop address;  
  }  
  no-filter-check;  
}
```

Hierarchy Level [edit forwarding-options port-mirroring family (inet | inet6)]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure output interfaces and flow properties.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- *Configuring Port Mirroring on M, T MX, and PTX Series Routers*

output (Port Mirroring)

Syntax

```
output {
  interface interface-name {
    next-hop address;
  }
  next-hop-group group-name{
    group-type inet6;
    interface interface-name {
      next-hop ipv6-address;
    }
  }
  next-hop-subgroup group-name{
    interface interface-name {
      next-hop ipv6-address;
    }
  }
}
no-filter-check;
server-profile server-profile-name;
}
```

Hierarchy Level [edit [forwarding-options port-mirroring family](#) (ccc | inet | inet6 | mpls | vpls)],
[edit [forwarding-options port-mirroring instance](#) *instance-name* [family](#) (ccc | inet | inet6 | mpls | vpls)]

Release Information Statement introduced before Junos OS Release 7.4.
vpls option introduced in Junos OS Release 9.3 for MX Series routers only; support extended to M7i, M10i, M120, and M320 routers in Junos OS Release 9.5.
ccc option introduced in Junos OS Release 9.6 for M120 and M320 routers only.
server-profile option introduced in Junos OS Release 13.2 for PTX Series Packet Transport Routers only.
next-hop-group option introduced for **family inet6** in Junos OS Release 14.2 for MX Series routers only.

Description Configure the port mirroring destination properties.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Configuring Port Mirroring](#)
- [Configuring Active Flow Monitoring on PTX Series Packet Transport Routers](#)

port-mirroring

List of Syntax Syntax: MX Series and PTX Series Routers, M120 and M320 on page 1779
 Syntax: QFX Series Switches, EX4600 and NFX Series Devices on page 1780
 Syntax: OCX1100 on page 1781

Syntax: MX Series and
 PTX Series Routers,
 M120 and M320

```
port-mirroring {
  input {
    maximum-packet-length bytes;
    rate number;
    run-length number;
  }
  family (ccc | inet | inet6 | vpls) {
    output {
      interface interface-name {
        next-hop address;
      }
      next-hop-group group-name {
        group-type inet6;
        interface interface-name {
          next-hop ipv6-address;
        }
        next-hop-subgroup group-name {
          interface interface-name {
            next-hop ipv6-address;
          }
        }
      }
    }
    no-filter-check;
  }
}
instance {
  instance-name {
    input {
      maximum-packet-length bytes;
      rate number;
      run-length number;
    }
    family (ccc | inet | inet6 | vpls) {
      output {
        interface interface-name {
          next-hop address;
        }
        no-filter-check;
        server-profile server-profile-name;
      }
    }
  }
}
mirror-once;
traceoptions {
  file filename <files number> <size bytes> <world-readable | no-world-readable>;
}
```

```
}
}
```

Syntax: QFX Series
Switches, EX4600 and
NFX Series Devices

```
port-mirroring {
  family {
    ethernet-switching
    output {
      interface interface-name {
      }
      no-filter-check;
    }
    vlan vlan-name {
      no-tag;
    }
  }
  inet
  output {
    ip-address address {
    }
    routing-instance instance-name {
      ip-address address {
      }
    }
  }
}
instance instance-name {
  family
  ethernet-switching {
    output {
      interface interface-name {
      }
      no-filter-check;
    }
    vlan vlan-name {
      no-tag;
    }
  }
  inet
  output {
    ip-address address {
    }
    routing-instance instance-name {
      ip-address address {
      }
    }
  }
}
}
```

Syntax: OCX1100

```

port-mirroring {
  family {
    inet
    output {
      ip-address address {
      }
      routing-instance instance-name {
        ip-address address {
        }
      }
    }
  }
  instance instance-name {
    family
    inet
    output {
      ip-address address {
      }
      routing-instance instance-name {
        ip-address address {
        }
      }
    }
  }
}

```

Hierarchy Level

[edit [forwarding-options](#)]

Release Information

Statement introduced before Junos OS Release 7.4 for MX Series and PTX Series routers, M120 and M320.

family vpls statement introduced in Junos OS Release 9.3 (MX Series routers only); support extended to M7i, M10, M120, and M320 routers in Junos OS Release 9.5.

instance port-mirroring-instance-name statement introduced in Junos OS Release 9.3 (MX Series routers only); support extended to M120 and M320 routers in Junos OS Release 9.5.

mirror-once statement introduced in Junos OS Release 9.3 (MX Series routers only); support extended to M120 routers in Junos OS Release 9.5.

family ccc statement introduced in Junos OS Release 9.6 (M120 and M320 routers only). Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.

family inet6 and **next-hop-group** statements introduced in Junos OS Release 14.2 (MX Series routers only).

Statement introduced in Junos OS Release 13.2 for the QFX Series.

Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

Description

Create a port-mirroring configuration. Specify the address family, rate, run length, interface, and next-hop address for sending copies of packets to an analyzer.

The remaining statements are explained separately. See [CLI Explorer](#).

Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration. routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• <i>Configuring Port Mirroring</i> Configuring Port Mirroring on page 1017• <i>Configuring Port Mirroring</i>• <i>Configuring Active Flow Monitoring on PTX Series Packet Transport Routers</i>• Understanding Port Mirroring on page 814• Understanding Port Mirroring on page 821• Examples: Configuring Port Mirroring for Local Analysis on page 1020• Example: Mirroring Employee Web Traffic with a Firewall Filter on page 1023• Example: Mirroring Employee Web Traffic with a Firewall Filter on page 952

rate (Forwarding Options)

Syntax	<code>rate <i>number</i>;</code>
Hierarchy Level	<p>[edit forwarding-options analyzer <i>analyzer-name</i> input], [edit forwarding-options port-mirroring family (inet inet6) input], [edit forwarding-options port-mirroring input], [edit forwarding-options sampling input], [edit forwarding-options sampling instance <i>instance-name</i> input]</p>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport routers.</p> <p>Support at the [edit forwarding-options analyzer analyzer-name input] hierarchy level for MX Series routers introduced in Junos OS Release 14.1.</p> <p>Statement introduced in Junos OS Release 17.2R1 for QFX10002 switches.</p> <p>Statement introduced in Junos OS Release 17.4R1 for QFX10008 and QFX10016 switches.</p>
Description	<p>Set the ratio of the number of packets to be sampled. For example, if you specify a rate of 10, every tenth packet (1 packet out of 10) is sampled.</p> <p>Native analyzer sessions (that is, the [edit forwarding-options analyzer analyzer-name input] hierarchy level for MX Series routers) can be configured without specifying input parameters, which means that the instance uses default input values: rate = 1 and maximum-packet-length = 0.</p>
Options	<p><i>number</i>—Denominator of the ratio.</p> <p>Range: 1 through 16000000(16M)</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • <i>Configuring Port Mirroring</i> • <i>Configuring Traffic Sampling</i>


routing-instance

Syntax	<pre> routing-instance { instance-name { bridge-domain bridge-domain-name; } vlan (vlan-id vlan-name); } </pre>
Hierarchy Level	<pre> [edit forwarding-options analyzer analyzer-name input egress], [edit forwarding-options analyzer analyzer-name input ingress], [edit forwarding-options analyzer analyzer-name output] </pre>
Release Information	Statement introduced in Junos OS Release 14.1.
Description	Configure routing instance.
Options	<i>instance-name</i> —Name of the routing instance.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	

routing-instance (Port Mirroring)

Syntax	<pre> routing-instance instance-name; </pre>
Hierarchy Level	<pre> [edit forwarding-options analyzer name output] [edit forwarding-options port-mirroring [instance name] family inet output interface name] </pre>
Release Information	Statement introduced in Junos OS Release 12.3 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure a port mirroring instance. You do not specify an input for this instance. Instead, you, create a firewall filter that specifies the required traffic and directs it to the mirror. This instance type is useful for controlling which types of traffic should be mirrored.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.

run-length

Syntax	<code>run-length <i>number</i>;</code>
Hierarchy Level	<code>[edit forwarding-options port-mirroring input],</code> <code>[edit forwarding-options port-mirroring instance <i>port-mirroring-instance-name</i> input],</code> <code>[edit forwarding-options port-mirroring family (inet inet6) input],</code> <code>[edit forwarding-options sampling input],</code> <code>[edit forwarding-options sampling instance <i>instance-name</i> input]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport routers.</p> <p>Statement introduced in Junos OS Release 17.2R1 for QFX10002 switches.</p> <p>Statement introduced in Junos OS Release 17.4R1 for QFX10008 and QFX10016 switches.</p>
Description	<p>Set the number of samples following the initial trigger event. The configuration enables you to sample packets following those already being sampled.</p>
	<p> NOTE: The <code>run-length</code> statement is not supported when you configure inline flow monitoring (by including the <code>inline-jflow</code> statement at the <code>[edit forwarding-options sampling instance <i>instance-name</i> family (inet inet6) output]</code> hierarchy level).</p>
Options	<p><i>number</i>—Number of samples.</p> <p>Range: 0 through 20</p> <p>Default: 0</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • <i>Applying Forwarding Table Filters</i> • <i>Configuring Port Mirroring on M, T MX, and PTX Series Routers</i> • <i>Configuring Traffic Sampling on MX, M and T Series Routers</i>

vlan (Mirroring)

Syntax	<code>vlan (<i>vlan-id</i> <i>vlan-name</i>);</code>
Hierarchy Level	<code>[edit forwarding-options analyzer <i>analyzer-name</i> input ingress],</code> <code>[edit forwarding-options analyzer <i>analyzer-name</i> input ingress routing-instance</code> <code> <i>instance-name</i>],</code> <code>[edit forwarding-options analyzer <i>analyzer-name</i> output],</code> <code>[edit forwarding-options analyzer <i>analyzer-name</i> output routing-instance <i>instance-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 13.2X50-D10 (ELS).
Description	Configure mirrored traffic to be sent to a VLAN for remote monitoring.
Options	<i>vlan-id</i> —Numeric VLAN identifier. <i>vlan-name</i> —Name of the VLAN.
Required Privilege Level	system —To view this statement in the configuration. system-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Example: Configuring Mirroring for Remote Monitoring of Employee Resource Use Through a Transit Switch on EX9200 Switches on page 879• Example: Configuring Port Mirroring for Remote Monitoring of Employee Resource Use on page 859

vlan (Port Mirroring)

Syntax	<code>vlan (<i>vlan-name</i> <i>vlan-ID</i>);</code>
Hierarchy Level	<code>[edit forwarding-options port-mirroring family ethernet-switching output]</code> <code>[edit forwarding-options port-mirroring instance instance-name family ethernet-switching output]</code>
Release Information	Statement introduced in Junos OS Release 13.2.
Description	Specify the VLAN name or ID for sending copies of packets to an analyzer. This configuration enables remote VLAN port mirroring on EX Series switches.
Options	<i>vlan-name</i> —Name of remote mirroring VLAN. <i>vlan-ID</i> —ID of the remote mirroring VLAN.
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"> • Example: Configuring Layer 2 Port Mirroring to Remote VLAN on page 1010 • Layer 2 Port Mirroring to Remote Destination by Using Destination as VLAN on page 1007

vlan (Port Mirroring)

Syntax	<code>vlan (<i>vlan-id</i> <i>vlan-name</i>) { no-tag;</code>
Hierarchy Level	<p>For platforms without ELS:</p> <pre>[edit ethernet-switching-options analyzer <i>name</i> input ingress], [edit ethernet-switching-options analyzer <i>name</i> output]</pre> <p>For platforms with ELS:</p> <pre>[edit forwarding-options analyzer <i>name</i> input (egress ingress)] [edit forwarding-options analyzer <i>name</i> output] [edit forwarding-options port-mirroring [instance <i>name</i>] family ethernet-switching output]</pre>
Release Information	<p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Option output vlan added in Junos OS Release 12.1 for the QFX Series.</p> <p>Option no-tag added in Junos OS Release 15.1X53-D10 for QFX10000 switches.</p>
Description	<p>When used in an input statement, specifies that traffic entering or exiting a VLAN should be mirrored. (You can include this statement in an ingress statement or egress statement within the input statement. It is not supported in an egress statement on all switches)</p> <p>When used in an output statement, specifies that mirrored traffic to be sent to a VLAN for remote monitoring.</p> <p>On some switches, only one interface can be a member of the output (analyzer) VLAN. This limitation does not apply on the QFX10000 switch if traffic is mirrored on ingress. In this case, multiple QFX10000 interfaces can belong to the output VLAN, and traffic is mirrored to all of those interfaces. If traffic is mirrored on egress on a QFX10000 switch, only one interface can be a member of the analyzer VLAN.</p>
Options	<p><i>vlan-id</i>—Numeric VLAN identifier.</p> <p><i>vlan-name</i>—Name of the VLAN.</p> <p>no-tag—Specifies that remote mirrored packets are not tagged with the tag of the output (analyzer) VLAN.</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Understanding Port Mirroring on page 814 • Configuring Port Mirroring on page 1017 • Examples: Configuring Port Mirroring for Local Analysis on page 1020

CHAPTER 72

Configuration Statements: TWAMP

- [twamp-server](#) on page 1790
- [twamp-client](#) on page 1792

twamp-server

Syntax

```
twamp {
  server {
    authentication-mode mode;
    client-list list-name {
      address address;
    }
    max-connection-duration hours;
    maximum-connections count;
    maximum-connections-per-client count;
    maximum-sessions count;
    maximum-sessions-per-connection count;
    port number;
    routing-instance-list {
      instance-name {
        port number;
      }
    }
    server-inactivity-timeout minutes;
  }
}
```

Hierarchy Level [edit services rpm twamp server]

Release Information Statement introduced in Junos OS Release 15.1X49-D110 for SRX Series devices.

Description Defines the Two-Way Active Measurement Protocol (TWAMP) server configurations. This configuration describes a TWAMP server on the router that enables a TWAMP client to connect to the server using any media interface IP address. In such scenarios, the router functions as a TWAMP server and timestamping is performed in the ukernel of the media-facing Flexible PIC Concentrator (FPC).

Options **server**—TWAMP server configuration.

authentication-mode—Set of authentication modes that the server can accept.

Default: none

max-connection-duration—Maximum time a connection can exist between the client and the server.

Default: 24

Range: 0-120

maximum-sessions—Maximum number of test sessions for the server.

Default: 64

Range: 1-2048

maximum-sessions-per-connection—Maximum number of test sessions per client connection.

Default: 64

Range: 1-1024

maximum-connections—Maximum number of connections for the server.

Default: 64

Range: 1-1000

maximum-connections-per-client—Maximum number of server connections per client.

Default: 64

Range: 1-500

port—TWAMP server listening port used by the routing instance.

Default: 862

Range: 1-65535

client-list—List of allowed control client hosts that can connect to this server. Each item in the list is a Classless Interdomain Routing (CIDR) address (ip address1/mask1) that represents the network of allowed hosts.

routing-instance-list— List of allowed routing instances (a maximum of 31 characters).

It configures the TWAMP servers on specific routing instances, instead of associating the TWAMP server at the system-level to apply to all routing instances configured on a router. The default routing instance is Internet routing table **inet.0**. If you do not specify a routing instance then the TWAMP probe applies to all routing instances. Up to 100 routing instances can be configured for a TWAMP server.

Range: 1-65535

server-inactivity-timeout—Maximum time the TWAMP server has to finish the TWAMP control protocol negotiation. Control packet idle timeout value in minutes, 0 to disable (minutes).

Default: 15

Range: 0-30

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

Related Documentation	<ul style="list-style-type: none"> • Two-Way Active Measurement Protocol (TWAMP) Overview on page 497 • Example: Configuring TWAMP Client and Server on page 500
------------------------------	--

twamp-client

```
Syntax twamp {
  client {
    control-connection name {
      authentication-mode none;
      destination-port;
      history-size;
      moving-average-size;
      target-address;
      test-count ;
      test-interval seconds;
      test-session name {
        target-address;
        data-fill-with-zeros;
        data-size;
        dscp-code-points;
        probe-count;
        probe-interval;
        thresholds;
        traps;
      }
      traps {
        control-connection-closed ;
        test-iteration-done ;
      }
    }
  }
}
```

Hierarchy Level [edit services rpm twamp client]

Release Information Statement introduced in Junos OS Release 15.1X49-D110 for SRX Series devices.

Description Defines the Two-Way Active Measurement Protocol (TWAMP) client configuration. A client opens a TCP connection to the server on well-known port 862. The host that initiates the TCP connection takes the roles of control client and session sender. The host that acknowledges the TCP connection accepts the roles of server and session reflector.

Options **client**—TWAMP client configuration.

authentication-mode—Set of authentication modes that the client can accept.

Default: none

destination-port—Either the User Datagram Protocol (UDP) or the Transmission Control Protocol (TCP) port to which a probe is sent.

Default: 862

history-size—Number of stored history entries.

Default: 50

Range: 0-500

moving-average-size—Number of samples for making statistical calculations.

Default: 0

Range: 0-1024

routing-instance—Routing instance used by test sessions.

target-address—Destination address or URL used for the probes.

test-count—Total number of test session iterations.

Default: 0

Range: 0-4,294,967,290

test-interval—Number of seconds to wait between tests.

Default: 1

Range: 1-255

test-session—Test session details.

data-fill-with-zeros—If the option is defined, then the test packet value becomes zero. If the option is not defined, then a pseudorandom number is updated as data.

dscp-code-points—DiffServ code point bits or alias used for UDP data of test probes or test packets in test sessions.

Default: 0

probe-count—Total number of probes per test.

Default: 1

Range: 1-4,294,967,290

thresholds—Test threshold values.

traps—Trap to send if threshold is met or exceeded.

control-connection-closed—Generate traps when the control connection is closed.

test-iteration-done—Generate traps when all test sessions under control connections complete one test iteration.

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"> • Two-Way Active Measurement Protocol (TWAMP) Overview on page 497 • Example: Configuring TWAMP Client and Server on page 500
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Configuration Statements: System Logging

- [allow-duplicates](#) on page 1797
- [archive \(All System Log Files\)](#) on page 1798
- [archive \(Individual System Log File\)](#) on page 1800
- [cache \(Security Log\)](#) on page 1802
- [category \(Security Logging\)](#) on page 1803
- [console \(System Logging\)](#) on page 1804
- [destination-override](#) on page 1805
- [event-rate](#) on page 1806
- [exclude \(Security Log\)](#) on page 1807
- [exclude-hostname](#) on page 1808
- [explicit-priority](#) on page 1808
- [facility-override \(Security\)](#) on page 1809
- [file \(Security Log\)](#) on page 1810
- [file \(System Logging\)](#) on page 1811
- [files](#) on page 1812
- [host \(Security Log\)](#) on page 1813
- [host \(System\)](#) on page 1814
- [limit \(Security Log\)](#) on page 1816
- [log \(Security\)](#) on page 1817
- [log \(Services\)](#) on page 1821
- [log-prefix \(System\)](#) on page 1822
- [log-rotate-frequency](#) on page 1823
- [match](#) on page 1824
- [match-string](#) on page 1825
- [mode \(Security Log\)](#) on page 1826
- [no-remote-trace \(System\)](#) on page 1827

- [pic-services-logging](#) on page 1828
- [port \(Syslog\)](#) on page 1829
- [rate-cap](#) on page 1830
- [report \(Security Log\)](#) on page 1831
- [routing-instance \(Syslog\)](#) on page 1832
- [security-log](#) on page 1833
- [security-log-percent-full](#) on page 1834
- [severity \(Security Log\)](#) on page 1835
- [size \(System\)](#) on page 1836
- [stream \(Security Log\)](#) on page 1837
- [structured-data](#) on page 1839
- [syslog \(System\)](#) on page 1840
- [system](#) on page 1842
- [time-format](#) on page 1843
- [traceoptions \(Security Log\)](#) on page 1845
- [tracing](#) on page 1847
- [transport \(Security Log\)](#) on page 1848
- [ukern-trace](#) on page 1849
- [user \(System Logging\)](#) on page 1850
- [world-readable](#) on page 1851

allow-duplicates

Syntax allow-duplicates;

Hierarchy Level [edit logical-systems *logical-system-name* system syslog],
[edit logical-systems *logical-system-name* system syslog file *file-name*],
[edit logical-systems *logical-system-name* system syslog host *host-name*],
[edit logical-systems *logical-system-name* system syslog user *user-name*],
[edit system syslog],
[edit system syslog file *file-name*],
[edit system syslog host *host-name*],
[edit system syslog user *user-name*],

Release Information Statement introduced in Junos OS Release 11.1.
Logical systems support introduced in Junos OS Release 11.4.

Description Specify whether to allow the repeated messages in the system log output files. This can be set either at global configuration level or for individual file, host, or user. By default, this parameter is set to disable.

Options **file**—Name of the file to log messages
host —Host to receive the messages
user—User to receive the notification of the event

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

Related Documentation • [syslog \(System\) on page 1840](#)

archive (All System Log Files)

Syntax	archive <files <i>number</i> > <size <i>size</i> > <start-time <i>time</i> > <transfer-interval <i>interval</i> > <binary-data no-binary-data>; <world-readable no-world-readable>;
Hierarchy Level	[edit system syslog]
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure archiving properties for all system log files.
Options	<p>files <i>number</i>—Maximum number of archived log files to retain. When the Junos OS logging utility has written a defined maximum amount of data to a log file <i>logfile</i>, it closes the file, compresses it, and renames it <i>logfile.0.gz</i> (the amount of data is determined by the size statement at this hierarchy level). The utility then opens and writes to a new file called <i>logfile</i>. When the new file reaches the maximum size, the <i>logfile.0.gz</i> file is renamed to <i>logfile.1.gz</i>, and the new file is closed, compressed, and renamed <i>logfile.0.gz</i>. By default, the logging facility creates up to ten archive files in this manner. Once the maximum number of archive files exists, each time the active log file reaches the maximum size, the contents of the oldest archive file are lost (overwritten by the next oldest file).</p> <p>Range: 1 through 1000</p> <p>Default: 10 files</p> <p>size <i>size</i>—Maximum amount of data that the Junos OS logging utility writes to a log file <i>logfile</i> before archiving it (closing it, compressing it, and changing its name to <i>logfile.0.gz</i>). The utility then opens and writes to a new file called <i>logfile</i>.</p> <p>Syntax: <i>x k</i> to specify the number of kilobytes, <i>x m</i> for the number of megabytes, or <i>x g</i> for the number of gigabytes</p> <p>Range: 64 KB through 1 GB</p> <p>Default:</p> <ul style="list-style-type: none"> • 128 KB for EX Series switches • 1 MB for M Series, MX Series, and T Series routers, OCX Series, and the QFX3500 switch • 10 MB for TX Matrix and TX Matrix Plus routers <p>binary-data no-binary-data—Mark file as containing binary data. This allows proper archiving of binary files, such as WTMP files (login records for UNIX based systems)..</p> <p>Default: no-binary-data</p>

world-readable | no-world-readable—Grant all users permission to read archived log files, or restrict the permission only to the **root** user and users who have the Junos OS **maintenance** permission.

Default: no-world-readable

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

Related Documentation	<ul style="list-style-type: none">• Specifying Log File Size, Number, and Archiving Properties on page 1070
------------------------------	---

archive (Individual System Log File)

Syntax	archive <archive-sites (<i>ftp-url</i> <password <i>password</i> >)> <files <i>number</i> > <size <i>size</i> > <start-time "YYYY-MM-DD.hh:mm"> <transfer-interval <i>minutes</i> > <world-readable no-world-readable>;
Hierarchy Level	[edit system syslog file <i>filename</i>]
Release Information	Statement introduced before Junos OS Release 7.4. start-time and transfer-interval statements introduced in Junos OS Release 8.5. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Configure archiving properties for a specific system log file.
Options	<p>archive-sites <i>site-name</i>—FTP URL representing the destination for the archived log file (for information about how to specify valid FTP URLs, see <i>Format for Specifying Filenames and URLs in Junos OS CLI Commands</i>). If more than one site name is configured, a list of archive sites for the system log files is created. When a file is archived, the router attempts to transfer the file to the first URL in the list, moving to the next site only if the transfer does not succeed. The log file is stored at the archive site with the filename specified at the [edit system syslog] hierarchy level.</p> <p>files <i>number</i>—Maximum number of archived log files to retain. When the Junos OS logging utility has written a defined maximum amount of data to a log file <i>logfile</i>, it closes the file, compresses it, and renames it <i>logfile.0.gz</i> (the amount of data is determined by the size statement at this hierarchy level). The utility then opens and writes to a new file called <i>logfile</i>. When the new file reaches the maximum size, the <i>logfile.0.gz</i> file is renamed to <i>logfile.1.gz</i>, and the new file is closed, compressed, and renamed <i>logfile.0.gz</i>. By default, the logging facility creates up to ten archive files in this manner. Once the maximum number of archive files exists, each time the active log file reaches the maximum size, the contents of the oldest archive file are lost (overwritten by the next oldest file).</p> <p>Range: 1 through 1000</p> <p>Default: 10 files</p> <p>password <i>password</i>—Password for authenticating with the site specified by the archive-sites statement.</p> <p>size <i>size</i>—Maximum amount of data that the Junos OS logging utility writes to a log file <i>logfile</i> before archiving it (closing it, compressing it, and changing its name to <i>logfile.0.gz</i>). The utility then opens and writes to a new file called <i>logfile</i>.</p> <p>Syntax: <i>xk</i> to specify the number of kilobytes, <i>xm</i> for the number of megabytes, or <i>xg</i> for the number of gigabytes</p> <p>Range: 64 KB through 1 GB</p>

Default: 128 KB for J Series routers; 1 MB for M Series, MX Series, and T Series routers, and the QFX3500 switch; 10 MB for TX Matrix and TX Matrix Plus routers

start-time "YYYY-MM-DD.hh:mm"—Date and time in the local time zone for a one-time transfer of the active log file to the first reachable site in the list of sites specified by the **archive-sites** statement.

transfer-interval *interval*—Interval at which to transfer the log file to an archive site.

Range: 5 through 2880 minutes

world-readable | no-world-readable—Grant all users permission to read archived log files, or restrict the permission only to the **root** user and users who have the Junos OS **maintenance** permission.

Default: no-world-readable

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

Related Documentation	<ul style="list-style-type: none">• Specifying Log File Size, Number, and Archiving Properties on page 1070
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cache (Security Log)

Syntax

```
cache {
  exclude exclude-name {
    destination-address destination-address;
    destination-port destination-port;
    event-id event-id;
    failure;
    interface-name interface-name;
    policy-name policy-name;
    process process-name;
    protocol protocol;
    source-address source-address;
    source-port source-address;
    success;
    user-name user-name;
  }
  limit value;
}
```

Hierarchy Level [edit security log]

Release Information Statement modified in Junos OS Release 9.2.

Description Cache security log events in the audit log buffer.

Options The remaining statements are explained separately. See [CLI Explorer](#).

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


Related Documentation

- [syslog \(System\) on page 1840](#)

category (Security Logging)

Syntax	category (all content-security fw-auth screen alg nat flow sctp gtp ipsec idp rtlog pst-ds-lite appqos secintel)
Hierarchy Level	[edit security log stream <i>stream-name</i>]
Release Information	Statement introduced in Junos OS Release 10.0. Statement modified in Junos OS Release 15.1X49-D40.
Description	Set the category of logging to all or content-security . Note that for the WELF format, the category must be set to content-security .
Options	<ul style="list-style-type: none"> • all—All events are logged. By default, all the events listed in the category parameter are logged. • content-security—Only content security events are logged. • fw-auth—Firewall authentication events are logged. • screen—Screen events are logged. • alg—Application Layer Gateway (ALG) events are logged. • nat—Network Address Translation (NAT) events are logged. • flow—Flow events are logged. • sctp—Stream Control Transmission Protocol (SCTP) events are logged. • gtp—GPRS Tunneling Protocol (GTP) events are logged. • ipsec—IPsec events are logged. • idp—Intrusion Detection and Prevention (IDP) events are logged. • rtlog—RTLOG system log events are logged. • pst-ds-lite—PST dual-stack lite (DS-Lite) events are logged. • appqos—Application quality of service (AppQoS) events are logged. • secintel—Juniper Networks Security Intelligence (SecIntel) events are logged.
Required Privilege Level	security—To view this statement in the configuration. security-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • <i>Application Security Feature Guide for Security Devices</i> • <i>Logical Systems and Tenant Systems Feature Guide for Security Devices</i>

console (System Logging)

Syntax	<pre>console { facility severity; }</pre>
Hierarchy Level	[edit system syslog]
Release Information	<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 14.1X53-D20 for the OCX Series.</p>
Description	Configure the logging of system messages to the system console. Log messages include priority information, which is information about log messages' facility and severity levels.
Options	<p>facility—Class (type) of messages to log. To specify multiple classes, include multiple facility severity statements.</p> <p>severity—Severity of the messages that belong to the facility specified by the paired facility name. Messages with severities of the specified level and higher are logged. You can specify the minimum severity level of a message.</p>
<div>  <p>NOTE: For a list of the facilities and message severities, see Table 160 on page 1051.</p> </div>	
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Directing System Log Messages to the Console on page 1105 • System Log Explorer

destination-override

Syntax	<pre>destination-override { syslog host <i>ip-address</i>; }</pre>
Hierarchy Level	[edit system tracing]
Release Information	Statement introduced in Junos OS Release 9.2.
Description	This option overrides the system-wide configuration under [edit system tracing] and has no effect if system tracing is not configured.
Options	<p>These options specify the system logs and the host to which remote tracing output is sent:</p> <ul style="list-style-type: none">• syslog—Specify the system process log files to send to the remote tracing host.• host <i>ip-address</i>—Specify the IP address to which to send tracing information.
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• <i>Junos OS Tracing and Logging Operations</i>• tracing on page 1847

event-rate

Syntax	event-rate <i>rate</i> ;
Hierarchy Level	[edit security log]
Release Information	Statement introduced in Junos OS Release 10.0.
Description	Limits the rate at which logs will be streamed per second.
Options	rate —Rate at which logs will be streamed per second. Range: 0 through 1500 logs per second Default: 1500 logs per second
Required Privilege Level	security—To view this statement in the configuration. security-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• syslog (System) on page 1840

exclude (Security Log)

Syntax

```
exclude exlude-name {
  destination-address destination-address;
  destination-port destination-port;
  event-id event-id;
  failure;
  interface-name interface-name;
  policy-name policy-name;
  process process-name;
  protocol protocol;
  source-address source-address;
  source-port source-port;
  success;
  user-name user-name;
}
```

Hierarchy Level [edit security log cache]

Release Information Statement introduced in Junos OS Release 11.2.

Description Configure a list of auditable events that can be excluded from the audit log.

- Options**
- **destination-ip** *destination-address*—Destination IP address.
 - **destination-port** *destination-port*—Destination port number.
 - **event-id** *event-id*—Error message identification number.
 - **failure**—Failed audit event logs.
 - **interface-name** *interface-name*—Name of the interface.
 - **policy-name** *policy-name*—Policy name filter.
 - **process** *process-name*—Process that generated the event.
 - **protocol** *protocol*—Protocol that generated the event.
 - **source-ip** *source-address*—Source IP address.
 - **source-port** *source-port*—Source port number.
 - **success**—Successful audit event logs.
 - **username** *user-name*—User name filter.

Required Privilege Level

security—To view this statement in the configuration.
 security-control—To add this statement to the configuration.

Related Documentation

- [show security log on page 2061](#)

- [clear security log on page 2048](#)

exclude-hostname

Syntax	exclude-hostname;
Hierarchy Level	[edit system syslog host <i>hostname</i>]
Release Information	Statement introduced in Junos OS Release 13.2
Description	Disable logging of hostname in the message directed to remote host.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

explicit-priority

Syntax	explicit-priority;
Hierarchy Level	[edit logical-systems <i>logical-system-name</i> system syslog file <i>filename</i>], [edit logical-systems <i>logical-system-name</i> system syslog host], [edit system syslog file <i>filename</i>], [edit system syslog host]
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Record the priority (facility and severity level) in each standard-format system log message directed to a file or remote destination. When the structured-data statement is also included at the [edit system syslog file <i>filename</i>] hierarchy level, this statement is ignored for the file.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Including Priority Information in System Log Messages on page 1072• System Log Explorer• structured-data on page 1839

facility-override (Security)

Syntax	<code>facility-override <i>facility</i>;</code>
Hierarchy Level	[edit security log]
Release Information	Statement introduced in Junos OS Release 12.3X48-D35 for SRX Series devices.
Description	<p>Alternate facility for logging to remote host.</p> <p>System log server is set up to use a facility-override value to filter or write log files received by a system log agent.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>

file (Security Log)

Syntax	<pre>file { files <i>max-file-number</i>; name <i>file-name</i>; path <i>binary-log-file-path</i>; size <i>maximum-file-size</i>; }</pre>
Hierarchy Level	[edit security log]
Release Information	Statement modified in Junos OS Release 9.2.
Description	Configure security log file options for logs in binary format.
Options	<ul style="list-style-type: none">• files <i>number</i>—Specify the maximum number of binary log files. Range: 2 through 10 files.• name <i>name</i> —Name of the file to log messages.• path <i>filepath</i>—Specify the path of the binary log file.• size <i>maximum-file-size</i>—Maximum size of each trace file, in megabytes (MB). Range: 1 KB through 10 MB
Required Privilege Level	security—To view this statement in the configuration. security-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• syslog (System) on page 1840

file (System Logging)

Syntax	<pre> file <i>filename</i> { <i>facility severity</i>; archive { <i>files number</i>; <i>size size</i>; (no-world-readable world-readable); } explicit-priority; match "regular-expression"; match-string <i>string-name</i>; structured-data { brief; } } </pre>
Hierarchy Level	[edit system syslog]
Release Information	<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>
Description	Configure the logging of system messages to a file.
Options	<p>facility—Class of messages to log. To specify multiple classes, include multiple facility severity statements. For a list of the facilities, see Table 160 on page 1051.</p> <p>file filename—File in the <code>/var/log</code> directory in which to log messages from the specified facility. To log messages to more than one file, include more than one file statement.</p> <p>severity—Severity of the messages that belong to the facility specified by the paired facility name. Messages with severities of the specified level and higher are logged. For a list of the severities, see Table 161 on page 1052.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Directing System Log Messages to a Log File on page 1103 • Junos OS System Log Reference for Security Devices

files

Syntax	<code>files <i>number</i>;</code>
Hierarchy Level	<code>[edit system syslog archive],</code> <code>[edit system syslog file <i>filename</i> archive]</code>
Release Information	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 11.1 for EX Series switches.
Description	Configure the maximum number of archived log files to retain. When the Junos OS logging utility has written a defined maximum amount of data to a log file <i>logfile</i> , it closes the file, compresses it, and renames it to <i>logfile.0.gz</i> (for information about the maximum file size, see size). The utility then opens and writes to a new file called <i>logfile</i> . When the new file reaches the maximum size, the <i>logfile.0.gz</i> file is renamed to <i>logfile.1.gz</i> , and the new file is closed, compressed, and renamed <i>logfile.0.gz</i> . By default, the logging facility creates up to ten archive files in this manner. Once the maximum number of archive files exists, each time the active log file reaches the maximum size, the contents of the oldest archive file are lost (overwritten by the next oldest file).
Options	<i>number</i> —Maximum number of archived files. Range: 1 through 1000 Default: 10 files
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• <i>Junos OS System Log Reference for Security Devices</i>• size on page 1836

host (Security Log)

Syntax	<pre>host { ip-address; port port-number; }</pre>
Hierarchy Level	[edit security log stream <i>stream-name</i>]
Release Information	Statement introduced in Junos OS Release 9.2.
Description	You can specify the IP address of the server to which the security logs are streamed.
Options	<ul style="list-style-type: none">• <i>ip-address</i>—Specify IP address of the host.• port <i>port-number</i>—Specify host port number. <p>Default: The default destination port is the system log port. For UDP or TCP, the default port is 514. For TLS, the default port is 6514.</p>
Required Privilege Level	security—To view this statement in the configuration. security-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• syslog (System) on page 1840


host (System)

Syntax `host (hostname | other-routing-engine) {
 facility severity;
 exclude-hostname
 explicit-priority;
 facility-override facility;
 log-prefix string;
 match "regular-expression";
 match-string string-name;
 routing-instance routing-instance-name;
 source-address source-address;
 structured-data {
 brief;
 }
 }`

QFX Series and OCX Series `host (hostname {
 facility severity;
 explicit-priority;
 facility-override facility;
 log-prefix string;
 match "regular-expression";
 match-string string-name;
 port;
 source-address source-address;
 }`

TX Matrix Router and EX Series Switches `host (hostname | other-routing-engine | scc-master) {
 facility severity;
 explicit-priority;
 facility-override facility;
 log-prefix string;
 match "regular-expression";
 match-string string-name;
 port;
 source-address source-address;
 }`

TX Matrix Plus Router `host (hostname | other-routing-engine | sfc0-master) {
 facility severity;
 allow-duplicates;
 explicit-priority;
 facility-override facility;
 log-prefix (System) string;
 match "regular-expression";
 match-string string-name;
 port;
 source-address source-address;
 }`

Hierarchy Level	[edit logical-systems <i>logical-system-name</i> system syslog], [edit system syslog]
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure the logging of system messages to a remote destination.
Options	<p>facility—Class of messages to log. To specify multiple classes, include multiple facility severity statements. For a list of the facilities, see Table 160 on page 1051.</p> <p>hostname—IPv4 address, IPv6 address, or fully qualified hostname of the remote machine to which to direct messages. To direct messages to multiple remote machines, include a host statement for each one.</p> <p>other-routing-engine—Direct messages to the other Routing Engine on a router or switch with two Routing Engines installed and operational.</p>
	<p> NOTE: The other-routing-engine option is not applicable to the QFX Series and OCX Series.</p>
	<p>port—Port number of the remote syslog server that can be modified.</p> <p>scc-master—(TX Matrix routers only) On a T640 router that is part of a routing matrix, direct messages to the TX Matrix router.</p> <p>severity—Severity of the messages that belong to the facility specified by the paired facility name. Messages with severities of the specified level and higher are logged. For a list of the severities, see Table 161 on page 1052.</p> <p>sfc0-master—(TX Matrix Plus routers only) On a T1600 or T4000 router that is part of a routing matrix, direct messages to the TX Matrix Plus router.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Directing Messages to a Remote Destination from the Routing Matrix Based on the TX Matrix Router on page 1112 • Directing Messages to a Remote Destination from the Routing Matrix Based on a TX Matrix Plus Router on page 1113 • Junos OS System Log Reference

limit (Security Log)

Syntax	limit <i>value</i> ;
Hierarchy Level	[edit security log cache]
Release Information	Statement modified in Junos OS Release 9.2.
Description	Specify the number of security log entries to be kept in memory.
Options	Once the maximum value limit is reached, new entries will not be added until the cache size drops. Range: 0 through 4,294,967,295 Default: 10,000 security log entries.
Required Privilege Level	security—To view this statement in the configuration. security-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• syslog (System) on page 1840

log (Security)

```

Syntax log {
    cache {
        exclude exclude-name {
            destination-address destination-address;
            destination-port destination-port;
            event-id event-id;
            failure;
            interface-name interface-name;
            policy-name policy-name;
            process process-name;
            protocol protocol;
            source-address source-address;
            source-port source-port;
            success;
            user-name user-name;
        }
        limit value;
    }
    disable;
    event-rate rate;
    facility-override (authorization | daemon | ftp | kernel | local | user);
    file {
        files max-file-number;
        name file-name;
        path binary-log-file-path;
        size maximum-file-size;
    }
    format (binary | sd-syslog | syslog);
    max-database-record <max-database-record>;
    mode (event | stream);
    rate-cap <rate-cap-value>;
    report;
    (source-address source-address | source-interface interface-name);
    stream stream-name {
        category (all | content-security | fw-auth | screen | alg | nat | flow | sctp | gtp | ipsec | idp
            | rtlog | pst-ds-lite | appqos | secintel);
        file {
            name file-name;
            size file-size;
            rotation max-rotation-number;
        }
        filter {
            threat-attack;
        }
        format (binary | sd-syslog | syslog | welf);
        host {
            ip-address;
            port port-number;
        }
        rate-limit {
            log-rate;


```

```
    }
    severity (alert | critical | debug | emergency | error | info | notice | warning);
  }
  traceoptions {
    file {
      filename;
      files number;
      match regular-expression;
      size maximum-file-size;
      (world-readable | no-world-readable);
    }
    flag (all | configuration | hpl | report | source);
    no-remote-trace;
  }
  transport {
    protocol (udp | tcp | tls);
    tcp-connections tcp-connections;
    tls-profile tls-profile-name;
  }
  utc-timestamp;
}
```

Hierarchy Level	[edit security]
-----------------	-----------------

Release Information	Statement introduced in Junos OS Release 9.2.
---------------------	---

Description	Configure security log. Set the mode of logging (event for traditional system logging or stream for streaming security logs through a revenue port to a server). You can also specify all the other parameters for security logging.
-------------	--

- Options**
- cache**—Cache security log events in the audit log buffer.
 - disable**—Disable the security logging for the device.
 - event-rate** *rate*—Limit the rate at which logs are streamed per second.
Range: 0 through 1500
Default: 1500
 - facility-override**—Alternate facility for logging to remote host.
 - file**—Specify the security log file options for logs in binary format.
Values:
 - **max-file-number**—Maximum number of binary log files.
 - The range is 2 through 10 and the default value is 10.
 - **file-name**—Name of binary log file.
 - **binary-log-file-path**—Path to binary log files.
 - **maximum-file-size**—Maximum size of binary log file in megabytes.
 - The range is 1 through 10 and the default value is 10.
 - format**—Set the security log format for the device.
 - max-database-record**—The following are the disk usage range limits for the database:
Range:
 - SRX1500, SRX4100, and SRX4200: 0 through 15,000,000
 - vSRX: 0 through 1,000,000**Default:**
 - SRX1500, SRX4100, and SRX4200: 15,000,000
 - vSRX: 1,000,000
- 

NOTE: Be sure there is enough free space in `/var/log/hostlogs/`, otherwise logs might be dropped when written into the database.
- mode**—Control how security logs are processed and exported.
 - rate-cap** *rate-cap-value*—Work with event mode only. This option limits the rate at which data plane logs are generated per second.
Range: 0 through 5000 logs per second
Default: 5000 logs per second
 - source-address** *source-address*—Specify a source IP address or IP address used when exporting security logs, which is mandatory to configure *stream host*.

source-interface *interface-name*—Specify a source interface name, which is mandatory to configure *stream host*.



NOTE: The **source-address** and **source-interface** are alternate values. Using one of the options is mandatory.

stream—Every stream can configure file or host.

- **category**— Type of events that might be logged.
- **file name**—Specify the filename.
- **file size**—Specify the file size.
 - SRX1500, SRX4100, and SRX4200—The default value is 25 MB and the range is 10 MB through 50 MB.
 - vSRX - The default value is 2 MB and the range is 1 MB through 3 MB.
- **rotation**—Configure the maximum file number for rotation.
 - The default value is 10 and the range is 2 through 19.
- **rate-limit**—Rate-limit for security logs.
 - The range is 1 through 65,535 logs per second and the default value is 65,535 .
- **filter**—Selects the filter to filter the logs to be logged.
- **format**—Specify the log stream format.
- **host**—Destination to send security logs.
- **severity**—Severity threshold for security logs.

traceoptions—Specify security log daemon trace options.

transport—Set security log transport settings.

utc-timestamp—Specify to use UTC time for security log timestamps.

The remaining statements are explained separately. See [CLI Explorer](#).

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

log (Services)

Syntax	<pre>log { all; errors; info; sessions-allowed; sessions-dropped; sessions-ignored; sessions-whitelisted; warning; }</pre>
Hierarchy Level	[edit services ssl proxy profile <i>profile-name</i> actions]
Release Information	Statement introduced in Junos OS Release 12.1X44-D10.
Description	<p>Specify the logging actions. When configuring SSL proxy, you can choose to set the option to receive some or all of the logs.</p> <p>SSL proxy logs contain the logical system name, SSL proxy whitelists, policy information, SSL proxy information, and other information that helps you troubleshoot when there is an error.</p> <p>You can configure logging of all or specific events, such as error, warning, and information events. You can also configure logging of sessions that are whitelisted, dropped, ignored, or allowed after an error occurs.</p>
Options	<ul style="list-style-type: none"> • all—Log all events. • errors—Log all error events. • info—Log all information events. • sessions-allowed—Log SSL session allowed events after an error. • sessions-dropped—Log only SSL session dropped events. • sessions-ignored—Log session ignored events. • sessions-whitelisted—Log SSL session whitelisted events. • warning—Log all warning events.
Required Privilege Level	<p>services—To view this statement in the configuration.</p> <p>services-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • <i>Configuring SSL Forward Proxy</i>

log-prefix (System)

Syntax	<code>log-prefix <i>string</i>;</code>
Hierarchy Level	[edit system syslog host]
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Include a text string in each message directed to a remote destination.
Options	<i>string</i> —Text string to include in each message.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Adding a Text String to System Log Messages Directed to a Remote Destination on page 1107• <i>Junos OS System Log Reference for Security Devices</i>

log-rotate-frequency

Syntax	<code>log-rotate-frequency <i>frequency</i>;</code>
Hierarchy Level	[set system syslog]
Release Information	Statement introduced in Junos OS Release 11.3.
Description	<p>Configure the system log file rotation frequency by configuring the time interval for checking the log file size.</p> <p>When the log file size has exceeded the configured limit, the old log file is archived and a new log file is created.</p>
Options	<p><i>frequency</i>—Frequency of rotation of the system log file.</p> <p>Range: 1 minute through 59 minutes</p> <p>Default: 15 minutes</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Specifying Log File Size, Number, and Archiving Properties on page 1070• syslog on page 1840


match

Syntax	<code>match "regular-expression";</code>
Hierarchy Level	<code>[edit logical-systems <i>logical-system-name</i> system syslog file <i>filename</i>],</code> <code>[edit logical-systems <i>logical-system-name</i> system syslog user (<i>username</i> *)],</code> <code>[edit system syslog file <i>filename</i>],</code> <code>[edit system syslog host <i>hostname</i> other-routing-engine scc-master)],</code> <code>[edit system syslog user (<i>username</i> *)]</code>
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Specify a text string that must (or must not) appear in a message for the message to be logged to a destination.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Using Regular Expressions to Refine the Set of Logged Messages on page 1076• match-string on page 1825

match-string

Syntax	<code>match-string [<i>string-name</i>];</code>
Hierarchy Level	[edit system syslog file <i>filename</i>], [edit system syslog host <i>hostname</i>], [edit system syslog user <i>username</i>]
Release Information	Statement introduced in Junos OS Release 16.1.
Description	<p>Specify a text substring that must appear in a message that is logged to a destination. The statement reduces the CPU utilization while displaying the system log messages.</p> <p>The match-string configuration statement can be configured along with the match configuration statement. When you configure both match and match-string, the conditions set for a particular substring in the match-string configuration statement is read first. If the conditions in the match-string configuration statement are not satisfied, then the conditions set in the match configuration statements is executed.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Using Regular Expressions to Refine the Set of Logged Messages on page 1076

mode (Security Log)

Syntax	mode (event stream)
Hierarchy Level	[edit security log]
Release Information	Statement introduced in Junos OS Release 10.0.
Description	Set the mode of logging (event for traditional system logging or stream for streaming security logs through a revenue port to a server).
Options	<ul style="list-style-type: none"> • event— Process security logs in the control plane. • stream—Process security logs directly in the forwarding plane. <p>Default:</p> <ul style="list-style-type: none"> • event is a default mode on SRX100, SRX110, SRX210, SRX220, SRX240, SRX300, SRX320, SRX340, SRX345, SRX550, SRX550M, SRX650, and SRX1500 devices. • stream is a default mode on SRX1400, SRX3400, SRX3600, SRX5400, SRX5600, SRX5800, SRX4100, and SRX4200 devices.
	<div>  <p>NOTE: Starting with Junos OS Release 15.1X49-D100, the default mode for SRX1500 device is stream mode. Prior to Junos OS Release 15.1X49-D100, the default mode for SRX1500 device was event mode.</p> </div>
Required Privilege Level	security—To view this statement in the configuration. security-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • syslog (System) on page 1840

no-remote-trace (System)

Syntax	no-remote-trace;
Hierarchy Level	[edit system scripts commit traceoptions]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Disable remote tracing.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• traceoptions (Security Datapath Debug) on page 1452

pic-services-logging

Syntax	<pre>pic-services-logging { command <i>binary-file-path</i>; disable; failover (alternate-media other-routing-engine); }</pre>
Hierarchy Level	[edit system processes]
Release Information	Statement introduced in Junos OS Release 8.5.
Description	Enable PICs to send special logging information to the Routing Engine for archiving on a hard disk.
Options	<ul style="list-style-type: none">• command <i>binary-file-path</i>—Path to the binary process.• disable—Disable the PIC services logging process.• failover—Configure the device to reboot if the software process fails four times within 30 seconds, and specify the software to use during the reboot.<ul style="list-style-type: none">• alternate-media—Configure the device to switch to backup media that contains a version of the system if a software process fails repeatedly.• other-routing-engine—Instruct the secondary Routing Engine to take mastership if a software process fails. If this statement is configured for a process, and that process fails four times within 30 seconds, the device reboots from the secondary Routing Engine.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• syslog (System) on page 1840

port (Syslog)

Syntax	<code>port <i>port number</i>;</code>
Hierarchy Level	<code>[edit system syslog host <i>hostname</i> other-routing-engine scc-master)]</code>
Release Information	Statement introduced in Junos OS Release 11.3.
Description	Specify the port number for the remote syslog server.
Options	<i>port number</i> —Port number of the remote syslog server. Range: 0 through 65535 Default: 514
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• syslog on page 1840• host on page 1814


rate-cap

Syntax	<code>rate-cap <rate-cap-value>;</code>
Hierarchy Level	[edit security log]
Release Information	Statement introduced in Junos OS Release 10.0.
Description	Limits the rate at which data plane logs will be generated per second.
Options	rate-cap <i>rate-cap-value</i> —Works with event mode only. Limits the rate at which data plane logs will be generated per second Range: 0 through 5000 logs per second Default: 5000 logs per second
Required Privilege Level	security—To view this statement in the configuration. security-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• syslog (System) on page 1840

report (Security Log)

Syntax	report;
Hierarchy Level	[edit security log (Security)]
Release Information	Statement introduced in Junos OS Release 15.1X49-D100
Description	<p>Set security log report settings.</p> <p>On-box reporting offers a comprehensive reporting facility where your security management team can spot a security event when it occurs, immediately access and review pertinent details about the event, and quickly decide appropriate remedial action.</p> <p>The on-box reporting feature is enabled by default on a SRX Series device with Junos OS Release 15.1X49-D100 or later.</p> <p>If you are upgrading your SRX Series device from a Junos OS Release prior to Junos OS 15.1X49-D100, then on-box reporting feature is disabled by default. You need to run the set security log report command to enable the on-box reporting feature on the device.</p>
Options	report —Enable log report.
Required Privilege Level	The remaining statements are explained separately. See CLI Explorer .
Related Documentation	<ul style="list-style-type: none"> • log (Security) on page 1817

routing-instance (Syslog)

Syntax	<code>routing-instance <i>routing-instance-name</i>;</code>
Hierarchy Level	<code>[edit system syslog],</code> <code>[edit system syslog host <i>ip-address</i>]</code>
Release Information	Statement introduced in Junos OS Release 18.4R1.
Description	Configure the routing instance name for the routing instance that you want the syslog client to use. If you want to use the reserved non-default management routing instance <code>mgmt_junos</code> , make sure you configure the management-instance statement.
<div> NOTE: You must also define the routing instance you want to use under the <code>[edit routing-instances]</code> hierarchy level.</div>	
Required Privilege Level	<code>system</code> —To view this statement in the configuration. <code>system-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"><i>Management Interface in a Nondefault Instance</i>

security-log

Syntax	<pre>security-log { command <i>binary-file-path</i>; disable; failover (alternate-media other-routing-engine); }</pre>
Hierarchy Level	[edit system processes]
Release Information	Statement introduced in Junos OS Release 8.5.
Description	Specify the security log process.
Options	<ul style="list-style-type: none"> • command <i>binary-file-path</i>—Path to the binary process. • disable—Disable the security log process. • failover—Configure the device to reboot if the software process fails four times within 30 seconds, and specify the software to use during the reboot. <ul style="list-style-type: none"> • alternate-media—Configure the device to switch to backup media that contains a version of the system if a software process fails repeatedly. • other-routing-engine—Instruct the secondary Routing Engine to take mastership if a software process fails. If this statement is configured for a process, and that process fails four times within 30 seconds, then the device reboots from the secondary Routing Engine.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • syslog (System) on page 1840

security-log-percent-full

Syntax	security-log-percent-full <i>percentage</i> ;
Hierarchy Level	[edit security alarms potential-violation]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Raise a security alarm when security log exceeds a specified percent of total capacity.
Options	<i>percentage</i> —Percentage of security log capacity at which a security alarm is raised. Range: 0 through 100 percent
Required Privilege Level	security—To view this statement in the configuration. security-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• syslog (System) on page 1840

severity (Security Log)

Syntax	severity (alert critical debug emergency error info notice warning)
Hierarchy Level	[edit security log stream <i>stream-name</i>]
Release Information	Statement modified in Junos OS Release 9.2.
Description	Set severity threshold for security logs.
Options	<ul style="list-style-type: none"> • alert—Conditions that require immediate attention. • critical—Critical conditions. • debug—Information normally used in debugging. • emergency—Conditions that cause security functions to stop. • error—General error conditions. • info—Information about normal security operations. • notice—Nonerror conditions that are of interest. • warning—General warning conditions. <p>Default: debug.</p>
Required Privilege Level	security—To view this statement in the configuration. security-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • syslog (System) on page 1840

size (System)

Syntax	<code>size size;</code>
Hierarchy Level	<code>[edit system syslog archive],</code> <code>[edit system syslog file <i>filename</i> archive]</code>
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure the maximum amount of data that the Junos OS logging utility writes to a log file logfile before archiving it (closing it, compressing it, and changing its name to logfile.0.gz). The utility then opens and writes to a new file called logfile . For information about the number of archive files that the utility creates in this way, see files .
Options	size —Maximum size of each system log file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). Syntax: <i>xk</i> to specify the number of kilobytes, <i>xm</i> for the number of megabytes, or <i>xg</i> for the number of gigabytes Range: 64 KB through 1 GB Default: 1 MB for MX Series routers the QFX Series, and the OCX Series
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Specifying Log File Size, Number, and Archiving Properties on page 1070• System Log Explorer• files on page 1812

stream (Security Log)

Syntax

```
stream stream-name {
    category (all | content-security | fw-auth | screen | alg | nat | flow | sctp | gtp | ipsec | idp |
    rtlog | pst-ds-lite | appqos | secintel);
    file {
        name file-name;
        size file-size;
        rotation max-rotation-number;
    }
    filter {
        threat-attack;
    }
    format (binary | sd-syslog | syslog | welf);
    host {
        ip-address;
        port port-number;
    }
    rate-limit {
        log-rate;
    }
    severity (alert | critical | debug | emergency | error | info | notice | warning);
}
```

Hierarchy Level [edit security log]

Release Information Statement modified in Junos OS Release 9.2.

Description Defines the TWAMP server configuration settings.

Options **stream**—Every stream can configure file or host.

Values:

- **category**— Type of events that may be logged.
- **file-name**—Specify the file name.
- **file-size**—Specify the file size.
 - SRX1500, SRX4100, and SRX4200- The default value is 25M and the range is 10M through 50M.
 - vSRX - The default value is 2M and the range is 1M through 3M.
- **rotation**—Configure the max file number for rotation.
 - The default value is 10 and the range is 2 through 19.
- **rate-limit**—Rate-limit for security logs.
 - The range is 1 through 65535 logs per second and the default value is 65535 .


- ***filter***—Selects the filter to filter the logs to be logged.
- ***format***—Specify the log stream format.
- ***host***—Destination to send security logs.
- ***severity***—Severity threshold for security logs.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation	<ul style="list-style-type: none">• <i>Example: Configuring AppTrack</i>• category (Security Logging) on page 1803
------------------------------	---

structured-data

Syntax	structured-data { brief; }
Hierarchy Level	[edit logical-systems <i>logical-system-name</i> system syslog file <i>filename</i>], [edit system syslog file <i>filename</i>]
Release Information	Statement introduced in Junos OS Release 8.3. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Write system log messages to the log file in structured-data format, which complies with Internet draft draft-ietf-syslog-protocol-23, <i>The syslog Protocol</i> (http://tools.ietf.org/html/draft-ietf-syslog-protocol-23).
<div>  <p>NOTE: When this statement is included, other statements that specify the format for messages written to the file are ignored (the explicit-priority statement at the [edit system syslog file <i>filename</i>] hierarchy level and the time-format statement at the [edit system syslog] hierarchy level).</p> </div>	
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Logging Messages in Structured-Data Format on page 1069 • <i>Junos OS System Log Reference for Security Devices</i> • explicit-priority on page 1808 • time-format on page 1843

syslog (System)

```
Syntax  syslog {
    allow-duplicates;
    archive {
        (binary-data | no-binary-data);
        files number;
        size maximum-file-size;
        start-time "YYYY-MM-DD.hh:mm";
        transfer-interval minutes;
        (world-readable | no-world-readable);
    }
    console {
        facility severity;
    }
    file filename {
        facility severity;
        explicit-priority;
        match "regular-expression";
        archive {
            (binary-data | no-binary-data);
            files number;
            size maximum-file-size;
            start-time "YYYY-MM-DD.hh:mm";
            transfer-interval minutes;
            (world-readable | no-world-readable);
        }
        structured-data {
            brief;
        }
    }
    host (hostname | other-routing-engine | scc-master) {
        facility severity;
        explicit-priority;
        facility-override facility;
        log-prefix string;
        match "regular-expression";
        routing-instance routing-instance-name;
        source-address source-address;
        structured-data {
            brief;
        }
        port port-number;
    }
    log-rotate-frequency frequency;
    routing-instance routing-instance-name;
    server {
        routing-instances (routing-instance-name | all | default) {
            disable;
        }
        source-address source-address;
        time-format (millisecond | year | year millisecond);
        user (username | *) {
            facility severity;
        }
    }
}
```

```

    match "regular-expression";
  }
}

```

Hierarchy Level	[edit system]
Release Information	<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 14.1X53-D20 for the OCX Series.</p> <p>IPv6 addresses using dedicated management instance mgmt_junos supported in Junos OS Release 18.1R1.</p>
Description	<p>Configure the types of system log messages to send to files, to a remote destination, to user terminals, or to the system console.</p> <p>The remaining statements are explained separately.</p>
Options	<p>archive—Define parameters for archiving log messages. As of Junos OS 18.1R1, supports IPv6 addresses using dedicated management instance mgmt_junos.</p> <p>console—Send log messages of a specified class and severity to the console.</p> <p>file—Send log messages to a named file. As of Junos OS 18.1R1, supports IPv6 addresses using dedicated management instance mgmt_junos.</p> <p>host —Remote location to be notified of specific log messages. As of Junos OS 18.1R1, supports IPv6 addresses using dedicated management instance mgmt_junos.</p> <p>log-rotate-frequency—Configure the interval for checking logfile size and archiving messages.</p> <p>server—Enable a syslog server for compute nodes and VMs in an App Engine.</p> <p>source-address—Include a specified address as the source address for log messages. As of Junos OS 18.1R1, supports IPv6 addresses using dedicated management instance mgmt_junos.</p> <p>time-format—Additional information to include in the system log time stamp.</p> <p>user—Notify a specific user of the log event.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Junos OS System Log Overview on page 1049 • System Log Explorer

system

Syntax	system { ... }
Hierarchy Level	[edit]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure system management properties.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• <i>System Management Configuration Statements</i>

time-format

Syntax	<code>time-format (year millisecond year millisecond);</code>
Hierarchy Level	<code>[edit system syslog]</code>
Release Information	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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Include the year, the millisecond, or both, in the timestamp on every standard-format system log message. The additional information is included for messages directed to each destination configured by a file , console , or user statement at the <code>[edit system syslog]</code> hierarchy level, but not to destinations configured by a host statement.



NOTE: By default, in a FreeBSD console, the additional time information is not available in system log messages directed to each destination configured by a **host** statement. However, in a Junos OS specific implementation using the FreeBSD console, the additional time information is available in system log messages directed to each destination.

By default, the timestamp specifies the month, date, hour, minute, and second when the message was logged—for example, **Aug 21 12:36:30**.

The following example illustrates the format for a timestamp that includes both the millisecond (**401**) and the year (**2006**):

```
Aug 21 12:36:30.401 2006
```

However, the timestamp for traceoption messages is specified in milliseconds by default, and is independent of the `[edit system syslog time-format]` statement.



NOTE: When the **structured-data** statement is included at the `[edit system syslog file filename]` hierarchy level, this statement is ignored for the file.

- Options**
- millisecond**—Include the millisecond in the timestamp.
 - year**—Include the year in the timestamp.

Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Including the Year or Millisecond in Timestamps on page 1075• <i>Junos OS System Log Reference for Security Devices</i>• structured-data on page 1839

traceoptions (Security Log)

Syntax	<pre> traceoptions { file { filename; files number; match regular-expression; size maximum-file-size; (world-readable no-world-readable); } flag (all configuration hpl report source); no-remote-trace; } </pre>
Hierarchy Level	[edit security log]
Release Information	Statement modified in Junos OS Release 9.2.
Description	Configure security log tracing options.
Options	<ul style="list-style-type: none"> file—Configure the trace file options. <ul style="list-style-type: none"> filename—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <code>/var/log</code>. By default, the name of the file is the name of the process being traced. files number—Maximum number of trace files. When a trace file named trace-file reaches its maximum size, it is renamed to trace-file.0, then trace-file.1, and so on, until the maximum number of trace files is reached. The oldest archived file is overwritten. If you specify a maximum number of files, you also must specify a maximum file size with the size option and a filename. Range: 2 through 1000 files Default: 10 files match regular-expression—Refine the output to include lines that contain the regular expression. size maximum-file-size—Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named trace-file reaches this size, it is renamed trace-file.0. When the trace-file again reaches its maximum size, trace-file.0 is renamed trace-file.1 and trace-file is renamed trace-file.0. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten. If you specify a maximum file size, you also must specify a maximum number of trace files with the files option and a filename.

Syntax: **x K** to specify KB, **x m** to specify MB, or **x g** to specify GB

Range: 10 KB through 1 GB

Default: 128 KB

- **world-readable | no-world-readable**—By default, log files can be accessed only by the user who configures the tracing operation. The **world-readable** option enables any user to read the file. To explicitly set the default behavior, use the **no-world-readable** option.
- **flag**—Trace operation to perform. To specify more than one trace operation, include multiple **flag** statements.
 - **all**—Trace with all flags enabled
 - **configuration**—Trace configuration events
 - **hpl**— Trace HPL logging
 - **report**— Trace report
 - **source**—Communicate with security log forwarder
- **no-remote-trace**—Set remote tracing as disabled.

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

Related Documentation	<ul style="list-style-type: none">• syslog (System) on page 1840
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tracing

Syntax	<pre>tracing { destination-override syslog host <i>ip-address</i>; }</pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 9.2.
Description	<p>Configure the router to enable remote tracing to a specified host IP address. The default setting is disabled.</p> <p>The following processes are supported:</p> <ul style="list-style-type: none"> • chassisd—Chassis-control process • eventd—Event-processing process • cosd—Class-of-service process • spd—Adaptive-services process <p>You can use the no-remote-trace statement, under the [edit system process-name traceoptions] hierarchy, to disable remote tracing.</p>
Options	destination-override syslog host <i>ip-address</i> —Overrides the global config under system tracing and has no effect if system tracing is not configured.
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • <i>Junos OS Tracing and Logging Operations</i> • destination-override on page 1805 • <i>no-remote-trace</i>

transport (Security Log)

Syntax	<pre>transport { protocol (udp tcp tls); tls-profile <i>tls-profile-name</i>; tcp-connections <i>tcp-connections</i>; }</pre>
Hierarchy Level	[edit security log]
Release Information	Statement introduced in Junos OS Release 12.1X46-D25.
Description	Configure security log transport options.
Options	<p>protocol—Specify the type of transport protocol to be used to log the data.</p> <ul style="list-style-type: none">• UDP—Set the transport protocol to UDP.• TCP—Set the transport protocol to TCP.• TLS—Set the transport protocol to TLS. <p>Default: UDP.</p> <p>tls-profile <i>tls-profile-name</i>—Specify the TLS profile name.</p> <p>tcp-connections <i>tcp-connections</i>—Specify the number of TCP connections per SPU.</p> <p>Range: 1 through 5.</p> <p>Default: 1.</p>
Required Privilege Level	<p>security—To view this in the configuration.</p> <p>security-control—To add this to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• <i>Understanding AppTrack</i>

ukern-trace

Syntax	<pre>ukern-trace { log { app-type dfw; logging (off on); } }</pre>
Hierarchy Level	<pre>[edit chassis fpc], [edit chassis lcc <i>name</i> fpc], [edit chassis member <i>name</i> fpc]</pre>
Release Information	Statement introduced in Junos OS Release 17.4
Description	Enable or disable logging of all debugging firewall (DFW) ukern-trace logs on the specified FPC slot. The CLI change takes effect immediately and persists after the FPC slot reboots.
Options	<p>app-type—Name of application with ukern-trace logs. The only supported app-type is dfw.</p> <p>logging—Turn ukern-trace logging on or off. By default logging is on.</p>
Required Privilege Level	interface
Related Documentation	Junos OS System Log Overview on page 1049

user (System Logging)

Syntax	<pre> user (username *) { facility severity; match "regular-expression"; match-string string-name; } </pre>
Hierarchy Level	[edit system syslog]
Release Information	<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>
Description	Configure the logging of system messages to user terminals.
Options	<p>* (the asterisk)—Log messages to the terminal sessions of all users who are currently logged in.</p> <p>facility—Class of messages to log. To specify multiple classes, include multiple facility severity statements. For a list of the facilities, see Table 160 on page 1051.</p> <p>severity—Severity of the messages that belong to the facility specified by the paired facility name. Messages with severities the specified level and higher are logged. For a list of the severities, see Table 161 on page 1052.</p> <p>username—Junos OS login name of the user whose terminal session is to receive system log messages. To log messages to more than one user's terminal session, include more than one user statement.</p> <p>The remaining statement is explained separately. See CLI Explorer.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Directing System Log Messages to a User Terminal on page 1104 • Junos OS System Logging Facilities and Message Severity Levels on page 1051 • Junos OS System Log Reference for Security Devices

world-readable

Syntax	<code>world-readable no-world-readable;</code>
Hierarchy Level	<code>[edit system syslog archive],</code> <code>[edit system syslog file filename archive]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Grant all users permission to read log files, or restrict the permission only to the root user and users who have the Junos OS maintenance permission.
Default	<code>no-world-readable</code>
Required Privilege Level	<code>system</code> —To view this statement in the configuration. <code>system-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Specifying Log File Size, Number, and Archiving Properties on page 1070 • <i>Junos OS System Log Reference for Security Devices</i>

CHAPTER 74

Configuration Statement: App-Engine

- [routing-instance on page 1854](#)

routing-instance

Syntax

```
routing-instance routing-instance-name{
  family inet {
    address ip-address;
  }
}
```

Hierarchy Level [edit services app-engine compute-cluster *compute-cluster-name* local-management],
[edit services app-engine virtual-machines instance *instance-name* local-management]

Release Information Statement introduced in Junos OS Release 13.2.

Description (Optional) Configure a routing instance for the JunosV App Engine infrastructure. Packets are restricted to the specified routing instance. By specifying the routing instance, the JunosV App Engine infrastructure can be made to operate in a non-default routing instance. This feature ensures that JunosV App Engine traffic can be segregated from other traffic.

If the **routing-instance** statement is absent from the [edit services app-engine virtual-machines instance *instance-name* local-management] hierarchy level, the virtual machine (VM) will inherit this routing instance from its [edit services app-engine compute-cluster *compute-cluster-name* local-management] hierarchy level.



NOTE: Additional configuration under the [edit routing-instances] hierarchy level is required to ensure that the Routing Engine interface address belongs to that particular routing instance on the routing engine. Each routing instance consists of sets of the following: Routing tables, interfaces that belong to these routing tables (optional, depending upon the routing instance type), and routing option configurations.

Options *routing-instance-name*—Name of the routing instance.

The remaining statements are explained separately. See [CLI Explorer](#).

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

PART 14

Operational Commands

- [Operational Commands: General on page 1857](#)
- [Operational Commands: Realtime Performance Monitoring on page 1887](#)
- [Operational Commands: Analyzers and Port Mirroring on page 1903](#)
- [Operational Commands: sFlow Monitoring Technology on page 1907](#)
- [Operational Commands: Ethernet OAM Connectivity Fault Management on page 1923](#)
- [Operational Commands: Ethernet OAM Link Fault Management on page 1969](#)
- [Operational Commands: Uplink Failure Detection on page 1975](#)
- [Operational Commands: RPM on page 1979](#)
- [Operational Commands: SNMP on page 1995](#)
- [Operational Commands: Port Mirroring on page 2037](#)
- [Operational Commands: Network Analytics on page 2041](#)
- [Operational Commands: System Logging on page 2045](#)
- [Monitoring Operational Commands on page 2069](#)

CHAPTER 75

Operational Commands: General

- monitor traffic
- ping
- show pfe statistics bridge
- traceroute

monitor traffic

Syntax monitor traffic
 <brief | detail | extensive>
 <absolute-sequence>
 <count *count*>
 <interface *interface-name*>
 <layer2-headers>
 <matching *matching*>
 <no-domain-names>
 <no-promiscuous>
 <no-resolve>
 <no-timestamp>
 <print-ascii>
 <print-hex>
 <resolve-timeout>
 <size *size*>

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 for EX Series switches.
 Command introduced in Junos OS Release 11.1 for the QFX Series.
 Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

Description Display packet headers or packets received and sent from the Routing Engine.



NOTE:

- Using the monitor-traffic command can degrade router or switch performance.
- Delays from DNS resolution can be eliminated by using the no-resolve option.



NOTE: This command is not supported on the QFabric system.

Options **none**—(Optional) Display packet headers transmitted through **fxp0**. On a TX Matrix Plus router, display packet headers transmitted through **em0**.

brief | detail | extensive—(Optional) Display the specified level of output.

absolute-sequence—(Optional) Display absolute TCP sequence numbers.

count *count*—(Optional) Specify the number of packet headers to display (0 through 1,000,000). The monitor traffic command quits automatically after displaying the number of packets specified.

interface *interface-name*—(Optional) Specify the interface on which the **monitor traffic** command displays packet data. If no interface is specified, the **monitor traffic** command displays packet data arriving on the lowest-numbered interface.

layer2-headers—(Optional) Display the link-level header on each line.

matching *matching*—(Optional) Display packet headers that match a regular expression. Use matching expressions to define the level of detail with which the **monitor traffic** command filters and displays packet data.

no-domain-names—(Optional) Suppress the display of the domain portion of hostnames. With the **no-domain-names** option enabled, the **monitor traffic** command displays only **team** for the hostname **team.company.net**.

no-promiscuous—(Optional) Do not put the interface into promiscuous mode.

no-resolve—(Optional) Suppress reverse lookup of the IP addresses.

no-timestamp—(Optional) Suppress timestamps on displayed packets.

print-ascii—(Optional) Display each packet in ASCII format.

print-hex—(Optional) Display each packet, except the link-level header, in hexadecimal format.

resolve-timeout *timeout*—(Optional) Amount of time the router or switch waits for each reverse lookup before timing out. You can set the timeout for 1 through 4,294,967,295 seconds. The default is 4 seconds. To display each packet, use the **print-ascii**, **print-hex**, or **extensive** option.

size *size*—(Optional) Read but do not display up to the specified number of bytes for each packet. When set to **brief** output, the default packet size is 96 bytes and is adequate for capturing IP, ICMP, UDP, and TCP packet data. When set to **detail** and **extensive** output, the default packet size is 1514. The **monitor traffic** command truncates displayed packets if the matched data exceeds the configured size.

Additional Information In the **monitor traffic** command, you can specify an expression to match by using the **matching** option and including the expression in quotation marks:

```
monitor traffic matching "expression"
```

Replace *expression* with one or more of the match conditions listed in [Table 221 on page 1860](#).

Table 221: Match Conditions for the monitor traffic Command

Match Type	Condition	Description
Entity	host [<i>address</i> <i>hostname</i>]	Matches packets that contain the specified address or hostname. The protocol match conditions arp , ip , or rarp , or any of the directional match conditions can be prepended to the host match condition.
	net <i>address</i>	Matches packets with source or destination addresses containing the specified network address.
	net <i>address mask mask</i>	Matches packets containing the specified network address and subnet mask.
	port (<i>port-number</i> <i>port-name</i>)	Matches packets containing the specified source or destination TCP or UDP port number or port name. In place of the numeric port address, you can specify a text synonym, such as bgp (179), dhcp (67), or domain (53) (the port numbers are also listed).
Directional	dst	Matches packets going to the specified destination. This match condition can be prepended to any of the entity type match conditions.
	src	Matches packets from a specified source. This match condition can be prepended to any of the entity type match conditions.
	src and dst	Matches packets that contain the specified source and destination addresses. This match condition can be prepended to any of the entity type match conditions.
	src or dst	Matches packets containing either of the specified addresses. This match condition can be prepended to any of the entity type match conditions.
Packet Length	less <i>value</i>	Matches packets shorter than or equal to the specified value, in bytes.
	greater <i>value</i>	Matches packets longer than or equal to the specified value, in bytes.

Table 221: Match Conditions for the monitor traffic Command (continued)

Match Type	Condition	Description
Protocol	amt	Matches all AMT packets. Use the extensive level of output to decode the inner IGMP packets in addition to the AMT outer packet.
	arp	Matches all ARP packets.
	ether	Matches all Ethernet packets.
	ether (broadcast multicast)	Matches broadcast or multicast Ethernet frames. This match condition can be prepended with src and dst .
	ether protocol (address (arp ip rarp))	Matches packets with the specified Ethernet address or Ethernet packets of the specified protocol type. The ether protocol arguments arp , ip , and rarp are also independent match conditions, so they must be preceded by a backslash (\) when used in the ether protocol match condition.
	icmp	Matches all ICMP packets.
	ip	Matches all IP packets.
	ip (broadcast multicast)	Matches broadcast or multicast IP packets.
	ip protocol (address (icmp igmp tcp udp))	Matches packets with the specified address or protocol type. The ip protocol arguments icmp , tcp , and udp are also independent match conditions, so they must be preceded by a backslash (\) when used in the ip protocol match condition.
	isis	Matches all IS-IS routing messages.
	proto ip-protocol-number	Matches packets whose headers contain the specified IP protocol number.
	rarp	Matches all RARP packets.
	tcp	Matches all TCP datagrams.
	udp	Matches all UDP datagrams.

To combine expressions, use the logical operators listed in [Table 222 on page 1862](#).

Table 222: Logical Operators for the monitor traffic Command

Logical Operator (Highest to Lowest Precedence)	Description
!	Logical NOT. If the first condition does not match, the next condition is evaluated.
&&	Logical AND. If the first condition matches, the next condition is evaluated. If the first condition does not match, the next condition is skipped.
	Logical OR. If the first condition matches, the next condition is skipped. If the first condition does not match, the next condition is evaluated.
()	Group operators to override default precedence order. Parentheses are special characters, each of which must be preceded by a backslash (\).

You can use relational operators to compare arithmetic expressions composed of integer constants, binary operators, a length operator, and special packet data accessors. The arithmetic expression matching condition uses the following syntax:

```
monitor traffic matching "ether[0] & 1 != 0"arithmetic_expression relational_operator arithmetic_expression
```

The packet data accessor uses the following syntax:

```
protocol [byte-offset <size>]
```

The optional *size* field represents the number of bytes examined in the packet header. The available values are 1, 2, or 4 bytes. The following sample command captures all multicast traffic:

```
user@host> monitor traffic matching "ether[0] & 1 != 0"
```

To specify match conditions that have a numeric value, use the arithmetic and relational operators listed in [Table 223 on page 1863](#).



NOTE: Because the Packet Forwarding Engine removes Layer 2 header information before sending packets to the Routing Engine:

- The `monitor traffic` command cannot apply match conditions to inbound traffic.
- The `monitor traffic interface` command also cannot apply match conditions for Layer 3 and Layer 4 packet data, resulting in the match pipe option (`| match`) for this command for Layer 3 and Layer 4 packets not working either. Therefore, ensure that you specify match conditions as described in this command summary. For more information about match conditions, see [Table 221 on page 1860](#).
- The 802.1Q VLAN tag information included in the Layer 2 header is removed from all inbound traffic packets. Because the `monitor traffic interface ae[x]` command for aggregated Ethernet interfaces (such as `ae0`) only shows inbound traffic data, the command does not show VLAN tag information in the output.

Table 223: Arithmetic and Relational Operators for the `monitor traffic` Command

Arithmetic or Relational Operator	Description
Arithmetic Operator	
+	Addition operator.
-	Subtraction operator.
/	Division operator.
&	Bitwise AND.
*	Bitwise exclusive OR.
	Bitwise inclusive OR.
Relational Operator (Highest to Lowest Precedence)	
<=	If the first expression is less than or equal to the second, the packet matches.
>=	If the first expression is greater than or equal to the second, the packet matches.
<	If the first expression is less than the second, the packet matches.
>	If the first expression is greater than the second, the packet matches.
=	If the compared expressions are equal, the packet matches.

Table 223: Arithmetic and Relational Operators for the monitor traffic Command (continued)

Arithmetic or Relational Operator	Description
!=	If the compared expressions are unequal, the packet matches.

Required Privilege Level trace
maintenance

List of Sample Output [monitor traffic count on page 1864](#)
[monitor traffic detail count on page 1864](#)
[monitor traffic extensive \(Absolute Sequence\) on page 1865](#)
[monitor traffic extensive \(Relative Sequence\) on page 1865](#)
[monitor traffic extensive count on page 1865](#)
[monitor traffic interface on page 1866](#)
[monitor traffic matching on page 1866](#)
[monitor traffic \(TX Matrix Plus Router\) on page 1866](#)
[monitor traffic \(QFX3500 Switch\) on page 1867](#)
[monitor traffic matching icmp on page 1868](#)
[monitor traffic matching IP protocol number on page 1868](#)
[monitor traffic matching arp on page 1869](#)
[monitor traffic matching port on page 1869](#)

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

monitor traffic count

```
user@host> monitor traffic count 2
listening on fxp0
04:35:49.814125 In my-server.home.net.1295 > my-server.work.net.telnet: . ack
4122529478 win 16798 (DF)
04:35:49.814185
Out my-server.work.net.telnet > my-server.home.net.1295: P
1:38(37) ack 0 win 17680 (DF) [tos 0x10]
```

monitor traffic detail count

```
user@host> monitor traffic detail count 2
listening on fxp0
04:38:16.265864 In my-server.home.net.1295 > my-server.work.net.telnet: . ack
4122529971 win 17678 (DF) (ttl 121, id 6812)
04:38:16.265926
Out my-server.work.net.telnet.telnet > my-server.home.net.1295: P 1:38(37) ack 0
win 17680 (DF) [tos 0x10] (ttl 6)
```

monitor traffic extensive (Absolute Sequence)

```

user@host> monitor traffic extensive no-domain-names no-resolve no-timestamp count 20
matching "tcp" absolute-sequence

listening on fxp0
In 203.0.113.193.179 > 192.168.4.227.1024: . 4042780859:4042780859(0)
ack 1845421797 win 16384 <nop,nop,timestamp 4935628 965951> [tos 0xc0] (ttl )
In 203.0.113.193.179 > 192.168.4.227.1024: P 4042780859:4042780912(53)
ack 1845421797 win 16384
<nop,nop,timestamp 4935628 965951>:
BGP [|BGP UPDAT)
In 192.168.4.227.1024 > 203.0.113.193.179:
P 1845421797:1845421852(55) ack 4042780912 win 16384 <nop,nop,timestamp 965951
4935628>: BGP [|BGP UPDAT)
...

```

monitor traffic extensive (Relative Sequence)

```

user@host> monitor traffic extensive no-domain-names no-resolve no-timestamp count 20
matching "tcp"

listening on fxp0
In 172.24.248.221.1680 > 192.168.4.210.23: . 396159737:396159737(0)
ack 1664980689 win 17574 (DF) (ttl 121, id 50003)
Out 192.168.4.210.23 > 172.24.248.221.1680: P 1:40(39)
ack 0 win 17680 (DF) [tos 0x10] (ttl 64, id 5394)
In 203.0.113.193.179 > 192.168.4.227.1024: P 4042775817:4042775874(57)
ack 1845416593 win 16384 <nop,nop,timestamp 4935379 965690>: BGP [|BGP UPDAT)
...

```

monitor traffic extensive count

```

user@host> monitor traffic extensive count 5 no-domain-names no-resolve

listening on fxp013:18:17.406933
In 192.168.4.206.2723610880 > 172.17.28.8.2049:
40 null (ttl 64, id 38367)13:18:17.407577
In 172.17.28.8.2049 > 192.168.4.206.2723610880:
reply ok 28 null (ttl 61, id 35495)13:18:17.541140
In 0:e0:1e:42:9c:e0 0:e0:1e:42:9c:e0 9000 60:
0000 0100 0000 0000
0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 0000 0000
0000 0000 000013:18:17.591513
In 172.24.248.156.4139 > 192.168.4.210.23:
3556964918:3556964918(0)
ack 295526518 win 17601 (DF)
(ttl 121, id 14)13:18:17.591568
Out 192.168.4.210.23 >
172.24.248.156.4139: P 1:40(39)
ack 0 win 17680 (DF) [tos 0x10]
(ttl 64, id 52376)

```

monitor traffic interface

```
user@host> monitor traffic interface fxp0

listening on fxp0.0
18:17:28.800650 In server.home.net.723 > host1-0.lab.home.net.log
18:17:28.800733 Out host2-0.lab.home.net.login > server.home.net.7
18:17:28.817813 In host30.lab.home.net.syslog > host40.home0
18:17:28.817846 In host30.lab.home.net.syslog > host40.home0
...
```

monitor traffic matching

```
user@host> monitor traffic matching "net 192.168.1.0/24"

verbose output suppressed, use <detail> or <extensive> for full protocol decode
Address resolution is ON. Use <no-resolve> to avoid any reverse lookup delay.
Address resolution timeout is 4s.
Listening on fxp0, capture size 96 bytes

Reverse lookup for 192.168.1.255 failed (check DNS reachability).
Other reverse lookup failures will not be reported.
Use no-resolve to avoid reverse lookups on IP addresses.

21:55:54.003511 In IP truncated-ip - 18 bytes missing!
192.168.1.17.netbios-ns > 192.168.1.255.netbios-ns: UDP, length 50
21:55:54.003585 Out IP truncated-ip - 18 bytes missing!
192.168.1.17.netbios-ns > 192.168.1.255.netbios-ns: UDP, length 50
21:55:54.003864 In arp who-has 192.168.1.17 tell 192.168.1.9
...
```

monitor traffic (TX Matrix Plus Router)

```
user@host> monitor traffic

verbose output suppressed, use <detail> or <extensive> for full protocol decode
Address resolution is ON. Use <no-resolve> to avoid any reverse lookup delay.
Address resolution timeout is 4s.
Listening on em0, capture size 96 bytes
04:11:59.862121 Out IP truncated-ip - 25 bytes missing!
summit-em0.example.net.syslog > sv-log-01.example.net.syslog:
SYSLOG kernel.info, length: 57
04:11:59.862303
Out IP truncated-ip - 25 bytes missing!
summit-em0.example.net.syslog >
sv-log-02.example.net.syslog: SYSLOG kernel.info, length: 57
04:11:59.923948
In IP aj-em0.example.net.65235 >
summit-em0.example.net.telnet: .
ack 1087492766 win 33304 <nop,nop,timestamp 42366734 993490>
04:11:59.923983 Out IP truncated-ip - 232 bytes missing!
summit-em0.example.net.telnet > aj-em0.example.net.65235: P 1:241(240) ack 0 win
33304
<nop,nop,timestamp 993590 42366734>
04:12:00.022900
In IP aj-em0.example.net.65235 >
summit-em0.example.net.telnet: . ack 241 win 33304 <nop,nop,timestamp 42366834
993590>
04:12:00.141204
In IP truncated-ip - 40 bytes missing!
```



```

ipg-lnx-shell1.example.net.46182 > summit-em0.example.net.telnet: P
2950530356:2950530404(48) ack 485494987 win 63712
<nop,nop,timestamp 1308555294 987086>
04:12:00.141345
Out IP summit-em0.example.net.telnet >
ipg-lnx-shell1.example.net.46182: P 1:6(5)
ack 48 win 33304
<nop,nop,timestamp 993809 1308555294>
04:12:00.141572
In IP ipg-lnx-shell1.example.net.46182 >
summit-em0.example.net.telnet: .
ack 6 win 63712
<nop,nop,timestamp 1308555294 993809>
04:12:00.141597
Out IP summit-em0.example.net.telnet >
ipg-lnx-shell1.example.net.46182: P 6:10(4) ack 48 win 33304
<nop,nop,timestamp 993810 1308555294>
04:12:00.141821
In IP ipg-lnx-shell1.example.net.46182 >
summit-em0.example.net.telnet: .
ack 10 win 63712 <nop,nop,timestamp 1308555294 993810>
04:12:00.141837 Out IP truncated-ip - 2 bytes missing!
summit-em0.example.net.telnet >
ipg-lnx-shell1.example.net.46182: P 10:20(10) ack 48 win 33304
<nop,nop,timestamp 993810 1308555294>
04:12:00.142072
In IP ipg-lnx-shell1.example.net.46182 >
summit-em0.example.net.telnet: . ack 20 win 63712
<nop,nop,timestamp 1308555294 993810>
04:12:00.142089 Out IP summit-em0.example.net.telnet >
ipg-lnx-shell1.example.net.46182: P 20:28(8) ack 48 win 33304 <nop,nop,timestamp
993810 1308555294>
04:12:00.142321
In IP ipg-lnx-shell1.example.net.46182 >
summit-em0.example.net.telnet: .
ack 28 win 63712 <nop,nop,timestamp 1308555294 993810>
04:12:00.142337
Out IP truncated-ip - 1 bytes missing!
summit-em0.example.net.telnet >
ipg-lnx-shell1.example.net.46182: P 28:37(9) ack 48 win 33304 <nop,nop,timestamp
993810 1308555294>
...

```

monitor traffic (QFX3500 Switch)

```

user@switch> monitor traffic

verbose output suppressed, use <detail> or <extensive> for full protocol decode
Address resolution is ON. Use <no-resolve> to avoid any reverse lookup delay.
Address resolution timeout is 4s.
Listening on me4, capture size 96 bytes
Reverse lookup for 172.22.16.246 failed (check DNS reachability).
Other reverse lookup failures will not be reported.
Use <no-resolve> to avoid reverse lookups on IP addresses.
16:35:32.240873 Out IP truncated-ip - 112 bytes missing! labqfx-me0.example.net.ssh
>
172.22.16.246.telefinder: P 4200727624:4200727756(132) ack 2889954831 win 65535
16:35:32.240900 Out IP truncated-ip - 176 bytes missing! labqfx-me0.example.net.ssh
>

```

```
172.22.16.246.telefinder: P 132:328(196) ack 1 win 65535
...
```

monitor traffic matching icmp

```
user@host> monitor traffic matching "icmp" no-resolve
verbose output suppressed, use <detail> or <extensive> for full protocol decode
Address resolution is OFF.
Listening on me0, capture size 96 bytes

09:23:17.728737 In IP 172.19.10.9 > 10.10.211.93: ICMP echo request, id 1, seq
322, length 40
09:23:17.728780 Out IP 10.10.211.93 > 172.19.10.9: ICMP echo reply, id 1, seq
322, length 40
09:23:18.735848 In IP 172.19.10.9 > 10.10.211.93: ICMP echo request, id 1, seq
323, length 40
09:23:18.735891 Out IP 10.10.211.93 > 172.19.10.9: ICMP echo reply, id 1, seq
323, length 40
09:23:19.749732 In IP 172.19.10.9 > 10.10.211.93: ICMP echo request, id 1, seq
324, length 40
09:23:19.749775 Out IP 10.10.211.93 > 172.19.10.9: ICMP echo reply, id 1, seq
324, length 40
09:23:20.749747 In IP 172.19.10.9 > 10.10.211.93: ICMP echo request, id 1, seq
325, length 40
09:23:20.749791 Out IP 10.10.211.93 > 172.19.10.9: ICMP echo reply, id 1, seq
325, length 40
...
```

monitor traffic matching IP protocol number

```
user@host> monitor traffic matching "proto 89" no-resolve
verbose output suppressed, use <detail> or <extensive> for full protocol decode
Address resolution is OFF.
Listening on me0, capture size 96 bytes

13:06:14.700311 In IP truncated-ip - 16 bytes missing! 10.94.211.254 > 224.0.0.
5: OSPFv2, Hello, length 56
13:06:16.067010 In IP truncated-ip - 20 bytes missing! 10.94.211.102 > 224.0.0.
5: OSPFv2, Hello, length 60
13:06:16.287566 In IP truncated-ip - 20 bytes missing! 10.94.211.142 > 224.0.0.
5: OSPFv2, Hello, length 60
13:06:20.758500 In IP truncated-ip - 16 bytes missing! 10.200.211.254 > 224.0.0.
5: OSPFv2, Hello, length 56
13:06:24.309882 In IP truncated-ip - 20 bytes missing! 10.94.211.102 > 224.0.0.
5: OSPFv2, Hello, length 60
13:06:24.396699 In IP truncated-ip - 16 bytes missing! 10.94.211.254 > 224.0.0.
5: OSPFv2, Hello, length 56
13:06:25.067386 In IP truncated-ip - 20 bytes missing! 10.94.211.142 > 224.0.0.
5: OSPFv2, Hello, length 60
13:06:29.499988 In IP truncated-ip - 16 bytes missing! 10.200.211.254 > 224.0.0.
5: OSPFv2, Hello, length 56
13:06:32.858753 In IP truncated-ip - 20 bytes missing! 10.94.211.102 > 224.0.0.
5: OSPFv2, Hello, length 60
...
```

monitor traffic matching arp

```

user@host> monitor traffic matching "arp" no-resolve

verbose output suppressed, use <detail> or <extensive> for full protocol decode
Address resolution is OFF.
Listening on me0, capture size 96 bytes

11:57:54.664501 In arp who-has 10.10.213.109 (00:1f:d5:f3:28:30) tell 10.10.213.31
11:57:56.828387 In arp who-has 10.10.213.233 (00:24:9d:06:77:4f) tell 10.10.213.31
11:58:01.735803 In arp who-has 10.10.213.251 (88:e0:f4:1d:41:40) tell 10.10.213.31
11:58:04.663241 In arp who-has 10.10.213.254 tell 10.94.211.170
11:58:28.488191 In arp who-has 10.10.213.149 (00:e0:91:c2:ff:8d) tell 10.10.213.31
11:58:41.858612 In arp who-has 10.10.213.148 tell 10.94.211.254
11:58:42.621533 In arp who-has 10.10.213.254 (5f:5e:ac:79:49:81) tell 10.10.213.31
11:58:44.533391 In arp who-has 10.10.213.186 tell 10.94.211.254
11:58:45.170405 In arp who-has 10.10.213.186 tell 10.94.211.254
11:58:45.770512 In arp who-has 10.10.213.186 tell 10.94.211.254

```

monitor traffic matching port

```

user@host> monitor traffic matching "port 22" no-resolve

verbose output suppressed, use <detail> or <extensive> for full protocol decode
Address resolution is OFF.
Listening on me0, capture size 96 bytes

13:14:19.108089 In IP 192.0.2.22.56714 > 10.19.300.05.22: S
2210742342:2210742342(0) win 65535 <mss 1360,nop,wscale 7,nop,nop,sackOK>
13:14:19.108165 Out IP 10.19.300.05.22 > 192.0.2.22.56714: S 23075150:23075150(0)
ack 2210742343 win 65535 <mss 1460,nop,wscale 1,sackOK,eol>
13:14:19.136883 In IP 192.0.2.22.56714 > 10.19.300.05.22: . ack 1 win 32768
13:14:19.231364 Out IP truncated-ip - 1 bytes missing! 10.19.300.05.22 >
172.29.102.9.56714: P 1:22(21) ack 1 win 33320
13:14:19.260174 In IP truncated-ip - 10 bytes missing! 192.0.2.22.56714 >
10.94.211.93.22: P 1:31(30) ack 22 win 32767
13:14:19.284865 Out IP truncated-ip - 964 bytes missing! 10.19.300.05.22 >
172.29.102.9.56714: P 22:1006(984) ack 31 win 33320
13:14:19.314549 In IP truncated-ip - 652 bytes missing! 192.0.2.22.56714 >
10.94.211.93.22: P 31:703(672) ack 1006 win 32760
13:14:19.414135 Out IP 10.19.300.05.22 > 192.0.2.22.56714: . ack 703 win 33320
13:14:19.443858 In IP 192.0.2.22.56714 > 10.19.300.05.22: P 703:719(16) ack 1006
win 32760
13:14:19.467379 Out IP truncated-ip - 516 bytes missing! 10.19.300.05.22 >
172.29.102.9.56714: P 1006:1542(536) ack 719 win 33320
13:14:19.734097 In IP 192.0.2.22.56714 > 10.19.300.05.22: . ack 1542 win 32768
13:14:19.843574 In IP truncated-ip - 508 bytes missing! 192.0.2.22.56714 >
10.94.211.93.22: P 719:1247(528) ack 1542 win 32768
...

```

ping

List of Syntax [Syntax on page 1870](#)
[Syntax \(QFX Series\) on page 1870](#)

Syntax

```
ping host
<bypass-routing>
<ce-ip destination-ip-address instance routing-instance-name source-ip source-ip-address>
<count requests>
<detail>
<do-not-fragment>
<inet | inet6>
<interface source-interface>
<interval seconds>
<logical-system logical-system-name>
<loose-source value>
<mac-address mac-address>
<no-resolve>
<pattern string>
<rapid>
<record-route>
<routing-instance routing-instance-name>
<size bytes>
<source source-address>
<strict >
<strict-source value.>
<tos type-of-service>
<ttl value>
<verbose>
<vpls instance-name>
<wait seconds>
```

Syntax (QFX Series)

```
ping host
<bypass-routing>
<count requests>
<detail>
<do-not-fragment>
<inet>
<interface source-interface>
<interval seconds>
<logical-system logical-system-name>
<loose-source value>
<mac-address mac-address>
<no-resolve>
<pattern string>
<rapid>
<record-route>
<routing-instance routing-instance-name>
<size bytes>
<source source-address>
<strict>
< strict-source value>
```

```
<tos type-of-service>
<ttl value>
<verbose>
<wait seconds>
```

- Release Information** Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 for EX Series switches.
 Command introduced in Junos OS Release 11.1 for the QFX Series.
 Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
ce-ip option introduced in Junos OS Release 17.3 for MX Series routers with MPC and MIC interfaces.
- Description** Check host reachability and network connectivity. The **ping** command sends Internet Control Message Protocol (ICMP) ECHO_REQUEST messages to elicit ICMP ECHO_RESPONSE messages from the specified host. Press Ctrl+c to interrupt a ping command.
- Options** **host**—IP address or hostname of the remote system to ping.
- bypass-routing**—(Optional) Bypass the normal routing tables and send ping requests directly to a system on an attached network. If the system is not on a directly attached network, an error is returned. Use this option to ping a local system through an interface that has no route through it.
- ce-ip destination-ip-address instance routing-instance-name source-ip source-ip-address**—(MX Series routers with MPC and MIC interfaces only) (Optional) Check the connectivity information of customer edge (CE) devices, such as reachability, attachment points, and MAC addresses, from a provider edge (PE) device in a virtual private LAN service (VPLS), hierarchical VPLS (H-VPLS), and Ethernet VPN (EVPN) network. The **ce-ip** option is based on the LSP ping infrastructure, where the **ping** utility is extended to use the CE device IP address as the target host and the PE device loopback address as the source for a specific VPLS or EVPN routing instance.
- destination-ip-address**—IPv4 address of the CE device to ping.
- instance routing-instance-name**—Name of the VPLS or EVPN routing instance. The command output displays the connectivity information of the CE device based on the configured routing instance type.
- source-ip source-ip-address**—Loopback address of the PE device.
- count requests**—(Optional) Number of ping requests to send. The range of values is 1 through 2,000,000,000. The default value is an unlimited number of requests.
- detail**—(Optional) Include in the output the interface on which the ping reply was received.
- do-not-fragment**—(Optional) Set the do-not-fragment (DF) flag in the IP header of the ping packets. For IPv6 packets, this option disables fragmentation.



NOTE: In Junos OS Release 11.1 and later, when issuing the `ping` command for an IPv6 route with the `do-not-fragment` option, the maximum ping packet size is calculated by subtracting 48 bytes (40 bytes for the IPv6 header and 8 bytes for the ICMP header) from the MTU. Therefore, if the ping packet size (including the 48-byte header) is greater than the MTU, the ping operation might fail.

inet—(Optional) Ping Packet Forwarding Engine IPv4 routes.

inet6—(Optional) Ping Packet Forwarding Engine IPv6 routes.

interface *source-interface*—(Optional) Interface to use to send the ping requests.

interval *seconds*—(Optional) How often to send ping requests. The range of values, in seconds, is 1 through infinity. The default value is 1.

logical-system *logical-system-name*—(Optional) Name of logical system from which to send the ping requests.

Alternatively, enter the `set cli logical-system logical-system-name` command and then run the `ping` command. To return to the main router or switch, enter the `clear cli logical-system` command.

loose-source *value*—(Optional) Intermediate loose source route entry (IPv4). Open a set of values.

mac-address *mac-address*—(Optional) Ping the physical or hardware address of the remote system you are trying to reach.

no-resolve—(Optional) Do not attempt to determine the hostname that corresponds to the IP address.

pattern *string*—(Optional) Specify a hexadecimal fill pattern to include in the ping packet.

rapid—(Optional) Send ping requests rapidly. The results are reported in a single message, not in individual messages for each ping request. By default, five ping requests are sent before the results are reported. To change the number of requests, include the `count` option.

record-route—(Optional) Record and report the packet's path (IPv4).

routing-instance *routing-instance-name*—(Optional) Name of the routing instance for the ping attempt.

size *bytes*—(Optional) Size of ping request packets. The range of values, in bytes, is 0 through 65,468. The default value is 56, which is effectively 64 bytes because 8 bytes of ICMP header data are added to the packet.

source *source-address*—(Optional) IP address of the outgoing interface. This address is sent in the IP source address field of the ping request. If this option is not specified, the default address is usually the loopback interface (**lo.0**).

strict—(Optional) Use the strict source route option (IPv4).

strict-source *value*—(Optional) Intermediate strict source route entry (IPv4). Open a set of values.

tos *type-of-service*—(Optional) Set the type-of-service (ToS) field in the IP header of the ping packets. The range of values is **0** through **255**.

If the device configuration includes the **dscp-code-point *value*** statement at the **[edit class-of-service host-outbound-traffic]** hierarchy level, the configured DSCP value overrides the value specified in this command option. In this case, the ToS field of ICMP echo request packets sent on behalf of this command carries the DSCP value specified in the **dscp-code-point** configuration statement instead of the value you specify in this command option.

ttl *value*—(Optional) Time-to-live (TTL) value to include in the ping request (IPv6). The range of values is **0** through **255**.

verbose—(Optional) Display detailed output.

vpls *instance-name*—(Optional) Ping the instance to which this VPLS belongs.

wait *seconds*—(Optional) Maximum wait time, in seconds, after the final packet is sent. If this option is not specified, the default delay is **10** seconds. If this option is used without the count option, a default count of **5** packets is used.

Required Privilege Level

network

Related Documentation

- *Configuring Junos OS ICMPv4 Rate Limit for ICMPv4 Routing Engine Messages*
- *Pinging Customer Edge Device IP Address*

List of Sample Output

[ping ce-ip <destination-ip-address> instance <routing-instance-name> source-ip <source-ip-address> \(EVPN\) on page 1874](#)
[ping ce-ip <destination-ip-address> instance <routing-instance-name> source-ip <source-ip-address> \(VPLS\) on page 1874](#)
[ping hostname on page 1874](#)
[ping hostname rapid on page 1874](#)
[ping hostname size count on page 1874](#)

Output Fields

When you enter this command, you are provided feedback on the status of your request. An exclamation point (!) indicates that an echo reply was received. A period (.) indicates that an echo reply was not received within the timeout period. An x indicates that an echo reply was received with an error code. These packets are not counted in the received packets count. They are accounted for separately.

Sample Output

ping ce-ip <destination-ip-address> instance <routing-instance-name> source-ip <source-ip-address> (EVPN)

```
user@host> ping ce-ip 10.0.0.4 instance foo source-ip 127.0.0.1
! -> PE5|foo|evpn|ge-0/0/2.100, 00:11:22:33:44:55:66:77:88:99|12:23:ab:98:34:05
! -> PE5|foo|evpn|ge-0/0/2.100, 00:11:22:33:44:55:66:77:88:99|12:23:ab:98:34:05
! -> PE5|foo|evpn|ge-0/0/2.100, 00:11:22:33:44:55:66:77:88:99|12:23:ab:98:34:05
! -> PE5|foo|evpn|ge-0/0/2.100, 00:11:22:33:44:55:66:77:88:99|12:23:ab:98:34:05
! -> PE5|foo|evpn|ge-0/0/2.100, 00:11:22:33:44:55:66:77:88:99|12:23:ab:98:34:05
--- ce-ip ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
```

ping ce-ip <destination-ip-address> instance <routing-instance-name> source-ip <source-ip-address> (VPLS)

```
user@host> ping ce-ip 10.0.0.4 instance foo source-ip 127.0.0.1
! -> PE2|foo|vpls|ge-0/0/2.100|12:23:ab:98:34:02
! -> PE2|foo|vpls|ge-0/0/2.100|12:23:ab:98:34:02
! -> PE2|foo|vpls|ge-0/0/2.100|12:23:ab:98:34:02
! -> PE2|foo|vpls|ge-0/0/2.100|12:23:ab:98:34:02
! -> PE2|foo|vpls|ge-0/0/2.100|12:23:ab:98:34:02
--- ce-ip ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
```

ping hostname

```
user@host> ping device1.example.com
PING device1.example.com (192.0.2.0): 56 data bytes
64 bytes from 192.0.2.0: icmp_seq=0 ttl=253 time=1.028 ms
64 bytes from 192.0.2.0: icmp_seq=1 ttl=253 time=1.053 ms
64 bytes from 192.0.2.0: icmp_seq=2 ttl=253 time=1.025 ms
64 bytes from 192.0.2.0: icmp_seq=3 ttl=253 time=1.098 ms
64 bytes from 192.0.2.0: icmp_seq=4 ttl=253 time=1.032 ms
64 bytes from 192.0.2.0: icmp_seq=5 ttl=253 time=1.044 ms
^C [abort]
```

ping hostname rapid

```
user@host> ping device1.example.com rapid
PING device1.example.com (192.0.2.0): 56 data bytes
!!!!
--- device1.example.com ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max/stddev = 0.956/0.974/1.025/0.026 ms
```

ping hostname size count

```
user@host> ping device1.example.com size 200 count 5
PING device1.example.com (192.0.2.0): 200 data bytes
208 bytes from 192.0.2.0: icmp_seq=0 ttl=253 time=1.759 ms
208 bytes from 192.0.2.0: icmp_seq=1 ttl=253 time=2.075 ms
208 bytes from 192.0.2.0: icmp_seq=2 ttl=253 time=1.843 ms
208 bytes from 192.0.2.0: icmp_seq=3 ttl=253 time=1.803 ms
208 bytes from 192.0.2.0: icmp_seq=4 ttl=253 time=17.898 ms
```



```
--- device1.example.com ping statistics ---  
5 packets transmitted, 5 packets received, 0% packet loss  
round-trip min/avg/max = 1.759/5.075/17.898 ms
```

show pfe statistics bridge

Syntax	show pfe statistics bridge <fpc slot>
Release Information	Command introduced in Junos OS Release 12.1 for EX Series switches.
Description	Display information about the number of packets discarded in the ingress pipeline of the Packet Forwarding Engine, packets discarded because of egress filtering or congestion filtering, number of control packets, and general counters for dropped packets. You can use this information to inform troubleshooting investigations.
Options	none —Display bridge counter statistics for all Flexible PIC Concentrator (FPC) slots. fpc slot —(Optional) Display bridge counter statistics for a specific FPC slot.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • <i>Monitoring Switch Control Traffic</i>
List of Sample Output	show pfe statistics bridge (EX3200 and EX4200 Switches) on page 1877 show pfe statistics bridge (EX8200 Switches and EX8200 Virtual Chassis) on page 1878 show pfe statistics bridge fpc (EX8200 Switches and EX8200 Virtual Chassis) on page 1879 show pfe statistics bridge fpc (EX8200-40XS (40-port SFP+) Line Card) on page 1879
Output Fields	Table 224 on page 1876 lists the output fields for the show pfe statistics bridge command. Output fields are listed in the approximate order in which they appear.

Table 224: show pfe statistics bridge Output Fields

Field Name	Field Description
Ingress Counters	<p>Information about ingress counters:</p> <ul style="list-style-type: none"> • Received—Number of packets received by the bridge. • VLAN Filtered—Number of packets discarded because of VLAN filtering. • Security Filtered—Number of packets discarded because of security filtering. • Other Discards—Number of packets dropped by the bridge for reasons other than VLAN or security filtering.

Table 224: show pfe statistics bridge Output Fields (continued)

Field Name	Field Description
Egress Counters	Information about egress counters: <ul style="list-style-type: none"> • Unicast—Number of unicast packets transmitted. • Multicast—Number of multicast packets transmitted. • Broadcast—Number of broadcast packets transmitted. • Egress Filtered—Number of egress-filtered packets (regardless of port, priority, or mode). • TailDrop—Number of packets filtered because of egress queue congestion. • Forward Restrict—Number of packets filtered because of egress forward restrictions. • Congestion Filtered—Number of packets filtered because of transmit queue (TxQ) congestion. • Control Packets—Number of control packets (sent to CPU, received from CPU, and sent to analyzer).
Drop Counters	Information about drop counters: <ul style="list-style-type: none"> • Drop Mode—Count mode of the counter. • Drop Counter—Counter value.
General Counters	Information about general counters: <ul style="list-style-type: none"> • Drop Mode—Count mode of the counter. • Drop Counter—Counter value. • Source Not Learnt—Number of source addresses that were not learnt because of internal congestion.
MUX PFE	Information about multiplexer PFE for oversubscribed cards: <ul style="list-style-type: none"> • Drop Mode—Count mode of the counter. • Drop Count—Counter value.

Sample Output

show pfe statistics bridge (EX3200 and EX4200 Switches)

```
user@switch> show pfe statistics bridge
```

```
Slot 0
```

```

PFE:                0          1          2
-----
---- Ingress Counters ----
Received:            0          52          0
VLAN Filtered:       0           0          0
Security Filtered:   0           0          0
Other Discards:      0           0          0
---- Egress Counters ----
Unicast:             0         104         52
Multicast:           0           0          0
Broadcast:           0           0          0
Egress Filtered:     0           0          0
Congestion Filtered: 0           0          0
Control Packets:     5           0          0

```

```

---- General Counters ----
Drop Mode:                0          0          0
Drop Counter:             34217      36080      6367
Source Not Learnt:        0          0          0

```

show pfe statistics bridge (EX8200 Switches and EX8200 Virtual Chassis)

```
user@switch> show pfe statistics bridge
```

```

Slot 0
PFE:                0          1
-----
---- Ingress Counters ----
Received:           946          48
VLAN Filtered:      0           0
Security Filtered:  0           0
Other Discards:     0           0
---- Egress Counters ----
Unicast:            0           0
Multicast:          0           0
Broadcast:          0           0
Egress Filtered:    0           0
TailDrop:           0           0
Forward Restrict:   0           0
Congestion Filtered: 0           0
Control Packets:    4103        896
---- Drop Counters ----
Drop Mode:          0           0
Drop Counter:       12528        2

Slot 1
PFE:                0          1
-----
---- Ingress Counters ----
Received:           0           0
VLAN Filtered:      0           0
Security Filtered:  0           0
Other Discards:     0           0
---- Egress Counters ----
Unicast:            0           0
Multicast:          0           0
Broadcast:          0           0
Egress Filtered:    0           0
TailDrop:           0           0
Forward Restrict:   0           0
Congestion Filtered: 0           0
Control Packets:    0           0
---- Drop Counters ----
Drop Mode:          0           0
Drop Counter:       0           0

Slot 2
PFE:                0          1
-----
---- Ingress Counters ----
Received:           0           0
VLAN Filtered:      0           0
Security Filtered:  0           0

```

```

Other Filtered:          0          0
---- Egress Counters ----
Unicast:                 0          0
Multicast:               0          0
Broadcast:               0          0
Egress Filtered:        0          0
TailDrop:                0          0
Forward Restrict:        0          0
Congestion Filtered:    0          0
Control Packets:         0          0
---- Drop Counters ----
Drop Mode:               0          0
Drop Counter:            0          0

```

show pfe statistics bridge fpc (EX8200 Switches and EX8200 Virtual Chassis)

```
user@switch> show pfe statistics bridge fpc 2
```

Slot 2

```

PFE:                    0          1
-----
---- Ingress Counters ----
Received:                0          0
VLAN Filtered:           0          0
Security Filtered:       0          0
Other Discards:          0          0
---- Egress Counters ----
Unicast:                 0          0
Multicast:               0          0
Broadcast:               0          0
Egress Filtered:         0          0
TailDrop:                0          0
Forward Restrict:        0          0
Congestion Filtered:     0          0
Control Packets:         0          0
---- Drop Counters ----
Drop Mode:               0          0
Drop Counter:            0          0

```

show pfe statistics bridge fpc (EX8200-40XS (40-port SFP+) Line Card)

```
user@switch> show pfe statistics bridge fpc 8
```

Slot 8

```

PFE:                    0          1          2          3
-----
---- Ingress Counters ----
Received:                0          3          0          0
VLAN Filtered:           0          0          0          0
Security Filtered:       0          0          0          0
Other Discards:          0          1          0          0
---- Egress Counters ----
Unicast:                 0          0          0          0
Multicast:               0          0          0          0
Broadcast:               0          0          0          0
Egress Filtered:         0          0          0          0
TailDrop:                0          0          0          0

```

Forward Restrict:	0	0	0	0
Congestion Filtered:	0	2	0	0
Control Packets:	4	0	0	0
---- Drop Counters ----				
Drop Mode:	0	0	0	0
Drop Counter:	0	1	0	0
MUX PFE:	4	5		

Drop Mode:	0	0		
Drop Count:	0	0		

traceroute

List of Syntax [Syntax on page 1881](#)
 [Syntax \(QFX Series and OCX Series\) on page 1881](#)

Syntax `traceroute host`
 `<as-number-lookup>`
 `<bypass-routing>`
 `<clns>`
 `<gateway address>`
 `<inet | inet6>`
 `<interface interface-name>`
 `<logical system logical-system-name>`
 `<monitor host>`
 `<mpls (ldp FEC address | rsvp label-switched-path-name)>`
 `<no-resolve>`
 `<propagate-ttl>`
 `<routing-instance routing-instance-name>`
 `<source source-address>`
 `<tos value>`
 `<ttl value>`
 `<wait seconds>`

Syntax (QFX Series and OCX Series) `traceroute host`
 `<as-number-lookup>`
 `<bypass-routing>`
 `<gateway address>`
 `<inet>`
 `<inet6>`
 `<interface interface-name>`
 `<monitor host>`
 `<no-resolve>`
 `<routing-instance routing-instance-name>`
 `<source source-address>`
 `<tos value>`
 `<ttl value>`
 `<wait seconds>`

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 for EX Series switches.
 mpls option introduced in Junos OS Release 9.2.
 propagate-ttl option introduced in Junos OS Release 12.1.
 Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
 Support for IPv6 traceroute with **as-number-lookup** introduced with Junos OS Release 16.1.
 Support for traceroute **next-hop** introduced in Junos OS Release 17.4R1.

Description Display the route that packets take to a specified network host. Use **traceroute** as a debugging tool to locate points of failure in a network.

Options *host*—IP address or name of remote host.

as-number-lookup—(Optional) Display the autonomous system (AS) number of each intermediate hop on the path from the host to the destination.

bypass-routing—(Optional) Bypass the normal routing tables and send requests directly to a system on an attached network. If the system is not on a directly attached network, an error is returned. Use this option to display a route to a local system through an interface that has no route through it.

clns—(Optional) Trace the route belonging to Connectionless Network Service (CLNS).

gateway address—(Optional) Address of a router or switch through which the route transits.

inet | inet6—(Optional) Trace the route belonging to IPv4 or IPv6, respectively.

interface interface-name—(Optional) Name of the interface over which to send packets.

logical-system (all | logical-system-name)—(Optional) Perform this operation on all logical systems or on a particular logical system.

monitor host—(Optional) Display real-time monitoring information for the specified host.

monitor host—(Optional) Perform this operation to display real-time monitoring information.

monitor host—(Optional) Perform this operation to display real-time monitoring information.

monitor host—(Optional) Perform this operation to display real-time monitoring information.

mpls (ldp FEC address | rsvp label-switched-path name)—(Optional) See *traceroute mpls ldp* and *traceroute mpls rsvp*.

next-hop—The next-hop through which to send packets to a destination.

no-resolve—(Optional) Do not attempt to determine the hostname that corresponds to the IP address.

propagate-ttl—(Optional) On the PE routing device, use this option to view locally generated Routing Engine transit traffic. This is applicable for MPLS L3VPN traffic only.

Use for troubleshooting, when you want to view hop-by-hop information from the local provider router to the remote provider router, when TTL decrementing is disabled on the core network using the **no-propagate-ttl** configuration statement.



NOTE: Using **propagate-ttl** with **traceroute** on the CE router does not show hop-by-hop information.

routing-instance *routing-instance-name*—(Optional) Name of the routing instance for the traceroute attempt.

source *source-address*—(Optional) Source address of the outgoing traceroute packets.

tos *value*—(Optional) Value to include in the IP type-of-service (ToS) field. The range of values is **0** through **255**.

ttl *value*—(Optional) Maximum time-to-live value to include in the traceroute request. The range of values is **0** through **128**.

wait *seconds*—(Optional) Maximum time to wait for a response to the traceroute request.

Required Privilege Level network

Related Documentation

- *traceroute monitor*

List of Sample Output

[traceroute on page 1884](#)
[traceroute as-number-lookup host on page 1884](#)
[traceroute no-resolve on page 1884](#)
[traceroute propagate-ttl on page 1884](#)
[traceroute \(Between CE Routers, Layer 3 VPN\) on page 1885](#)
[traceroute \(Through an MPLS LSP\) on page 1885](#)

Output Fields [Table 225 on page 1883](#) describes the output fields for the **traceroute** command. Output fields are listed in the approximate order in which they appear.

Table 225: traceroute Output Fields

Field Name	Field Description
traceroute to	IP address of the receiver.
hops max	Maximum number of hops allowed.
byte packets	Size of packets being sent.
<i>number-of-hops</i>	Number of hops from the source to the named router or switch.
<i>router-name</i>	Name of the router or switch for this hop.
<i>address</i>	Address of the router or switch for this hop.
Round trip time	Average round-trip time, in milliseconds (ms).

Sample Output

traceroute

```
user@host> traceroute santacruz

traceroute to host1.example.com (10.156.169.254), 30 hops max, 40 byte packets
 1 blue23 (10.168.1.254) 2.370 ms 2.853 ms 0.367 ms
 2 red14 (10.168.255.250) 0.778 ms 2.937 ms 0.446 ms
 3 yellow (10.156.169.254) 7.737 ms 89.905 ms 0.834 ms
```

traceroute as-number-lookup host

```
user@host> traceroute as-number-lookup 10.100.1.1

traceroute to 10.100.1.1 (10.100.1.1), 30 hops max, 40 byte packets
 1 10.39.1.1 (10.39.1.1) 0.779 ms 0.728 ms 0.562 ms
 2 10.39.1.6 (10.39.1.6) [AS 32] 0.657 ms 0.611 ms 0.617 ms
 3 10.100.1.1 (10.100.1.1) [AS 10, 40, 50] 0.880 ms 0.808 ms 0.774 ms
```

```
user@host> traceroute as-number-lookup 1::1

traceroute6 to 1::1 (1::1) from 2001:b8::7, 64 hops max, 12 byte packets
```

```
user@host> traceroute 2001:b8::7 as-number-lookup

traceroute6 to 2001:b8::7 (2001:b8::7) from 2001:db8::9, 64 hops max, 12 byte packets
 1 2001:db8::10 (2001:db8::10) [AS 18] 0.657 ms 17.319 ms 0.504 ms
 2 2001:b8::7 (2001:b8::7) 0.949 ms 0.930 ms 0.739 ms
```

traceroute no-resolve

```
user@host> traceroute santacruz no-resolve

traceroute to host1.example.com (10.156.169.254), 30 hops max, 40 byte packets
 1 10.168.1.254 0.458 ms 0.370 ms 0.365 ms
 2 10.168.255.250 0.474 ms 0.450 ms 0.444 ms
 3 10.156.169.254 0.931 ms 0.876 ms 0.862 ms
```

traceroute propagate-ttl

```
user@host> traceroute propagate-ttl 100.200.2.2 routing-instance VPN-A

traceroute to 100.200.2.2 (100.200.2.2) from 1.1.0.2, 30 hops max, 40 byte packets

 1 1.2.0.2 (1.2.0.2) 2.456 ms 1.753 ms 1.672 ms
   MPLS Label=299776 CoS=0 TTL=1 S=0
   MPLS Label=299792 CoS=0 TTL=1 S=1
 2 1.3.0.2 (1.3.0.2) 1.213 ms 1.225 ms 1.166 ms
   MPLS Label=299792 CoS=0 TTL=1 S=1
 3 100.200.2.2 (100.200.2.2) 1.422 ms 1.521 ms 1.443 ms
```

traceroute (Between CE Routers, Layer 3 VPN)

```
user@host> traceroute vpn09
traceroute to host2.example.com (10.255.14.179), 30 hops max, 40
byte packets
 1  10.39.10.21 (10.39.10.21)  0.598 ms  0.500 ms  0.461 ms
 2  10.39.1.13 (10.39.1.13)  0.796 ms  0.775 ms  0.806 ms
    MPLS Label=100006 CoS=0 TTL=1 S=1
 3  host2.example.com (10.255.14.179)  0.783 ms  0.716 ms  0.686
```

traceroute (Through an MPLS LSP)

```
user@host> traceroute mpls1
traceroute to 10.168.1.224 (10.168.1.224), 30 hops max, 40 byte packets
 1  mpls1-sr0.company.net (10.168.200.101)  0.555 ms  0.393 ms  0.367 ms
    MPLS Label=1024 CoS=0 TTL=1
 2  mpls5-lo0.company.net (10.168.1.224)  0.420 ms  0.394 ms  0.401 ms
```


CHAPTER 76

Operational Commands: Realtime Performance Monitoring

- `show services rpm active-servers`
- `show services rpm history-results`
- `show services rpm probe-results`

show services rpm active-servers

Syntax `show services rpm active-servers`

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 for EX Series switches.
 Command introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers.
 Command introduced in Junos OS Release 18.1 for QFX Series switches.

Description Display the protocols and corresponding ports for which a router or switch is configured as a real-time performance monitoring (RPM) server.

Options This command has no options.

Required Privilege Level view

List of Sample Output [show services rpm active-servers on page 1888](#)

Output Fields [Table 226 on page 1888](#) lists the output fields for the **show services rpm active-servers** command. Output fields are listed in the approximate order in which they appear.

Table 226: show services rpm active-servers Output Fields

Field Name	Field Description
Protocol	Protocol configured on the receiving probe server. The protocol can be the User Datagram Protocol (UDP) or the Transmission Control Protocol (TCP).
Port	Port configured on the receiving probe server.
Destination interface name	Output interface name for the probes.

Sample Output

`show services rpm active-servers`

```
user@host> show services rpm active-servers
```

```
Protocol: TCP, Port: 50000, Destination interface name: lt-0/0/0.0
Protocol: UDP, Port: 50001, Destination interface name: lt-0/0/0.0
```

show services rpm history-results

Syntax show services rpm history-results
 <brief | detail>
 <dst-interface *interface-name*>
 <owner *owner*>
 <limit *number*>
 <since *time*>
 <source-address *address*>
 <target-address *address*>
 <test *name*>

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 on EX Series switches.
 Command introduced in Junos OS Release 13.2 on PTX Series Packet Transport routers.
dst-interface, **limit**, **source-address**, and **target-address** options introduced in Junos OS Release 18.1R1 on MX Series.
owner and **test** options became optional in Junos OS Release 18.1R1 on MX Series.
 Command introduced in Junos OS Release 18.1 on QFX Series switches.

Description Display the results stored for the specified real-time performance monitoring (RPM) probes.

Options **none**—(Optional) Display the results of the last 50 probes for all RPM instances.

brief | detail—(Optional) Display the specified level of output.

dst-interface *interface-name*—(Optional) Display information only for RPM probes that are generated on this MS-MPC or MS-MIC services interface. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface. You must also configure the **owner** option.

limit *number*—(Optional) Limit the number of results that are displayed. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface. You must also configure the **owner** option.

Range: 1 through 4,294,967,295

Default: 100

owner *owner*—(Optional) Display information only for probes with the specified probe owner. You must configure **owner** if you configure any of the following options: **dst-interface**, **limit**, **source-address**, or **target-address**.

since *time*—(Optional) Display information from the specified time. Specify time as *yyyy-mm-dd.hh:mm:ss*.

source-address *address*—(Optional) Display information only for probes with the specified source address. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface. You must also configure the **owner** option.

target-address address—(Optional) Display information only for probes with the specified target address. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface. You must also configure the **owner** option.

test name—(Optional starting in Junos OS Release 18.1R1) Display information only for the specified test.

Do not configure **test** if you configure any of the following options: **dst-interface**, **limit**, **source-address**, or **target-address**. These options do not work when you configure **test**.

Required Privilege Level view

List of Sample Output [show services rpm history-results owner test on page 1891](#)
[show services rpm history-results owner test detail on page 1891](#)

Output Fields [Table 227 on page 1890](#) lists the output fields for the **show services rpm history-results** command. Output fields are listed in the approximate order in which they appear.

Table 227: show services rpm history-results Output Fields

Field Name	Field Description	Level of Output
Owner	Probe owner.	All levels
Test	Name of a test for a probe instance.	All levels
Probe received	Timestamp when the probe result was determined.	All levels
Round trip time	Average ping round-trip time (RTT), in microseconds.	All levels
Probe results	Result of a particular probe performed by a remote host. The following information is contained in the results: <ul style="list-style-type: none"> Response received—Timestamp when the probe result was determined. Rtt—Average ping round-trip time (RTT), in microseconds. 	detail
Results over current test	Displays the results for the current test by probe at the time each probe was completed, as well as the status of the current test at the time the probe was completed.	detail
Probes sent	Number of probes sent with the current test.	detail
Probes received	Number of probe responses received within the current test.	detail
Loss percentage	Percentage of lost probes for the current test.	detail

Table 227: show services rpm history-results Output Fields (continued)

Field Name	Field Description	Level of Output
Measurement	<p>Increment of measurement. Possible values are round-trip time delay and, for the probe type icmp-pin-timestamp, the egress and ingress delay:</p> <ul style="list-style-type: none"> Minimum—Minimum RTT, ingress delay, or egress delay measured over the course of the current test. Maximum—Maximum RTT, ingress delay, or egress delay measured over the course of the current test. Average—Average RTT, ingress delay, or egress delay measured over the course of the current test. Jitter—Difference, in microseconds, between the maximum and minimum RTT measured over the course of the current test. Stddev—Standard deviation of the round-trip time, in microseconds, measured over the course of the current test. 	detail

Sample Output

show services rpm history-results owner test

```
user@host> show services rpm history-results owner p1 test t1
```

Owner, Test	Probe received	Round trip time
p1, t1	Wed Aug 12 01:02:35 2009	315 usec
p1, t1	Wed Aug 12 01:02:36 2009	266 usec
p1, t1	Wed Aug 12 01:02:37 2009	314 usec
p1, t1	Wed Aug 12 01:02:38 2009	388 usec
p1, t1	Wed Aug 12 01:02:39 2009	316 usec
p1, t1	Wed Aug 12 01:02:40 2009	271 usec
p1, t1	Wed Aug 12 01:02:41 2009	314 usec
p1, t1	Wed Aug 12 01:02:42 2009	1180 usec

show services rpm history-results owner test detail

```
user@host> show services rpm history-results owner p1 test t1 detail
```

```

Owner: p1, Test: t1, Probe type: icmp-ping-timestamp
Probe results:
  Response received, Wed Aug 12 01:02:35 2009,
  Client and server hardware timestamps
  Rtt: 315 usec
Results over current test:
  Probes sent: 1, Probes received: 1, Loss percentage: 0
  Measurement: Round trip time
    Samples: 1, Minimum: 315 usec, Maximum: 315 usec, Average: 315 usec,
    Peak to peak: 0 usec, Stddev: 0 usec, Sum: 315 usec

Owner: p1, Test: t1, Probe type: icmp-ping-timestamp
Probe results:
  Response received, Wed Aug 12 01:02:36 2009,
  Client and server hardware timestamps
  Rtt: 266 usec, Round trip jitter: -50 usec,
```

```
Round trip interarrival jitter: 3 usec
Results over current test:
Probes sent: 2, Probes received: 2, Loss percentage: 0
Measurement: Round trip time
  Samples: 2, Minimum: 266 usec, Maximum: 315 usec, Average: 291 usec,
  Peak to peak: 49 usec, Stddev: 24 usec, Sum: 581 usec
Measurement: Negative round trip jitter
  Samples: 1, Minimum: 50 usec, Maximum: 50 usec, Average: 50 usec,
  Peak to peak: 0 usec, Stddev: 0 usec, Sum: 50 usec

Owner: p1, Test: t1, Probe type: icmp-ping-timestamp
Probe results:
Response received, Wed Aug 12 01:02:37 2009,
Client and server hardware timestamps
Rtt: 314 usec, Round trip jitter: 49 usec,
Round trip interarrival jitter: 6 usec
Results over current test:
Probes sent: 3, Probes received: 3, Loss percentage: 0
Measurement: Round trip time
  Samples: 3, Minimum: 266 usec, Maximum: 315 usec, Average: 298 usec,
  Peak to peak: 49 usec, Stddev: 23 usec, Sum: 895 usec
Measurement: Positive round trip jitter
  Samples: 1, Minimum: 49 usec, Maximum: 49 usec, Average: 49 usec,
  Peak to peak: 0 usec, Stddev: 0 usec, Sum: 49 usec
Measurement: Negative round trip jitter
  Samples: 1, Minimum: 50 usec, Maximum: 50 usec, Average: 50 usec,
  Peak to peak: 0 usec, Stddev: 0 usec, Sum: 50 usec

Owner: p1, Test: t1, Probe type: icmp-ping-timestamp
Probe results:
Response received, Wed Aug 12 01:02:38 2009,
Client and server hardware timestamps
Rtt: 388 usec, Round trip jitter: 74 usec,
Round trip interarrival jitter: 10 usec
Results over current test:
Probes sent: 4, Probes received: 4, Loss percentage: 0
Measurement: Round trip time
  Samples: 4, Minimum: 266 usec, Maximum: 388 usec, Average: 321 usec,
  Peak to peak: 122 usec, Stddev: 44 usec, Sum: 1283 usec
Measurement: Positive round trip jitter
  Samples: 2, Minimum: 49 usec, Maximum: 74 usec, Average: 62 usec,
  Peak to peak: 25 usec, Stddev: 12 usec, Sum: 123 usec
Measurement: Negative round trip jitter
  Samples: 1, Minimum: 50 usec, Maximum: 50 usec, Average: 50 usec,
  Peak to peak: 0 usec, Stddev: 0 usec, Sum: 50 usec
```

show services rpm probe-results

Syntax show services rpm probe-results
 <dst-interface *interface-name*>
 <limit *number*>
 <owner *owner*>
 <source-address *address*>
 <status (fail | pass) >
 <target-address *address*>
 <terse>
 <test *name*>

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 on EX Series switches.
 Command introduced in Junos OS Release 13.2 on PTX Series Packet Transport Series routers.
dst-interface, **limit**, **source-address**, **status**, **target-address**, and **terse** options introduced in Junos OS Release 18.1R1 on MX Series.
 Command introduced in Junos OS Release 18.1 on QFX Series switches.

Description Display the results of the most recent real-time performance monitoring (RPM) probes.

Options All the following options require that you also configure the **owner** option.

dst-interface *interface-name*—(Optional) Display information only for RPM probes that are configured on this MS-MPC or MS-MIC services interface. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface.

limit *number*—(Optional) Limit the number of results that are displayed. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface.

Range: 1 through 4,294,967,295

Default: 100

none—Display information for all of the most recent RPM probes.

owner *owner*—(Optional) Display information only for probes with the specified probe owner. You must configure **owner** if you configure any other options.

source-address *address*—(Optional) Display information only for probes with the specified source address. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface.

status—(Optional) Display information only for probes with the specified type of test result. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface. Specify one of the following:

fail—Failed tests

pass—Passed tests

target-address *address*—(Optional) Display information only for probes with the specified target address. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface.

terse—(Optional) Display summary information. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface.

test *name*—(Optional) Display information only for the specified test.

Do not configure **test** if you configure any of the following options: **dst-interface**, **source-address**, or **target-address**. These options do not work when you configure **test**.

Required Privilege Level

view

List of Sample Output

[show services rpm probe-results \(IPv4 Targets\) on page 1899](#)
[show services rpm probe-results \(IPv6 Targets\) on page 1900](#)
[show services rpm probe-results owner terse on page 1901](#)
[show services rpm probe-results owner status fail on page 1901](#)
[show services rpm probe-results \(BGP Neighbor Discovery\) on page 1902](#)

Output Fields

[Table 228 on page 1894](#) lists the output fields for the **show services rpm probe-results** command. Output fields are listed in the approximate order in which they appear.

Table 228: show services rpm probe-results Output Fields

Field Name	Field Description	Level of Output
Owner	Owner name. When you configure the probe owner statement at the [edit services rpm] hierarchy level, this field displays the configured owner name. When you configure BGP neighbor discovery through RPM, the output for this field is Rpm-Bgp-Owner .	none dst-interface limit owner source-address target-address test
Test	Name of a test representing a collection of probes. When you configure the test test-name statement at the [edit services rpm probe owner] hierarchy level, the field displays the configured test name. When you configure BGP neighbor discovery through RPM, the output for this field is Rpm-BGP-Test- <i>n</i> , where <i>n</i> is a cumulative number.	All levels
Target address	Destination IPv4 address used for the probes. This field is displayed when the probes are sent to the configured IPv4 or IPv6 targets or RPM servers.	none dst-interface limit owner source-address target-address terse test
Target inet6-address	Destination IPv6 address used for the probes. This field is displayed when the probes are sent to the configured IPv6 targets or RPM servers.	none dst-interface limit owner source-address target-address terse test

Table 228: *show services rpm probe-results* Output Fields (continued)

Field Name	Field Description	Level of Output
Source address	Source address used for the probes.	none dst-interface limit owner source-address target-address test
Probe type	Protocol configured on the receiving probe server: http-get , http-metadata-get , icmp-ping , icmp-ping-timestamp , tcp-ping , udp-ping , or udp-ping-timestamp .	none dst-interface limit owner source-address target-address test
Test size	Number of probes within a test.	none dst-interface limit owner source-address target-address test
Routing Instance Name	<p>(BGP neighbor discovery) Name of the configured (if any) routing instance, logical system name, or both, in which the probe is configured:</p> <ul style="list-style-type: none"> When a routing instance is defined within a logical system, the logical system name is followed by the routing instance name. A slash (/) is used to separate the two entities. For example, if the routing instance called R1 is configured within the logical system called LS, the name in the output field is LS/R1. When a routing instance is configured but the default logical system is used, the name in the output field is the name of the routing instance. When a logical system is configured but the default routing instance is used, the name in the output field is the name of the logical system followed by default. A slash (/) is used to separate the two entities. For example, LS/default. 	none dst-interface limit owner source-address target-address test
Probe results	<p>Raw measurement of a particular probe sample done by a remote host. This data is provided separately from the calculated results. The following information is contained in the raw measurement:</p> <ul style="list-style-type: none"> Response received—Timestamp when the probe result was determined. Client and server hardware timestamps—If timestamps are configured, an entry appears at this point. Rtt—Average ping round-trip time (RTT), in microseconds. Egress jitter—Egress jitter, in microseconds. Ingress jitter—Ingress jitter, in microseconds. Round trip jitter—Round-trip jitter, in microseconds. Egress interarrival jitter—Egress interarrival jitter, in microseconds. Ingress interarrival jitter—Ingress interarrival jitter, in microseconds. Round trip interarrival jitter—Round-trip interarrival jitter, in microseconds. 	none dst-interface limit owner source-address target-address test

Table 228: *show services rpm probe-results* Output Fields (continued)

Field Name	Field Description	Level of Output
Results over current test	<p>Probes are grouped into tests, and the statistics are calculated for each test. If a test contains 10 probes, the average, minimum, and maximum results are calculated from the results of those 10 probes. If the command is issued while the test is in progress, the statistics use information from the completed probes.</p> <ul style="list-style-type: none"> • Probes sent—Number of probes sent within the current test. • Probes received—Number of probe responses received within the current test. • Loss percentage—Percentage of lost probes for the current test. • Measurement—Measurement type. Possible values are round-trip time, positive round-trip jitter, negative round-trip jitter, egress time, positive egress jitter, negative egress jitter, ingress time, positive ingress jitter, negative ingress jitter, and, for the probe type icmp-ping-timestamp, the egress delay and ingress delay. <p>For each measurement type, the following individual calculated results are provided:</p> <ul style="list-style-type: none"> • Samples—Number of probes. • Minimum—Minimum RTT, ingress delay, or egress delay measured over the course of the current test. • Maximum—Maximum RTT, ingress delay, or egress delay measured over the course of the current test. • Average—Average RTT, ingress delay, or egress delay measured over the course of the current test. • Peak to peak—Peak-to-peak difference, in microseconds. • Stddev—Standard deviation, in microseconds. • Sum—Statistical sum. 	<p>none dst-interface limit owner source-address target-address test</p>

Table 228: *show services rpm probe-results* Output Fields (continued)

Field Name	Field Description	Level of Output
Results over last test	<p>Results for the most recently completed test. If the command is issued while the first test is in progress, this information is not displayed</p> <ul style="list-style-type: none"> • Probes sent—Number of probes sent for the most recently completed test. • Probes received—Number of probe responses received for the most recently completed test. • Loss percentage—Percentage of lost probes for the most recently completed test. • Test completed—Time the most recent test was completed. • Measurement—Measurement type. Possible values are round-trip time, positive round-trip jitter, negative round-trip jitter, egress time, positive egress jitter, negative egress jitter, ingress time, positive ingress jitter, negative ingress jitter, and, for the probe type icmp-ping-timestamp, the egress delay and ingress delay. For each measurement type, the following individual calculated results are provided: <ul style="list-style-type: none"> • Samples—Number of probes. • Minimum—Minimum RTT, ingress delay, or egress delay measured for the most recently completed test. • Maximum—Maximum RTT, ingress delay, or egress delay measured for the most recently completed test. • Average—Average RTT, ingress delay, or egress delay measured for the most recently completed test. • Peak to peak—Peak-to-peak difference, in microseconds. • Stddev—Standard deviation, in microseconds. • Sum—Statistical sum. 	<p>none dst-interface limit owner source-address target-address test</p>

Table 228: *show services rpm probe-results Output Fields (continued)*

Field Name	Field Description	Level of Output
Results over all tests	<p>Displays statistics made for all the probes, independently of the grouping into tests, as well as statistics for the current test.</p> <ul style="list-style-type: none"> • Probes sent—Number of probes sent in all tests. • Probes received—Number of probe responses received in all tests. • Loss percentage—Percentage of lost probes in all tests. • Measurement—Measurement type. Possible values are round-trip time, positive round-trip jitter, negative round-trip jitter, egress time, positive egress jitter, negative egress jitter, ingress time, positive ingress jitter, negative ingress jitter, and, for the probe types icmp-ping-timestamp and udp-ping-timestamp, the egress delay and ingress delay. <p>For each measurement type, the following individual calculated results are provided:</p> <ul style="list-style-type: none"> • Samples—Number of probes. • Minimum—Minimum RTT, ingress delay, or egress delay measured over the course of the current test. • Maximum—Maximum RTT, ingress delay, or egress delay measured over the course of the current test. • Average—Average RTT, ingress delay, or egress delay measured over the course of the current test. • Peak to peak—Peak-to-peak difference, in microseconds. • Stddev—Standard deviation, in microseconds. • Sum—Statistical sum. 	none dst-interface limit owner source-address target-address test
Error Stats	<p>Displays error statistics for each probe.</p> <ul style="list-style-type: none"> • Invalid client rcv timestamp—Number of client receive timestamp less than client send timestamp. • Invalid server send timestamp—Number of server send timestamp less than server receive timestamp. • Invalid server processing time—Number of server side spent time greater than RTT. <p>NOTE: Error Stats is displayed in the output only if non-zero statistics exists.</p>	none dst-interface limit owner source-address target-address test
Last Probe Status	Status of the last probe that was sent for the current test (fail or pass).	status
Status	Status of the last completed test (up or down).	status terse
Source-IF	The MS-MPC or MS-MIC services interface that generates the RPM probes.	terse

Sample Output

show services rpm probe-results (IPv4 Targets)

```
user@host> show services rpm probe-results
```

```
Owner: ADSN-J4300.ADSN-J2300.D2, Test: 75300002
Target address: 172.16.54.172, Source address: 10.206.0.1,
Probe type: udp-ping-timestamp, Test size: 10 probes
Probe results:
  Response received, Tue Feb  6 14:53:15 2007,
  Client and server hardware timestamps
  Rtt: 575 usec, Egress jitter: 5 usec, Ingress jitter: 8 usec,
  Round trip jitter: 12 usec, Egress interarrival jitter: 8 usec,
  Ingress interarrival jitter: 7 usec, Round trip interarrival jitter: 7 usec,

  Round trip interarrival jitter: 669 usec
Results over current test:
  Probes sent: 10, Probes received: 10, Loss percentage: 0
  Measurement: Round trip time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
  Measurement: Positive round trip jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
  Measurement: Negative round trip jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
  Measurement: Egress time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
  Measurement: Positive Egress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
  Measurement: Negative Egress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
  Measurement: Ingress time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
  Measurement: Positive Ingress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
  Measurement: Negative Ingress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
Results over last test:
  Probes sent: 10, Probes received: 10, Loss percentage: 0
  Test completed on Tue Feb  6 14:53:16 2007
  Measurement: Round trip time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
  Measurement: Positive round trip jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
  Measurement: Negative round trip jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
  Measurement: Egress time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
```

```

    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
Measurement: Positive Egress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
Measurement: Negative Egress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
Measurement: Ingress time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
Measurement: Positive Ingress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
Measurement: Negative Ingress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
Results over all tests:
Probes sent: 560, Probes received: 560, Loss percentage: 0
Measurement: Round trip time
    Samples: 560, Minimum: 805 usec, Maximum: 3114 usec, Average: 1756 usec,

    Peak to peak: 2309 usec, Stddev: 519 usec, Sum: xxxx usec
Measurement: Positive round trip jitter
    Samples: 257, Minimum: 0 usec, Maximum: 2054 usec, Average: 597 usec,
    Peak to peak: 2054 usec, Stddev: 427 usec, Sum: xxxx usec
Measurement: Negative round trip jitter
    Samples: 302, Minimum: 1 usec, Maximum: 1812 usec, Average: 511 usec,
    Peak to peak: 1811 usec, Stddev: 408 usec, Sum: xxxx usec
Measurement: Egress time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
Measurement: Positive Egress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
Measurement: Negative Egress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
Measurement: Ingress time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
Measurement: Positive Ingress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
Measurement: Negative Ingress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
Error Stats:
    Invalid client recv timestamp: 3, Invalid server send timestamp: 0
    Invalid server processing time: 0

```

show services rpm probe-results (IPv6 Targets)

```
user@host> show services rpm probe-results
```

```

Owner: p, Test: t1
Target inet6-address: 2001:db8:0:1:2a0:a502:0:1da,
Target Port : 34567 Test size: 1000000 probes
Probe results:
    Response received, Mon Dec 16 10:48:07 2013, Client and server hardware
    timestamps

```

```

Rtt: 236 usec, Round trip jitter: -10 usec, Round trip interarrival jitter:
484 usec
Results over current test:
  Probes sent: 10, Probes received: 10, Loss percentage: 0
  Measurement: Round trip time
    Samples: 10, Minimum: 231 usec, Maximum: 298 usec, Average: 268 usec,
Peak to peak: 67 usec, Stddev: 24 usec, Sum: 2682 usec
  Measurement: Positive round trip jitter
    Samples: 3, Minimum: 15 usec, Maximum: 1841 usec, Average: 750 usec, Peak
to peak: 1826 usec, Stddev: 787 usec, Sum: 2251 usec
  Measurement: Negative round trip jitter
    Samples: 7, Minimum: 10 usec, Maximum: 1244 usec, Average: 709 usec, Peak
to peak: 1234 usec, Stddev: 466 usec, Sum: 4961 usec
Results over last test:
  Probes sent: 10, Probes received: 10, Loss percentage: 0
  Test completed on Mon Dec 16 10:48:07 2013
  Measurement: Round trip time
    Samples: 10, Minimum: 231 usec, Maximum: 298 usec, Average: 268 usec,
Peak to peak: 67 usec, Stddev: 24 usec, Sum: 2682 usec
  Measurement: Positive round trip jitter
    Samples: 3, Minimum: 15 usec, Maximum: 1841 usec, Average: 750 usec, Peak
to peak: 1826 usec, Stddev: 787 usec, Sum: 2251 usec
  Measurement: Negative round trip jitter
    Samples: 7, Minimum: 10 usec, Maximum: 1244 usec, Average: 709 usec, Peak
to peak: 1234 usec, Stddev: 466 usec, Sum: 4961 usec
Results over all tests(From start of current control session):
  Probes sent: 490, Probes received: 488, Loss percentage: 0
  Measurement: Round trip time
    Samples: 488, Minimum: 231 usec, Maximum: 306 usec, Average: 270 usec,
Peak to peak: 75 usec, Stddev: 16 usec, Sum: 131586 usec
  Measurement: Positive round trip jitter
    Samples: 254, Minimum: 0 usec, Maximum: 10151 usec, Average: 157 usec,
Peak to peak: 10151 usec, Stddev: 873 usec, Sum: 39817 usec
  Measurement: Negative round trip jitter
    Samples: 233, Minimum: 1 usec, Maximum: 10170 usec, Average: 171 usec,
Peak to peak: 10169 usec, Stddev: 888 usec, Sum: 39889 usec

```

show services rpm probe-results owner terse

```
user@host> show services rpm probe-results owner owner1 terse
```

Test Name	Source-IP	Target Address	Status	Last Change
t_1	ms-2/2/0.10	192.0.2.1	UP	0D0H1M29S
t_2	ms-2/2/0.10	192.0.2.1	UP	0D0H1M29S
t_3	ms-2/2/0.10	192.0.2.1	UP	0D0H1M29S

show services rpm probe-results owner status fail

```
user@host> show services rpm probe-results owner owner1 status fail
```

Test Name	Last Probe Status	Status
t_1	FAIL	DOWN
t_2	FAIL	DOWN
t_3	FAIL	DOWN

show services rpm probe-results (BGP Neighbor Discovery)

```
user@host> show services rpm probe-results
```

```
Owner: Rpm-Bgp-Owner, Test: Rpm-Bgp-Test-1
Target address: 10.209.152.37, Probe type: icmp-ping, Test size: 5 probes
Routing Instance Name: LS1/RI1
Probe results:
  Response received, Fri Oct 28 05:20:23 2005
  Rtt: 662 usec
Results over current test:
  Probes sent: 5, Probes received: 5, Loss percentage: 0
  Measurement: Round trip time
    Minimum: 529 usec, Maximum: 662 usec, Average: 585 usec,
    Jitter: 133 usec, Stddev: 53 usec
Results over all tests:
  Probes sent: 5, Probes received: 5, Loss percentage: 0
  Measurement: Round trip time
    Minimum: 529 usec, Maximum: 662 usec, Average: 585 usec,
    Jitter: 133 usec, Stddev: 53 usec
```

CHAPTER 77

Operational Commands: Analyzers and Port Mirroring

- `show analyzer`

show analyzer

Syntax	show analyzer <i>analyzer-name</i>
Release Information	Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Display information about analyzers configured for mirroring.
Options	<i>analyzer-name</i> —(Optional) Displays the status of a specific analyzer on the switch.
Required Privilege Level	view
List of Sample Output	show analyzer on page 1904
Output Fields	Table 229 on page 1904 lists the output fields for the command-name command. Output fields are listed in the approximate order in which they appear.

Table 229: show analyzer Output Fields

Field Name	Field Description
Analyzer name	Displays the name of the analyzer.
Output interface	Specifies a local interface to which mirrored packets are sent. An analyzer can have output to either an interface or a VLAN, not both.
Output VLAN	Specifies a VLAN to which mirrored packets are sent. An analyzer can have output to either an interface or a VLAN, not both.
Mirror ratio	Displays the ratio of packets to be mirrored.
Egress monitored interfaces	Displays interfaces for which traffic exiting the interfaces is mirrored.
Ingress monitored interfaces	Displays interfaces for which traffic entering the interfaces is mirrored.
Ingress monitored VLANs	Displays VLANs for which traffic entering the VLAN is mirrored.

Sample Output

show analyzer

```

user@host> show analyzer
Analyzer name       : employee-monitor
Output interface    : ge-0/0/10.0
Output VLAN         : remote-analyzer
Mirror ratio        : 1
Loss priority       : High

```

```
Egress monitored interfaces : ge-0/0/3.0  
Ingress monitored interfaces : ge-0/0/0.0  
Ingress monitored interfaces : ge-0/0/1.0
```


CHAPTER 78

Operational Commands: sFlow Monitoring Technology

- clear sflow collectors statistics
- clear sflow collector statistics (QFX Series)
- show sflow
- show sflow (QFX Series)
- show sflow collector
- show sflow collector (QFX Series)
- show sflow interface
- show sflow interface (QFX Series)

clear sflow collectors statistics

Syntax	clear sflow collectors statistics
Release Information	Command introduced in JUNOS Release 9.5 for EX Series switches.
Description	Clear the sFlow collector's statistics.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none">• show sflow collector on page 1914• Configuring sFlow Technology for Network Monitoring (CLI Procedure) on page 565

Sample Output

```
clear sflow collectors statistics
```

clear sflow collector statistics (QFX Series)

Syntax clear sflow collector statistics

Release Information Command introduced in Junos OS Release 11.3 for the QFX Series.
Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Command introduced in Junos OS Release 17.2R1 for the ACX5000 line of routers.

Description Clear the sample counters for all sFlow collectors.

Required Privilege Level view

Related Documentation

- [Example: Monitoring Network Traffic Using sFlow Technology on page 569](#)
- [Configuring sFlow Technology on page 567](#)
- [show sflow collector \(QFX Series\) on page 1915](#)

List of Sample Output [clear sflow collector statistics on page 1909](#)

Sample Output

clear sflow collector statistics

The following example shows two output examples for the **show sflow collector** command, one before and one after the **clear sflow collector statistics** command was issued.

```
user@host> show sflow collector
```

Collector address	Udp-port	No. of samples
10.1.1.1	6343	3174
10.1.2.1	6343	3562

```
user@host> clear sflow collector statistics
```

```
user@host> show sflow collector
```

Collector address	Udp-port	No. of samples
10.1.1.1	6343	0
10.1.2.1	6343	0

show sflow

Syntax `show sflow
<collector>
<interface>`

Release Information Command introduced in Junos OS Release 9.3 for EX Series switches.

Description Display default sFlow technology configuration information.

Options **none**—Display default sFlow technology configuration information.

collector—(Optional) Display standard status information about the specified sFlow collector.

interface—(Optional) Display standard status information about the specified sFlow interface.

Required Privilege Level view

- Related Documentation**
- [show sflow interface on page 1917](#)
 - [show sflow collector on page 1914](#)
 - [Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches on page 555](#)
 - [Configuring sFlow Technology for Network Monitoring \(CLI Procedure\) on page 565](#)

List of Sample Output [show sflow on page 1911](#)

Output Fields [Table 230 on page 1910](#) lists the output fields for the **show sflow** command. Output fields are listed in the approximate order in which they appear.

Table 230: show sflow Output Fields

Field Name	Field Description	Level of Output
sFlow	Status of the feature: enabled or disabled .	All levels
Sample rate egress	Rate at which egress packets are sampled.	All levels
Sample rate ingress	Rate at which ingress packets are sampled.	All levels
Sample limit	Number of packets sampled per second. The sampling limit cannot be configured and is set to 300 packets per second.	All levels
Polling interval	Interval at which the sFlow agent polls the interface.	All levels

Table 230: show sflow Output Fields (continued)

Field Name	Field Description	Level of Output
Agent ID	The IP address assigned to the sFlow agent.	All levels
Source IP address	The IP address for the sFlow datagram.	All levels

Sample Output

show sflow

```
sFlow          : Enabled
Sample rate egress  : 1:1000
Sample rate ingress : 1: 2048: Disabled
Sample limit       : 300 packets/second
Polling interval   : 20 seconds
Agent ID          : 10.93.54.7
Source IP address  : 10.93.54.7
```

show sflow (QFX Series)

Syntax	<code>show sflow <collector> <interface></code>
Release Information	Command introduced in Junos OS Release 11.3 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series. Command introduced in Junos OS Release 17.2R1 for the ACX5000 line of routers.
Description	Display sFlow configuration information.
Options	<p>none— Display all sFlow configuration information.</p> <p>collector—(Optional) Display a list of configured sFlow collectors and their properties.</p> <p>interface—(Optional) Display the interfaces on which sFlow technology is enabled and the sampling parameters.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show sflow interface (QFX Series) on page 1919 • show sflow collector (QFX Series) on page 1915 • clear sflow collector statistics (QFX Series) on page 1909 • Example: Monitoring Network Traffic Using sFlow Technology on page 569 • Configuring sFlow Technology on page 567
List of Sample Output	show sflow on page 1913
Output Fields	Table 230 on page 1910 lists the output fields for the show sflow command. Output fields are listed in the approximate order in which they appear.

Table 231: show sflow Output Fields

Field Name	Field Description	Level of Output
sFlow	Status of the feature: Enabled or Disabled .	All levels
Adaptive fallback	Reverts back to the previously configured adaptive sample rate. Adaptive fallback is triggered when the number of samples per second for each FPC is less than the sample-limit-threshold value. This option is disabled by default.	All levels
Sample limit	Number of packets sampled per second. This sample limit cannot be configured and is set to 300 packets per second.	All levels

Table 231: *show sflow* Output Fields (continued)

Field Name	Field Description	Level of Output
Sample limit threshold	Threshold value that you explicitly configure for adaptive sampling fallback.	All levels
Polling interval	Interval at which the sFlow agent polls the interface.	All levels
Sample rate egress	Rate at which egress packets are sampled.	All levels
Sample rate ingress	Rate at which ingress packets are sampled.	All levels
Agent ID	IP address assigned to the sFlow agent.	All levels
Source IP address	Source IP address for the sFlow packets.	All levels

Sample Output

show sflow

```

user@host> show sflow
sFlow                : Enabled
Adaptive fallback    : Disabled
Sample limit         : 300 packets/second
Sample limit threshold : 150 packets/second
Polling interval     : 20 second
Sample rate egress   : 1:2048: Disabled
Sample rate ingress  : 1:1000: Enabled
Agent ID             : 10.93.54.7
Source IP address    : 10.93.54.7

```

show sflow collector

Syntax `show sflow collector`

Release Information Command introduced in Junos OS Release 9.3 for EX Series switches.

Description Display a list of configured sFlow collectors and their properties.

Required Privilege Level view

Related Documentation

- [show sflow on page 1910](#)
- [show sflow interface on page 1917](#)
- [Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches on page 555](#)
- [Configuring sFlow Technology for Network Monitoring \(CLI Procedure\) on page 565](#)

List of Sample Output [show sflow collector on page 1914](#)

Output Fields [Table 232 on page 1914](#) lists the output fields for the **show sflow collector** command. Output fields are listed in the approximate order in which they appear.

Table 232: show sflow collector Output Fields

Field Name	Field Description	Level of Output
IP address	IP address of the collector.	All levels
UDP port	UDP port number.	All levels
No of samples	Number of samples sent to collector.	All levels

Sample Output

`show sflow collector`

```

IP-address  UDP-Port  No of samples
10.204.32.46 5600      1000
100.204.32.76 3400      1000

```


show sflow collector (QFX Series)

Syntax	show sflow collector
Release Information	Command introduced in Junos OS Release 11.3 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series. Command introduced in Junos OS Release 17.2R1 for the ACX5000 line of routers.
Description	Display a list of configured sFlow collectors and their properties.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear sflow collector statistics (QFX Series) on page 1909 • show sflow (QFX Series) on page 1912 • show sflow interface (QFX Series) on page 1919 • Example: Monitoring Network Traffic Using sFlow Technology on page 569 • Configuring sFlow Technology on page 567
List of Sample Output	show sflow collector on page 1915
Output Fields	Table 232 on page 1914 lists the output fields for the show sflow collector command. Output fields are listed in the approximate order in which they appear.

Table 233: show sflow collector Output Fields

Field Name	Field Description	Level of Output
Collector address	IP address of the collector.	All levels
UDP-Port	UDP port number of the collector.	All levels
No. of samples	Number of samples collected.	All levels

Sample Output

show sflow collector

```
user@host> show sflow collector
```

```

Collector      Udp-port      No. of samples
address
10.204.32.46   6343          1000
198.51.100.76  3400          1000

```


show sflow interface

Syntax	show sflow interface
Release Information	Command introduced in Junos OS Release 9.3 for EX Series switches.
Description	Display the interfaces on which sFlow technology is enabled and the sampling parameters.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show sflow on page 1910 • show sflow collector on page 1914 • Example: Configuring sFlow Technology to Monitor Network Traffic on EX Series Switches on page 555 • Configuring sFlow Technology for Network Monitoring (CLI Procedure) on page 565
List of Sample Output	show sflow interface on page 1918
Output Fields	Table 234 on page 1917 lists the output fields for the show sflow interface command. Output fields are listed in the approximate order in which they appear.

Table 234: show sflow interface Output Fields

Field Name	Field Description	Level of Output
Interface	Interfaces on which sFlow technology is enabled.	All levels
Status Egress	Indicates whether egress sampling rate is enabled.	All levels
Status Ingress	Indicates whether ingress sampling rate is enabled.	All levels
Sample rate Egress	Rate at which egress packets are sampled.	All levels
Sample rate Ingress	Rate at which ingress packets are sampled.	All levels
Adapted sample rate Egress	Adapted rate at which egress packets are sampled.	All levels
Adapted sample rate Ingress	Adapted rate at which ingress packets are sampled.	All levels
Polling-interval	The interval at which the sFlow agent polls the interface.	All levels

Sample Output

`show sflow interface`

Interface	Status		Sample rate		Adapted sample rate		Polling-interval
	Egress	Ingress	Egress	Ingress	Egress	Ingress	
ge-0/0/0.0	Enabled	Disabled	1000	2048	1000	2048	20

show sflow interface (QFX Series)

Syntax	show sflow interface
Release Information	<p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p>Command introduced in Junos OS Release 17.2R1 for the ACX5000 line of routers.</p>
Description	Display the interfaces on which sFlow is enabled and the sampling parameters for the interface.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show sflow (QFX Series) on page 1912 • show sflow collector (QFX Series) on page 1915 • Example: Monitoring Network Traffic Using sFlow Technology on page 569 • Configuring sFlow Technology on page 567
List of Sample Output	<p>show sflow interface (QFX Series Switch) on page 1920</p> <p>show sflow interface (QFX3500 Switch in Standalone Mode) on page 1920</p> <p>show sflow interface (QFX3500 Switch in Standalone Mode) on page 1920</p> <p>show sflow interface (QFX3500 Switch in Standalone Mode) on page 1920</p> <p>show sflow interface (QFX3500 Switch in Standalone Mode) on page 1920</p> <p>show sflow interface (QFabric System) on page 1921</p>
Output Fields	Table 234 on page 1917 lists the output fields for the show sflow interface command. Output fields are listed in the approximate order in which they appear.

Table 235: show sflow interface Output Fields

Field Name	Field Description	Level of Output
Interface	Interface on which sFlow technology is enabled.	All levels
Status Egress	Indicates whether an egress sample rate is enabled.	All levels
Status Ingress	Indicates whether an ingress sample rate is enabled.	All levels
Sample rate Egress	Rate at which egress packets are sampled.	All levels
Sample rate Ingress	Rate at which ingress packets are sampled.	All levels
Adapted sample rate Egress	Adapted rate at which egress packets are sampled.	All levels

Table 235: show sflow interface Output Fields (continued)

Field Name	Field Description	Level of Output
Adapted sample rate Ingress	Adapted rate at which ingress packets are sampled.	All levels
Polling-interval	Interval at which the sFlow agent polls the interface.	All levels

Sample Output

show sflow interface (QFX Series Switch)

```
user@host> show sflow interface
```

Interface	Status	Sample rate		Adapted sample rate		Polling-interval
		Egress	Ingress	Egress	Ingress	
ge-0/0/13.0	Enabled	Enabled	100	100	800	20
ge-1/0/15.0	Enabled	Enabled	100	100	400	20
ge-1/0/20.0	Enabled	Enabled	10	10	160	20
ge-1/0/21.0	Enabled	Enabled	10	10	10	20

show sflow interface (QFX3500 Switch in Standalone Mode)

```
user@host> show sflow interface
```

Interface	Status	Sample rate		Adapted sample rate		Polling-interval
		Egress	Ingress	Egress	Ingress	
xe-0/0/0.0	Enabled	Disabled	1000	2048	1000	20
xe-1/0/1.0	Enabled	Disabled	1000	2048	1000	20

show sflow interface (QFX3500 Switch in Standalone Mode)

```
user@host> show sflow interface
```

Interface	Status	Sample rate		Adapted sample rate		Polling-interval
		Egress	Ingress	Egress	Ingress	
xe-0/0/0.0	Enabled	Disabled	1000	2048	1000	20
xe-1/0/1.0	Enabled	Disabled	1000	2048	1000	20

Sample Output

show sflow interface (QFX3500 Switch in Standalone Mode)

```
user@host> show sflow interface
```

Interface	Status	Sample rate		Adapted sample rate		Polling-interval
		Egress	Ingress	Egress	Ingress	
xe-0/0/0.0	Enabled	Disabled	1000	2048	1000	20
xe-1/0/1.0	Enabled	Disabled	1000	2048	1000	20

Sample Output

show sflow interface (QFX3500 Switch in Standalone Mode)

```
user@host> show sflow interface
```

Interface	Status	Sample rate		Adapted sample rate		Polling-interval	
		Egress	Ingress	Egress	Ingress		
xe-0/0/0.0	Enabled	Disabled	1000	2048	1000	2048	20
xe-1/0/1.0	Enabled	Disabled	1000	2048	1000	2048	20

Sample Output

show sflow interface (QFabric System)

```
user@host> show sflow interface
```

Interface	Status	Sample rate		Adapted sample rate		Polling-interval	
		Egress	Ingress	Egress	Ingress		
node1:xe-0/0/0.0	Enabled	Disabled	1000	2048	1000	2048	20
node2:xe-1/0/1.0	Enabled	Disabled	1000	2048	1000	2048	20
node4:xe-1/0/0.0	Enabled	Disabled	1000	2048	1000	2048	20

CHAPTER 79

Operational Commands: Ethernet OAM Connectivity Fault Management

- `clear oam ethernet connectivity-fault-management delay-statistics`
- `clear oam ethernet connectivity-fault-management sla-iterator-statistics`
- `clear oam ethernet connectivity-fault-management statistics`
- `monitor ethernet delay-measurement`
- `show oam ethernet connectivity-fault-management delay-statistics`
- `show oam ethernet connectivity-fault-management forwarding-state`
- `show oam ethernet connectivity-fault-management interfaces`
- `show oam ethernet connectivity-fault-management path-database`
- `show oam ethernet connectivity-fault-management mep-database`
- `show oam ethernet connectivity-fault-management mip`
- `show oam ethernet connectivity-fault-management sla-iterator-statistics`

clear oam ethernet connectivity-fault-management delay-statistics

Syntax	clear oam ethernet connectivity-fault-management delay-statistics maintenance-association <i>maintenance-association-name</i> maintenance-domain <i>maintenance-domain-name</i> <logical-system <i>logical-system-name</i> > <one-way> <two-way>
Release Information	Command introduced in Junos OS Release 9.6. Command introduced in Junos OS Release 11.4 for EX Series switches.
Description	On MX Series routers and EX Series switches, clear ITU-T Y.1731 Ethernet frame delay measurement (ETH-DM) delay statistics and ETH-DM frame counts.
Options	maintenance-association <i>maintenance-association-name</i> —Clear ETH-DM delay statistics and ETH-DM frame counts for the specified maintenance association. maintenance-domain <i>maintenance-domain-name</i> —Clear ETH-DM delay statistics and ETH-DM frame counts for the specified maintenance domain. logical-system <i>logical-system-name</i> —(MX Series routers only) (Optional) Clear ETH-DM delay statistics and ETH-DM frame counts for the specified logical system. one-way —(Optional) Clear one-way ETH-DM delay statistics and ETH-DM frame counts for the specified maintenance association, maintenance domain, or (on the routers only) logical system. two-way —(Optional) Clear two-way ETH-DM delay statistics and ETH-DM frame counts for the specified maintenance association, maintenance domain, or (on the routers only) logical system.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• clear oam ethernet connectivity-fault-management statistics• show oam ethernet connectivity-fault-management delay-statistics on page 1933• show oam ethernet connectivity-fault-management interfaces
List of Sample Output	clear oam ethernet connectivity-fault-management delay statistics on page 1924
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear oam ethernet connectivity-fault-

management delay statistics

```
user@switch> clear oam ethernet connectivity-fault-management delay-statistics  
maintenance-domain md1 maintenance-association ma1  
Delay statistics entries cleared
```

clear oam ethernet connectivity-fault-management sla-iterator-statistics

Syntax	<pre>clear oam ethernet connectivity-fault-management sla-iterator-statistics maintenance-association <i>maintenance-association-name</i> maintenance-domain <i>maintenance-domain-name</i> <local-mep <i>local-mep-id</i>> <remote-mep <i>remote-mep-id</i>> sla-iterator <i>sla-iterator</i></pre>
Release Information	<p>Command introduced in Junos OS Release 11.4 for EX Series switches.</p> <p>Command introduced in Junos OS Release 13.2 for MX Series routers.</p>
Description	Clear Ethernet Operation, Administration, and Maintenance (OAM) service-level agreement (SLA) iterator statistics. For MX Series routers, clear the SLA iterator statistics and proactive Ethernet synthetic loss measurement (ETH-SLM) statistics.
Options	<p>maintenance-association <i>maintenance-association-name</i>—Name of the maintenance association.</p> <p>maintenance-domain <i>maintenance-domain-name</i>—Name of the maintenance domain.</p> <p>local-mep <i>local-mep-id</i>—(Optional) Identifier of the local MEP.</p> <p>remote-mep <i>remote-mep-id</i>—(Optional) Identifier of the remote MEP.</p> <p>sla-iterator <i>sla-iterator</i>— Name of the SLA iterator profile.</p>
Required Privilege Level	view
List of Sample Output	clear oam ethernet connectivity-fault-management sla-iterator- statistics on page 1926
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear oam ethernet connectivity-fault-management sla-iterator- statistics

```
user@switch> clear oam ethernet connectivity-fault-management sla-iterator-statistics
maintenance-domain md1 maintenance-association ma1 local-mep 1 remote-mep 2 sla-iterator
it
Iterator statistics entries cleared
```

clear oam ethernet connectivity-fault-management statistics

Syntax	<code>clear oam ethernet connectivity-fault-management statistics</code> <code><interface <i>ethernet-interface-name</i>></code> <code><level <i>md-level</i>></code>
Release Information	Command introduced in Junos OS Release 10.2 for EX Series switches.
Description	Clear all statistics maintained by CFM.
Options	<p><code>interface <i>ethernet-interface-name</i></code>—(Optional) Clear CFM statistics only for MEPs attached to the specified Ethernet physical interface.</p> <p><code>level <i>level</i></code>—(Optional) Clear CFM statistics only for MEPs within CFM maintenance domains (MDs) of the specified level.</p>
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none"> • show oam ethernet connectivity-fault-management interfaces on page 1941 • show oam ethernet connectivity-fault-management path-database on page 1948 • show oam ethernet connectivity-fault-management mip on page 1957
List of Sample Output	clear oam ethernet connectivity-fault-management statistics on page 1927
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear oam ethernet connectivity-fault-management statistics

```
user@host> clear oam ethernet connectivity-fault-management statistics
Cleared statistics of all CFM sessions
```

monitor ethernet delay-measurement

Syntax `monitor ethernet delay-measurement maintenance-domain md-name
maintenance-association ma-name (one-way | two-way) (remote-mac-address | mep
remote-mep-id) <count count> <no-session-id-tlv> <priority 802.1p value> <size size>
<wait time>`

Release Information Command introduced in Junos OS Release 11.4 for EX Series switches.

Description Start an ITU-T Y.1731 Ethernet frame delay measurement session between the specified local connectivity fault management (CFM) maintenance association end point (MEP) and the specified remote MEP, and display a summary of the frames exchanged in the measurement session. Frame delay measurement statistics are stored at one of the MEPs for later retrieval.



NOTE: If you attempt to monitor delays to a nonexistent MAC address, you must type Ctrl +C to explicitly quit the `monitor ethernet delay-measurement` command and return to the CLI command prompt.

To start an Ethernet frame delay measurement session, the switch initiates an exchange of frames carrying one-way or two-way frame delay measurement protocol data units (PDUs) between the local and remote MEPs. The frame counts—the types of and number of Ethernet frame delay measurement PDU frames exchanged to measure frame delay times—are displayed as the run-time output of the `monitor ethernet delay-measurement` command and are also stored at both the initiator and receiver MEPs for later retrieval. Ethernet frame delay measurement statistics, described below, are measured and stored at only one of the MEPs:

Frame delay—The difference, in microseconds, between the time a frame is sent and when it is received.

Frame delay variation—The difference, in microseconds, between consecutive frame delay values. Frame delay variation is sometimes called “frame jitter.”

For one-way Ethernet frame delay measurement, only the receiver MEP (on the remote system) collects statistics. For two-way Ethernet frame delay measurement, only the initiator MEP (on the local system) collects statistics.

Options `count count`—(Optional) Number of frames to send to the specified peer MEP. The range of values is 1 through 65,535 frames. The default value is 10 frames.

`maintenance-association ma-name`—Name of an existing CFM maintenance association.

`maintenance-domain md-name`—Name of an existing CFM maintenance domain.

mep remote-mep-id—Numeric identifier of the peer MEP with which to perform Ethernet frame delay measurement. The discovered MAC address of the peer MEP is used. The range of values is 1 through 8191.

no-session-id-tlv—(Optional) Prevent insertion of the session ID TLV in the request frame.

one-way—Measurement type is one-way Ethernet frame delay measurement, which is based on the difference between the time at which the initiator MEP sends a one-way delay measurement request (IDM) frame and the time at which the receiver MEP receives the frame.

priority 802.1p value—(Optional) Priority of the delay measurement request frame supported by both one-way delay measurement and two-way delay measurement. The range of values is from 0 through 7. The default value is zero.

remote-mac-address—Unicast MAC address of the peer MEP with which to perform Ethernet frame delay measurement. Specify the MAC address as six hexadecimal bytes in *nn:nn:nn:nn:nn:nn* format. Multicast MAC addresses are not supported.

size size —(Optional) Size of the data TLV to be included in the request frame. The range of values is from 1 through 1400 bytes.

two-way—Measurement type is two-way Ethernet frame delay measurement, which is based on the difference between the time at which the initiator MEP sends a two-way delay measurement message (DMM) frame and the time at which the initiator MEP receives an associated two-way delay measurement reply (DMR) frame from the responder MEP, subtracting the time elapsed at the responder MEP.

wait time—(Optional) Number of seconds to wait between sending frames. The range of values is from 1 through 255 seconds. The default value is 1 second.

Required Privilege Level trace and maintenance

Related Documentation

- [Configuring an Iterator Profile on a Switch \(CLI Procedure\) on page 749](#)
- [show oam ethernet connectivity-fault-management mep-database on page 1951](#)
- [show oam ethernet connectivity-fault-management mep-statistics](#)
- [show oam ethernet connectivity-fault-management delay-statistics on page 1933](#)
- [clear oam ethernet connectivity-fault-management statistics on page 1927](#)

List of Sample Output

- [monitor ethernet delay-measurement one-way on page 1931](#)
- [monitor ethernet delay-measurement two-way on page 1931](#)
- [monitor ethernet delay-measurement two-way \(Invalid DMR Frames Received\) on page 1931](#)

Output Fields The **monitor ethernet delay-measurement** command displays different output at the CLI, depending on whether you start a one-way or two-way frame delay measurement:

- [Table 236 on page 1930](#) lists the run-time output fields for the **monitor ethernet delay-measurement one-way** command.
- [Table 237 on page 1930](#) lists the run-time output fields for the **monitor ethernet delay-measurement two-way** command.

Output fields are listed in the approximate order in which they appear.

Table 236: monitor ethernet delay-measurement one-way Output Fields

Output Field Name	Output Field Description
One-way ETH-DM request to	Unicast MAC address of the remote peer MEP.
Interface	Name of the Ethernet physical, logical, or trunk interface to which the local MEP is attached.
IDM Frames sent	PDU frames sent to the remote MEP in this ETH-DM session.
Packets transmitted	Total number of IDM PDU frames sent to the remote MEP during this measurement session.
Average delay	Average two-way frame delay measured in this session.
Average delay variation	Average frame jitter measured in this session.
Best case delay	Lowest two-way frame delay measured in this session.
Worst case delay	Highest two-way frame delay measured in this session.

NOTE: For one-way delay measurement, these CLI output fields display **NA** ("not applicable") at the initiator MEP because one-way frame delay measurements occur at the receiver MEP.

Table 237: monitor ethernet delay-measurement two-way Output Fields

Output Field Name	Output Field Description
Two-way Ethernet frame delay measurement request to	Unicast MAC address of the remote peer MEP.
Interface	Name of the Ethernet physical, logical, or trunk interface to which the local MEP is attached.
DMR received from	Unicast MAC address of the remote MEP that transmitted this DMR frame in response to a DMM frame.
Delay	Two-way delay, in microseconds, for the initiator-transmitted DMM frame.
Delay variation	Difference, in microseconds, between the current and previous delay values. This is also known as <i>jitter</i> .

Table 237: monitor ethernet delay-measurement two-way Output Fields (continued)

Output Field Name	Output Field Description
Packets transmitted	Total number of DMM PDU frames sent to the remote MEP in this measurement session.
Valid packets received	Total number of DMR PDU frames received from the remote MEP in this measurement session.
Average delay	Average two-way frame delay measured in this session.
Average delay variation	Average frame jitter measured in this session.
Best case delay	Lowest two-way frame delay measured in this session.
Worst case delay	Highest two-way frame delay measured in this session.

Sample Output

monitor ethernet delay-measurement one-way

```

user@switch> monitor ethernet delay-measurement one-way 00:05:85:73:39:4a
maintenance-domain md6 maintenance-association ma6 count 10

One-way ETH-DM request to 00:05:85:73:39:4a, Interface xe-5/0/0.0
1DM Frames sent : 10
--- Delay measurement statistics ---
Packets transmitted: 10
Average delay: NA, Average delay variation: NA
Best case delay: NA, Worst case delay: NA

```

monitor ethernet delay-measurement two-way

```

user@switch> monitor ethernet delay-measurement two-way 00:05:85:73:39:4a
maintenance-domain md6 maintenance-association ma6 count 10

Two-way ETH-DM request to 00:05:85:73:39:4a, Interface xe-5/0/0.0
DMR received from 00:05:85:73:39:4a Delay: 100 usec Delay variation: 0 usec
DMR received from 00:05:85:73:39:4a Delay: 92 usec Delay variation: 8 usec
DMR received from 00:05:85:73:39:4a Delay: 92 usec Delay variation: 0 usec
DMR received from 00:05:85:73:39:4a Delay: 111 usec Delay variation: 19 usec
DMR received from 00:05:85:73:39:4a Delay: 110 usec Delay variation: 1 usec
DMR received from 00:05:85:73:39:4a Delay: 119 usec Delay variation: 9 usec
DMR received from 00:05:85:73:39:4a Delay: 122 usec Delay variation: 3 usec
DMR received from 00:05:85:73:39:4a Delay: 92 usec Delay variation: 30 usec
DMR received from 00:05:85:73:39:4a Delay: 92 usec Delay variation: 0 usec
DMR received from 00:05:85:73:39:4a Delay: 108 usec Delay variation: 16 usec

--- Delay measurement statistics ---
Packets transmitted: 10, Valid packets received: 10
Average delay: 103 usec, Average delay variation: 8 usec
Best case delay: 92 usec, Worst case delay: 122 usec

```

monitor ethernet delay-measurement two-way (Invalid DMR Frames Received)

```

user@switch> monitor ethernet delay-measurement two-way 00:05:85:73:39:4a
maintenance-domain md6 maintenance-association ma6 count 10

```

```
Two-way ETH-DM request to 00:05:85:73:39:4a, Interface xe-5/0/0.0
DMR received from 00:05:85:73:39:4a Delay: 100 usec Delay variation: 0 usec
DMR received from 00:05:85:73:39:4a Delay: 92 usec Delay variation: 8 usec
DMR received from 00:05:85:73:39:4a Delay: 92 usec Delay variation: 0 usec
DMR received from 00:05:85:73:39:4a Delay: 111 usec Delay variation: 19 usec
DMR received from 00:05:85:73:39:4a Delay: 110 usec Delay variation: 1 usec
DMR received from 00:05:85:73:39:4a Delay: 119 usec Delay variation: 9 usec
DMR received from 00:05:85:73:39:4a Delay: 122 usec Delay variation: 3 usec
DMR received from 00:05:85:73:39:4a Delay: 92 usec Delay variation: 30 usec
DMR received from 00:05:85:73:39:4a with invalid timestamp(s).
DMR received from 00:05:85:73:39:4a Delay: 108 usec Delay variation: 16 usec

--- Delay measurement statistics ---
Packets transmitted: 10, Valid packets received: 9, Invalid packets received: 1
Average delay: 105 usec, Average delay variation: 9 usec
Best case delay: 92 usec, Worst case delay: 122 usec
```

show oam ethernet connectivity-fault-management delay-statistics

Syntax	<pre>show oam ethernet connectivity-fault-management delay-statistics <count <i>entry-count</i>> <local-mep <i>mep-id</i>> <maintenance-association <i>ma-name</i>> <maintenance-domain <i>md-name</i>> <remote-mep <i>remote-mep-id</i>></pre>
Release Information	<p>Command introduced in Junos OS Release 9.5.</p> <p>Command introduced in Junos OS Release 11.4 for EX Series switches.</p>
Description	<p>On MX Series routers with Ethernet interfaces on Dense Port Concentrators (DPCs), display ETH-DM delay statistics.</p> <p>On EX Series switches, display delay measurement results.</p>
Options	<p>count <i>entry-count</i>—(Optional) Number of entries to display from the statistics table. The range of values is 1 through 100. The default value is 100 entries.</p> <p>local-mep <i>mep-id</i>—(Optional) Numeric identifier of the local MEP. On MX Series routers, the range of values is 1 through 8192. On EX Series switches, the range of values is 1 through 8191.</p> <p>maintenance-association <i>ma-name</i>—Name of an existing CFM maintenance association.</p> <p>maintenance-domain <i>md-name</i>—Name of an existing connectivity fault management (CFM) maintenance domain.</p> <p>remote-mep <i>remote-mep-id</i>—(Optional) Numeric identifier of the remote MEP. On MX Series routers, the range of values is 1 through 8192. On EX Series switches, the range of values is 1 through 8191.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> clear oam ethernet connectivity-fault-management statistics clear oam ethernet connectivity-fault-management delay-statistics on page 1924 show oam ethernet connectivity-fault-management interfaces show oam ethernet connectivity-fault-management mep-database show oam ethernet connectivity-fault-management mep-statistics
List of Sample Output	<p>show oam ethernet connectivity-fault-management delay-statistics on page 1935</p> <p>show oam ethernet connectivity-fault-management delay-statistics remote-mep on page 1935</p>

Output Fields Table 238 on page 1934 lists the output fields for the **show oam ethernet connectivity-fault-management delay-statistics** command and the **show oam ethernet connectivity-fault-management mep-statistics** command. Output fields are listed in the approximate order in which they appear.

Table 238: show oam ethernet connectivity-fault-management delay-statistics and mep-statistics Output Fields

Output Field Name	Field Description
MEP identifier	Maintenance association end point (MEP) numeric identifier.
MAC address	Unicast MAC address configured for the MEP.
Remote MEP count	Number of remote MEPs (unless you specify the remote-mep option).
Remote MEP identifier	Numeric identifier of the remote MEP.
Remote MAC address	Unicast MAC address of the remote MEP.
Index	Index number that corresponds to the ETH-DM entry in the CFM database.
One-way delay (usec)	<p>For a one-way ETH-DM session, the frame delay time, in microseconds, measured at the receiver MEP.</p> <p>For a detailed description of one-way Ethernet frame delay measurement, see the <i>ITU-T Y.1731 Ethernet Service OAM</i> topics in the <i>Junos OS Network Interfaces Library for Routing Devices</i>.</p>
Two-way delay (usec)	<p>For a two-way ETH-DM session, the frame delay time, in microseconds, measured at the initiator MEP.</p> <p>For a detailed description of two-way Ethernet frame delay measurement, see the <i>ITU-T Y.1731 Ethernet Service OAM</i> topics in the <i>Junos OS Network Interfaces Library for Routing Devices</i>.</p>
Average one-way delay	Average one-way frame delay for the statistics displayed.
Average one-way delay variation	Average one-way “frame jitter” for the statistics displayed.
Best-case one-way delay	Lowest one-way frame delay for the statistics displayed.
Worst-case one-way delay	Highest one-way frame delay for the statistics displayed.
Average two-way delay	Average two-way frame delay for the statistics displayed.
Average two-way delay variation	Average two-way “frame jitter” for the statistics displayed.
Best-case two-way delay	Lowest two-way frame delay for the statistics displayed.
Worst-case two-way delay	Highest two-way frame delay calculated in this session.

Sample Output

show oam ethernet connectivity-fault-
management
delay-statistics

```
user@switch> show oam ethernet connectivity-fault-management delay-statistics
maintenance-domain md6 maintenance-association ma6
```

```
MEP identifier: 100, MAC address: 00:05:85:73:7b:39
```

```
Remote MEP count: 2
```

```
Remote MEP identifier: 101
```

```
Remote MAC address: 00:05:85:73:39:4a
```

```
Delay measurement statistics:
```

Index	One-way delay (usec)	Two-way delay (usec)
1	259	519
2	273	550
3	287	571
4	299	610
5	313	650

```
Average one-way delay : 286 usec
```

```
Average one-way delay variation: 62 usec
```

```
Best case one-way delay : 259 usec
```

```
Worst case one-way delay : 313 usec
```

```
Average two-way delay : 580 usec
```

```
Average two-way delay variation: 26 usec
```

```
Best case two-way delay : 519 usec
```

```
Worst case two-way delay : 650 usec
```

```
Remote MEP identifier: 102
```

```
Remote MAC address: 00:04:55:63:39:5a
```

```
Delay measurement statistics:
```

Index	One-way delay (usec)	Two-way delay (usec)
1	29	58
2	23	59
3	27	56
4	29	62
5	33	68

```
Average one-way delay : 28 usec
```

```
Average one-way delay variation: 3 usec
```

```
Best case one-way delay : 23 usec
```

```
Worst case one-way delay : 33 usec
```

```
Average two-way delay : 60 usec
```

```
Average two-way delay variation: 3 usec
```

```
Best case two-way delay : 56 usec
```

```
Worst case two-way delay : 68 usec
```

show oam ethernet connectivity-fault-
management delay-statistics remote-mep

```
user@switch> show oam ethernet connectivity-fault-management delay-statistics
maintenance-domain md6 maintenance-association ma6 remote-mep 101
```

```
MEP identifier: 100, MAC address: 00:05:85:73:7b:39
```

```
Remote MEP identifier: 101
```

```
Remote MAC address: 00:05:85:73:39:4a
```

```
Delay measurement statistics:
```

Index	One-way delay (usec)	Two-way delay (usec)
1	259	519
2	273	550
3	287	571
4	299	610
5	313	650
Average one-way delay		: 286 usec
Average one-way delay variation:		62 usec
Best case one-way delay		: 259 usec
Worst case one-way delay		: 313 usec
Average two-way delay		: 580 usec
Average two-way delay variation:		26 usec
Best case two-way delay		: 519 usec
Worst case two-way delay		: 650 usec

show oam ethernet connectivity-fault-management forwarding-state

Syntax	show oam ethernet connectivity-fault-management forwarding-state interface <i>interface-name</i> <brief detail extensive>
Release Information	Command introduced in Junos OS Release 10.2 for EX Series switches.
Description	Display IEEE 802.1ag Operation, Administration, and Management (OAM) connectivity fault management forwarding state information for Ethernet interfaces.
Options	interface <i>interface-name</i> —Display forwarding state information for the specified Ethernet interface only. brief detail extensive —(Optional) Display the specified level of output.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear oam ethernet connectivity-fault-management statistics on page 1927 • show oam ethernet connectivity-fault-management path-database on page 1948 • show oam ethernet connectivity-fault-management mip on page 1957
List of Sample Output	show oam ethernet connectivity-fault-management forwarding-state on page 1938 show oam ethernet connectivity-fault-management forwarding-state interface on page 1938 show oam ethernet connectivity-fault-management forwarding-state interface detail on page 1939 show oam ethernet connectivity-fault-management forwarding-state interface interface-name on page 1940
Output Fields	Table 239 on page 1937 lists the output fields for the show oam ethernet connectivity-fault-management forwarding-state command. Output fields are listed in the approximate order in which they appear.

Table 239: show oam ethernet connectivity-fault-management forwarding-state Output Fields

Field Name	Field Description	Level of Output
Interface name	Interface identifier.	All levels
Filter action	Filter action for messages at the level.	All levels
Nexthop type	Next-hop type.	All levels
Nexthop index	Next-hop index number.	brief

Table 239: show oam ethernet connectivity-fault-management forwarding-state Output Fields (continued)

Field Name	Field Description	Level of Output
Level	Maintenance domain (MD) level.	detail
Direction	MEP direction configured.	none
CEs	Number of customer edge (CE) interfaces.	All levels

Sample Output

show oam ethernet
connectivity-fault-
management forwarding-
state

```
user@host> show oam ethernet connectivity-fault-management forwarding-state
```

```
CEs: 3
```

```
Maintenance domain forwarding state:
```

Level	Direction	Filter action	Nexthop type	Nexthop index
0		Drop	none	
1		Drop	none	
2		Drop	none	
3		Drop	none	
4		Drop	none	
5		Drop	none	
6		Drop	none	
7		Drop	none	

show oam ethernet
connectivity-fault-
management forwarding-
state interface

```
user@host> show oam ethernet connectivity-fault-management forwarding-state interface
```

```
Interface name: ge-3/0/0.0
```

```
Maintenance domain forwarding state:
```

Level	Direction	Filter action	Nexthop type	Nexthop index
0		Drop	none	
1		Drop	none	
2		Drop	none	
3		Drop	none	
4		Drop	none	
5		Drop	none	
6		Drop	none	
7	down	Receive	none	

```
Interface name: xe-0/0/0.0
```

```
Instance name: __+bd1__
```


Maintenance domain forwarding state:

Level	Direction	Filter action	Nexthop type	Nexthop index
0		Drop	none	
1		Drop	none	
2		Drop	none	
3		Drop	none	
4		Drop	none	
5		Drop	none	
6		Drop	none	
7	down	Receive	none	

**show oam ethernet
connectivity-fault-
management forwarding-
state interface detail**

user@host> **show oam ethernet connectivity-fault-management forwarding-state interface detail**

Interface name: ge-3/0/0.0

Level: 0
Filter action: Drop
Nexthop type: none

Level: 1
Filter action: Drop
Nexthop type: none

Level: 2
Filter action: Drop
Nexthop type: none

Level: 3
Filter action: Drop
Nexthop type: none

Level: 4
Filter action: Drop
Nexthop type: none

Level: 5
Filter action: Drop
Nexthop type: none

Level: 6
Filter action: Drop
Nexthop type: none

Level: 7
Direction: down
Filter action: Receive
Nexthop type: none

Interface name: xe-0/0/0.0

Level: 0
Filter action: Drop

```
Nexthop type: none

Level: 1
Filter action: Drop
Nexthop type: none

...
```

`show oam ethernet
connectivity-fault-
management forwarding-
state interface
interface-name`

```
user@host> show oam ethernet connectivity-fault-management forwarding-state interface  
interface-name ge-3/0/0.0
```

```
Interface name: ge-3/0/0.0
```

```
Maintenance domain forwarding state:
```

Level	Direction	Filter action	Nexthop type	Nexthop index
0		Drop	none	
1		Drop	none	
2		Drop	none	
3		Drop	none	
4		Drop	none	
5		Drop	none	
6		Drop	none	
7	down	Receive	none	

show oam ethernet connectivity-fault-management interfaces

Syntax	<pre>show oam ethernet connectivity-fault-management interfaces <ethernet-interface-name> <level md-level> <brief detail extensive></pre>
Release Information	Command introduced in Junos OS Release 10.2 for EX Series switches.
Description	Display IEEE 802.1ag Operation, Administration, and Management (OAM) connectivity fault management (CFM) database information for Ethernet interfaces.
Options	<p>brief detail extensive—(Optional) Display the specified level of output.</p> <p>ethernet-interface-name—(Optional) Display CFM information only for CFM entities attached to the specified Ethernet interface.</p> <p>level md-level—(Optional) Display CFM information for CFM identities enclosed within a maintenance domain of the specified level.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear oam ethernet connectivity-fault-management statistics on page 1927 • show oam ethernet connectivity-fault-management path-database on page 1948 • show oam ethernet connectivity-fault-management mip on page 1957
List of Sample Output	<p>show oam ethernet connectivity-fault-management interfaces on page 1944</p> <p>show oam ethernet connectivity-fault-management interfaces detail on page 1945</p> <p>show oam ethernet connectivity-fault-management interfaces extensive on page 1945</p> <p>show oam ethernet connectivity-fault-management interfaces level on page 1946</p> <p>show oam ethernet connectivity-fault-management interfaces (Trunk Interfaces) on page 1946</p>
Output Fields	Table 240 on page 1941 lists the output fields for the show oam ethernet connectivity-fault-management interfaces command. Output fields are listed in the approximate order in which they appear.

Table 240: show oam ethernet connectivity-fault-management interfaces Output Fields

Field Name	Field Description	Level of Output
Interface	Interface identifier.	All levels
Interface status	Local interface status.	All levels

Table 240: show oam ethernet connectivity-fault-management interfaces Output Fields (continued)

Field Name	Field Description	Level of Output
Link status	Local link status. Up , down , or oam-down .	All levels
Maintenance domain name	Maintenance domain name.	detail extensive
Format (Maintenance domain)	Maintenance domain name format configured.	detail extensive
Level	Maintenance domain level configured.	All levels
Maintenance association name	Maintenance association name.	detail extensive
Format (Maintenance association)	Maintenance association name format configured.	detail extensive
Continuity-check status	Continuity-check status.	detail extensive
Interval	Continuity-check message interval.	detail extensive
Loss-threshold	Lost continuity-check message threshold.	detail extensive
MEP identifier	Maintenance association end point (MEP) identifier.	All levels
Neighbours	Number of MEP neighbors.	All levels
Direction	MEP direction configured.	detail extensive
MAC address	MAC address configured for the MEP.	detail extensive
MEP status	Indicates the status of the Connectivity Fault Management (CFM) protocol running on the MEP: Running , inactive , disabled , or unsupported .	detail extensive
Remote MEP not receiving CCM	Whether the remote MEP is not receiving connectivity check messages (CCMs).	detail extensive
Erroneous CCM received	Whether erroneous CCMs have been received.	detail extensive
Cross-connect CCM received	Whether cross-connect CCMs have been received.	detail extensive
RDI sent by some MEP	Whether the remote defect indication (RDI) bit is set in messages that have been received. The absence of the RDI bit in a CCM indicates that the transmitting MEP is receiving CCMs from all configured MEPs.	detail extensive

Table 240: show oam ethernet connectivity-fault-management interfaces Output Fields (continued)

Field Name	Field Description	Level of Output
CCMs sent	Number of CCMs transmitted.	detail extensive
CCMs received out of sequence	Number of CCMs received out of sequence.	detail extensive
LBM sent	Number of loopback request messages (LBMs) sent.	detail extensive
Valid in-order LBRs received	Number of loopback response messages (LBRs) received that were valid messages and in sequence.	detail extensive
Valid out-of-order LBRs received	Number of LBRs received that were valid messages and not in sequence.	detail extensive
LBRs received with corrupted data	Number of LBRs received that were corrupted.	detail extensive
LBRs sent	Number of LBRs transmitted.	detail extensive
LTM sent	Linktrace messages (LTMs) transmitted.	detail extensive
LTM received	Linktrace messages received.	detail extensive
LTR sent	Linktrace responses (LTRs) transmitted.	detail extensive
LTR received	Linktrace responses received.	detail extensive
Sequence number of next LTM request	Sequence number of next LTM request to be transmitted.	detail extensive
1DMs sent	<p>If the interface is attached to an initiator MEP for a one-way ETH-DM session: Number of one-way delay measurement (1DM) PDU frames sent to the peer MEP in this session.</p> <p>For all other cases, this field displays 0.</p>	detail extensive
Valid 1DMs received	<p>If the interface is attached to a receiver MEP for a one-way ETH-DM session: Number of valid 1DM frames received.</p> <p>For all other cases, this field displays 0.</p>	detail extensive
Invalid 1DMs received	<p>If the interface is attached to a receiver MEP for a one-way ETH-DM session: Number of invalid 1DM frames received.</p> <p>For all other cases, this field displays 0.</p>	detail extensive
DMMs sent	<p>If the interface is attached to an initiator MEP for a two-way ETH-DM session: Number of Delay Measurement Message (DMM) PDU frames sent to the peer MEP in this session.</p> <p>For all other cases, this field displays 0.</p>	detail extensive

Table 240: show oam ethernet connectivity-fault-management interfaces Output Fields (continued)

Field Name	Field Description	Level of Output
DMRs sent	If the interface is attached to a responder MEP for a two-way ETH-DM session: Number of Delay Measurement Reply (DMR) frames sent. For all other cases, this field displays 0.	detail extensive
Valid DMRs received	If the interface is attached to an initiator MEP for a two-way ETH-DM session: Number of valid DMRs received. For all other cases, this field displays 0.	detail extensive
Invalid DMRs received	If the interface is attached to an initiator MEP for a two-way ETH-DM session: Number of invalid DMRs received. For all other cases, this field displays 0.	detail extensive
Remote MEP count	Number of remote MEPs.	extensive
Identifier (remote MEP)	MEP identifier of the remote MEP.	extensive
MAC address (remote MEP)	MAC address of the remote MEP.	extensive
State (remote MEP)	State of the remote MEP.	extensive
Interface (remote MEP)	Interface of the remote MEP.	extensive

Sample Output

show oam ethernet connectivity-fault-management interfaces

```
user@host> show oam ethernet connectivity-fault-management interfaces
```

Interface	Link	Status	Level	MEP Identifier	Neighbours
ge-1/1/0.0	Up	Active	0	2	1
ge-1/1/0.1	Up	Active	0	2	1
ge-1/1/0.10	Up	Active	0	2	1
ge-1/1/0.100	Up	Active	0	2	1
ge-1/1/0.101	Up	Active	0	2	1
ge-1/1/0.102	Up	Active	0	2	1
ge-1/1/0.103	Up	Active	0	2	1
ge-1/1/0.104	Up	Active	0	2	1
ge-1/1/0.105	Up	Active	0	2	1
ge-1/1/0.106	Up	Active	0	2	1
...					

show oam ethernet connectivity-fault-management interfaces detail

```

user@host> show oam ethernet connectivity-fault-management interfaces detail
Interface name: ge-5/2/9.0, Interface status: Active, Link status: Up
Maintenance domain name: md0, Format: string, Level: 5
Maintenance association name: ma1, Format: string
Continuity-check status: enabled, Interval: 100ms, Loss-threshold: 3 frames
MEP identifier: 1, Direction: down, MAC address: 00:90:69:0b:4b:94
MEP status: running
Defects:
  Remote MEP not receiving CCM                : no
  Erroneous CCM received                      : yes
  Cross-connect CCM received                  : no
  RDI sent by some MEP                       : yes
Statistics:
  CCMs sent                                  : 76
  CCMs received out of sequence              : 0
  LBMs sent                                  : 0
  Valid in-order LBRs received               : 0
  Valid out-of-order LBRs received          : 0
  LBRs received with corrupted data          : 0
  LBRs sent                                  : 0
  LTMs sent                                  : 0
  LTMs received                              : 0
  LTRs sent                                  : 0
  LTRs received                              : 0
  Sequence number of next LTM request        : 1320235363
  1DMs sent                                  : 0
  Valid 1DMs received                       : 0
  Invalid 1DMs received                     : 0
  DMMs sent                                  : 0
  DMRs sent                                  : 0
  Valid DMRs received                      : 0
  Invalid DMRs received                    : 0
Remote MEP count: 2
Identifier  MAC address      State  Interface
  2001      00:90:69:0b:7f:71  ok    ge-5/2/9.0
  4001      00:90:69:0b:09:c5  ok    ge-5/2/9.0

```

show oam ethernet connectivity-fault-management interfaces extensive

```

user@host> show oam ethernet connectivity-fault-management interfaces extensive
Interface name: ge-5/2/9.0, Interface status: Active, Link status: Up
Maintenance domain name: md0, Format: string, Level: 5
Maintenance association name: ma1, Format: string
Continuity-check status: enabled, Interval: 100ms, Loss-threshold: 3 frames
MEP identifier: 1, Direction: down, MAC address: 00:90:69:0b:4b:94
MEP status: running
Defects:
  Remote MEP not receiving CCM                : no
  Erroneous CCM received                      : yes
  Cross-connect CCM received                  : no
  RDI sent by some MEP                       : yes
Statistics:
  CCMs sent                                  : 76

```

```

CCMs received out of sequence      : 0
LBMs sent                          : 0
Valid in-order LBRs received       : 0
Valid out-of-order LBRs received  : 0
LBRs received with corrupted data  : 0
LBRs sent                         : 0
LTMs sent                         : 0
LTMs received                     : 0
LTRs sent                         : 0
LTRs received                     : 0
Sequence number of next LTM request : 1542035464
1DMs sent                         : 0
Valid 1DMs received               : 0
Invalid 1DMs received             : 0
DMMs sent                        : 0
DMRs sent                        : 0
Valid DMRs received              : 0
Invalid DMRs received            : 0
Remote MEP count: 2
Identifier  MAC address  State  Interface
2001      00:90:69:0b:7f:71  ok   ge-5/2/9.0
4001      00:90:69:0b:09:c5  ok   ge-5/2/9.0

```

show oam ethernet connectivity-fault-management interfaces level

```
user@host> show oam ethernet connectivity-fault-management interfaces level 7
```

Interface	Link	Status	Level	MEP Identifier	Neighbours
ge-3/0/0.0	Up	Active	7	201	0
xe-0/0/0.0	Up	Active	7	203	1

show oam ethernet connectivity-fault-management interfaces (Trunk Interfaces)

```
user@host> show oam ethernet connectivity-fault-management interfaces
```

Interface	Link	Status	Level	MEP Identifier	Neighbours
ge-4/0/1.0, vlan 100	Up	Active	5	100	0
ge-10/3/10.4091, vlan 4091	Down	Inactive	4	400	0
ge-4/0/0.0	Up	Active	6	200	0

```
user@host> show oam ethernet connectivity-fault-management interfaces ge-4/0/0.0
```

Interface	Link	Status	Level	MEP Identifier	Neighbours
ge-4/0/0.0	Up	Active	6	200	0

```
user@host> show oam ethernet connectivity-fault-management interfaces ge-4/0/1.0 vlan 100
```


Interface	Link	Status	Level	MEP Identifier	Neighbours
ge-4/0/1.0, vlan 100	Up	Active	5	100	0

user@host> show oam ethernet connectivity-fault-management interfaces ge-10/3/10.4091
vlan 4091

Interface	Link	Status	Level	MEP Identifier	Neighbours
ge-10/3/10.4091, vlan 4091	Down	Inactive	4	400	0

show oam ethernet connectivity-fault-management path-database

Syntax	show oam ethernet connectivity-fault-management path-database <i>host</i> maintenance-association <i>ma-name</i> maintenance-domain <i>md-name</i> <i>mac-address</i>
Release Information	Command introduced in Junos OS Release 10.2 for EX Series switches.
Description	Display IEEE 802.1ag Operation, Administration, and Management (OAM) connectivity fault management maintenance linktrace database information.
Options	<p>mac-address—Display connectivity fault management path database information for the specified MAC address of the remote host.</p> <p>maintenance-association <i>ma-name</i>—Display connectivity fault management path database information for the specified maintenance association.</p> <p>maintenance-domain <i>md-name</i>—Display connectivity fault management path database information for the specified maintenance domain.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear oam ethernet connectivity-fault-management statistics on page 1927 • show oam ethernet connectivity-fault-management interfaces on page 1941 • show oam ethernet connectivity-fault-management mip on page 1957
List of Sample Output	show oam ethernet connectivity-fault-management path-database on page 1949 show oam ethernet connectivity-fault-management linktrace path-database (Two traceroute Commands) on page 1949
Output Fields	Table 241 on page 1948 lists the output fields for the show oam ethernet connectivity-fault-management path-database command. Output fields are listed in the approximate order in which they appear.

Table 241: show oam ethernet connectivity-fault-management linktrace path-database Output Fields

Field Name	Field Description
Linktrace to	MAC address of the 802.1ag node to which the linktrace message is targeted.
Interface	Interface used by the local MEP to send the linktrace message (LTM).
Maintenance Domain	Maintenance domain identifier specified in the traceroute command.
Maintenance Association	Maintenance association identifier specified in the traceroute command.

Table 241: show oam ethernet connectivity-fault-management linktrace path-database Output Fields (continued)

Field Name	Field Description
Level	Maintenance domain level configured for the maintenance domain.
Local Mep	MEP identifier of the local MEP originating the linktrace.
Hop	Sequential hop count of the linktrace path.
TTL	Number of hops remaining in the linktrace message (LTM). The time to live (TTL) is decremented at each hop.
Source MAC address	MAC address of the 802.1ag maintenance intermediate point (MIP) that is forwarding the LTM.
Next hop MAC address	MAC address of the 802.1ag node that is the next hop in the LTM path.
Transaction Identifier	4-byte identifier maintained by the MEP. Each LTM uses a transaction identifier. The transaction identifier is maintained globally across all maintenance domains. Use the transaction identifier to match an incoming linktrace responses (LTR), with a previously sent LTM.

Sample Output

show oam ethernet connectivity-fault-management path-database

```
user@host> show oam ethernet connectivity-fault-management path-database
maintenance-domain MD1 maintenance-association MA1 00:01:02:03:04:05
```

```
Linktrace to 00:01:02:03:04:05, Interface : ge-5/0/0.0
Maintenance Domain: MD1, Level: 7
Maintenance Association: MA1, Local Mep: 1
```

Hop	TTL	Source MAC address	Next hop MAC address
Transaction Identifier:100001			
1	63	00:00:aa:aa:aa:aa	00:00:bb:bb:bb:bb
2	62	00:00:bb:bb:bb:bb	00:00:cc:cc:cc:cc
3	61	00:00:cc:cc:cc:cc	00:01:02:03:04:05
4	60	00:01:02:03:04:05	00:00:00:00:00:00

show oam ethernet connectivity-fault-management linktrace path-database (Two traceroute Commands)

```
user@host> show oam ethernet connectivity-fault-management path-database
maintenance-domain MD2 maintenance-association MA2 00:06:07:08:09:0A
```

```
Linktrace to 00:06:07:08:09:0A, Interface : ge-5/0/1.0
Maintenance Domain: MD2, Level: 6
Maintenance Association: MA2, Local Mep: 10
```

Hop	TTL	Source MAC address	Next hop MAC address
Transaction Identifier:100002			
1	63	00:00:aa:aa:aa:aa	00:00:bb:bb:bb:bb
2	62	00:00:bb:bb:bb:bb	00:00:cc:cc:cc:cc
3	61	00:00:cc:cc:cc:cc	00:06:07:08:09:0A
4	60	00:06:07:08:09:0A	00:00:00:00:00:00

Transaction Identifier:100003

1	63	00:00:aa:aa:aa:aa	00:00:bb:bb:bb:bb
2	62	00:00:bb:bb:bb:bb	00:00:cc:cc:cc:cc
3	61	00:00:cc:cc:cc:cc	00:06:07:08:09:0A
4	60	00:06:07:08:09:0A	00:00:00:00:00:00

show oam ethernet connectivity-fault-management mep-database

Syntax	<pre>show oam ethernet connectivity-fault-management mep-database maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> <local-mep <i>local-mep-id</i>> <remote-mep <i>remote-mep-id</i>></pre>
Release Information	Command introduced in Junos OS Release 10.2 for EX Series switches.
Description	Display IEEE 802.1ag Operation, Administration, and Management (OAM) connectivity fault management (CFM) database information for CFM maintenance association end points (MEPs) in a CFM session.
Options	<p>maintenance-association <i>ma-name</i>—Display connectivity fault management information for the specified maintenance association.</p> <p>maintenance-domain <i>domain-name</i>—Display connectivity fault management information for the specified maintenance domain.</p> <p>local-mep <i>local-mep-id</i>—(Optional) Display connectivity fault management information for the specified local MEP only.</p> <p>remote-mep <i>remote-mep-id</i>—(Optional) Display connectivity fault management information for the specified remote MEP only.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear oam ethernet connectivity-fault-management statistics on page 1927 • show oam ethernet connectivity-fault-management interfaces on page 1941 • show oam ethernet connectivity-fault-management mip on page 1957
List of Sample Output	<p>show oam ethernet connectivity-fault-management mep-database on page 1955</p> <p>show oam ethernet connectivity-fault-management mep-database local-mep remote-mep on page 1955</p> <p>show oam ethernet connectivity-fault-management mep-database remote-mep (Action Profile Event) on page 1955</p>
Output Fields	Table 242 on page 1952 lists the output fields for the show oam ethernet connectivity-fault-management mep-database command. Output fields are listed in the approximate order in which they appear.

Table 242: show oam ethernet connectivity-fault-management mep-database Output Fields

Field Name	Field Description
Maintenance domain name	Maintenance domain name.
Format (Maintenance domain)	Maintenance domain name format configured.
Level	Maintenance domain level configured.
Maintenance association name	Maintenance association name.
Format (Maintenance association)	Maintenance association name format configured.
Continuity-check status	Continuity-check status.
Interval	Continuity-check message interval.
MEP identifier	Maintenance association end point (MEP) identifier.
Direction	MEP direction configured.
MAC address	MAC address configured for the MEP.
Auto-discovery	Whether automatic discovery is enabled or disabled.
Priority	Priority used for CCMs and linktrace messages transmitted by the MEP.
Interface name	Interface identifier.
Interface status	Local interface status.
Link status	Local link status.
Remote MEP not receiving CCM	Whether the remote MEP is not receiving CCMs.
Erroneous CCM received	Whether erroneous CCMs have been received.
Cross-connect CCM received	Whether cross-connect CCMs have been received.
RDI sent by some MEP	Whether the remote defect indication (RDI) bit is set in messages that have been received. The absence of the RDI bit in a CCM indicates that the transmitting MEP is receiving CCMs from all configured MEPs.
CCMs sent	Number of CCMs transmitted.

Table 242: show oam ethernet connectivity-fault-management mep-database Output Fields (continued)

Field Name	Field Description
CCMs received out of sequence	Number of CCMs received out of sequence.
LBMs sent	Number of loopback messages (LBMs) sent.
Valid in-order LBRs received	Number of loopback response messages (LBRs) received that were valid messages and in sequence.
Valid out-of-order LBRs received	Number of LBRs received that were valid messages and not in sequence.
LBRs received with corrupted data	Number of LBRs received that were corrupted.
LBRs sent	Number of LBRs transmitted.
LTMs sent	Linktrace messages (LTMs) transmitted.
LTMs received	Linktrace messages received.
LTRs sent	Linktrace responses (LTRs) transmitted.
LTRs received	Linktrace responses received.
Sequence number of next LTM request	Sequence number of the next linktrace message request to be transmitted.
1DMs sent	<p>If the MEP is an initiator for a one-way ETH-DM session: Number of one-way delay measurement (1DM) PDU frames sent to the peer MEP in this session.</p> <p>For all other cases, this field displays 0.</p>
Valid 1DMs received	<p>If the MEP is a receiver for a one-way ETH-DM session: Number of valid 1DM frames received.</p> <p>For all other cases, this field displays 0.</p>
Invalid 1DMs received	<p>If the MEP is a receiver for a one-way ETH-DM session: Number of invalid 1DM frames received.</p> <p>For all other cases, this field displays 0.</p>
DMMs sent	<p>If the MEP is an initiator for a two-way ETH-DM session: Number of Delay Measurement Message (DMM) PDU frames sent to the peer MEP in this session.</p> <p>For all other cases, this field displays 0.</p>
DMRs sent	<p>If the MEP is a responder for a ETH-DM session: Number of Delay Measurement Reply (DMR) frames sent.</p> <p>For all other cases, this field displays 0.</p>

Table 242: show oam ethernet connectivity-fault-management mep-database Output Fields (continued)

Field Name	Field Description
Valid DMRs received	If the MEP is an initiator for a two-way ETH-DM session: Number of valid DMRs received. For all other cases, this field displays 0.
Invalid DMRs received	If the MEP is an initiator for a two-way ETH-DM session: Number of invalid DMRs received. For all other cases, this field displays 0.
Remote MEP identifier	MEP identifier of the remote MEP.
State (remote MEP)	State of the remote MEP: idle , start , ok , or failed .
MAC address	MAC address of the remote MEP.
Type	Whether the remote MEP MAC address was learned using automatic discovery or configured.
Interface	Interface of the remote MEP. A seven-digit number is appended if CFM is configured to run on a routing instance of type VPLS.
Last flapped	Date, time, and how long ago the remote MEP interface went from down to up. The format is Last flapped: year-month-day hours:minutes:seconds timezone (hours:minutes:seconds ago) . For example, Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago) .
Remote defect indication	Whether the remote defect indication (RDI) bit is set in messages that have been received or transmitted.
Port status TLV	<ul style="list-style-type: none"> In the Maintenance domain section, displays the last transmitted port status TLV value. In the Remote MEP section, displays the last value of port status TLV received from the remote MEP. <p>In the Action profile section, displays, the last occurred event port-status-tlv blocked event. This event occurred due to the reception of blocked value in the port status TLV from remote MEP.</p>
Interface status TLV	<ul style="list-style-type: none"> In the Maintenance domain section, displays the last transmitted interface status TLV value. In the Remote MEP section, displays the last value of interface status TLV received from the remote MEP. <p>In the Action profile section, if displays, the last occurred event interface-status-tlv event (either lower-layer-down or down). This event occurred due to the reception of either lower or down value in the interface status TLV from remote MEP.</p>
Action profile	Name of the action profile occurrence associated with a remote MEP.
Last event	When an action profile occurs, displays the last event that triggered it.
Last event cleared	When all the configured and occurred events (under action profile) are cleared, then the action taken gets reverted (such as down interface is made up) and the corresponding time is noted and displayed.
Action	Action taken and the corresponding time of the action occurrence.

Sample Output

show oam ethernet connectivity-fault-management mep-database

```

user@host> show oam ethernet connectivity-fault-management mep-database
maintenance-domain vpls-vlan2000 maintenance-association vpls-vlan200

Maintenance domain name: vpls-vlan2000, Format: string, Level: 5
Maintenance association name: vpls-vlan200, Format: string
Continuity-check status: enabled, Interval: 100ms, Loss-threshold: 3 frames
MEP identifier: 200, Direction: up, MAC address: 00:19:e2:b0:74:01
Auto-discovery: enabled, Priority: 0
Interface name: ge-0/0/1.0, Interface status: Active, Link status: Up
Defects:
  Remote MEP not receiving CCM                : no
  Erroneous CCM received                      : no
  Cross-connect CCM received                  : no
  RDI sent by some MEP                       : no
Statistics:
  CCMs sent                                  : 1476
  CCMs received out of sequence              : 0
  LBMs sent                                  : 85
  Remote MEP count: 1
Identifier  MAC address      State  Interface
  100      00:19:e2:b2:81:4b  ok    vt-0/1/10.1049088

```

show oam ethernet connectivity-fault-management mep-database local-mep remote-mep

```

user@host> show oam ethernet connectivity-fault-management mep-database
maintenance-domain vpls-vlan2000 maintenance-association vpls-vlan200 local-mep 200
remote-mep 100

Maintenance domain name: vpls-vlan2000, Format: string, Level: 5
Maintenance association name: vpls-vlan200, Format: string
Continuity-check status: enabled, Interval: 100ms, Loss-threshold: 3 frames
MEP identifier: 200, Direction: up, MAC address: 00:19:e2:b0:74:01
Auto-discovery: enabled, Priority: 0
Interface name: ge-0/0/1.0, Interface status: Active, Link status: Up

Remote MEP identifier: 100, State: ok
MAC address: 00:19:e2:b2:81:4b, Type: Learned
Interface: vt-0/1/10.1049088
Last flapped: Never
Remote defect indication: false
Port status TLV: none
Interface status TLV: none

```

show oam ethernet connectivity-fault-management mep-database remote-mep (Action Profile Event)

```

user@host> show oam ethernet connectivity-fault-management mep-database
maintenance-domain md5 maintenance-association ma5 remote-mep 200

Maintenance domain name: md5, Format: string, Level: 5
Maintenance association name: ma5, Format: string
Continuity-check status: enabled, Interval: 1s, Loss-threshold: 3 frames

```

```
MEP identifier: 100, Direction: down, MAC address: 00:05:85:73:e8:ad
Auto-discovery: enabled, Priority: 0
Interface status TLV: none, Port status TLV: none
Interface name: ge-1/0/8.0, Interface status: Active, Link status: Up

Remote MEP identifier: 200, State: ok
MAC address: 00:05:85:73:96:1f, Type: Configured
Interface: ge-1/0/8.0
Last flapped: Never
Remote defect indication: false
Port status TLV: none
Interface status TLV: lower-layer-down
Action profile: juniper
  Last event: Interface-status-tlv lower-layer-down
  Action: Interface-down, Time: 2009-03-27 14:25:10 PDT (00:00:02 ago)
```

show oam ethernet connectivity-fault-management mip

Syntax	<code>show oam ethernet connectivity-fault-management mip <qualifier></code>
Release Information	Command introduced in Junos OS Release 10.2 for EX Series switches.
Description	Display all the maintenance association intermediate points (MIPs) created in the system. Specify qualifiers to display specific MIPs.
Options	<i>qualifier</i> —(Optional) Display the specified MIP.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show oam ethernet connectivity-fault-management interfaces on page 1941 • show oam ethernet connectivity-fault-management path-database on page 1948
List of Sample Output	show oam ethernet connectivity-fault-management mip on page 1957
Output Fields	Table 243 on page 1957 lists the output fields for the show oam ethernet connectivity-fault-management mip command. Output fields are listed in the approximate order in which they appear.

Table 243: show oam ethernet connectivity-fault-management mip Output Fields

Field Name	Field Description
MIP information for instance	Header for the MIP information showing the MIP name.
Interface	Interface type-dpc/pic/port.unit-number.
Level	MIP level configured.

Sample Output

show oam ethernet
connectivity-fault-
management mip

```
user@host> show oam ethernet connectivity-fault-management mip
MIP information for  __mip_name__
MIP information for  default-switch bd1
```

Interface	Level
ge-3/0/0.0	7
ge-3/0/1.0	6
ge-3/0/3.0	6

show oam ethernet connectivity-fault-management sla-iterator-statistics

Syntax	<pre>show oam ethernet connectivity-fault-management sla-iterator-statistics maintenance-domain <i>md-name</i> maintenance-association <i>ma-name</i> sla-iterator <i>sla-iterator</i> <local-mep <i>local-mep-id</i>> <remote-mep <i>remote-mep-id</i>></pre>
Release Information	<p>Command introduced in Junos OS Release 11.4 for EX Series switches.</p> <p>Command introduced in Junos OS Release 9.6.</p> <p>Command introduced in Junos OS Release 12.2 for ACX Series routers.</p> <p>Command introduced in Junos OS Release 13.2 for MX Series routers (not on MPC3E Hyperion cards).</p>
Description	Display the Ethernet Operation, Administration, and Maintenance (OAM) service-level agreement (SLA) iterator statistics.
Options	<p>maintenance-domain <i>md-name</i>—Name of an existing connectivity fault management (CFM) maintenance domain.</p> <p>maintenance-association <i>ma-name</i>—Name of an existing CFM maintenance association.</p> <p>sla-iterator <i>sla-iterator</i>— Name of the iterator profile.</p> <p>local-mep <i>local-mep-id</i>—(Optional) Numeric identifier of the local MEP. The range of values is 1 through 8191.</p> <p>remote-mep <i>remote-mep-id</i>—(Optional) Numeric identifier of the remote MEP. The range of values is 1 through 8192.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • Configuring an Iterator Profile on a Switch (CLI Procedure) on page 749 • clear oam ethernet connectivity-fault-management sla-iterator-statistics on page 1926
List of Sample Output	<p>show oam ethernet connectivity-fault-management sla-iterator-statistics on page 1962</p> <p>show oam ethernet connectivity-fault-management sla-iterator-statistics (MX Series routers) on page 1963</p> <p>show oam ethernet connectivity-fault-management sla-iterator-statistics (MX Series routers) - Delay Measurement (DM) in Metro Ethernet Forum (MEF) mode on page 1964</p> <p>show oam ethernet connectivity-fault-management sla-iterator-statistics (MX Series routers) - Synthetic loss measurement (SLM) in Metro Ethernet Forum (MEF) mode on page 1965</p>

[show oam ethernet connectivity-fault-management sla-iterator-statistics \(MX Series routers\) - Delay measurement \(DM\) statistics in non-Metro Ethernet Forum \(MEF\) mode on page 1966](#)

[show oam ethernet connectivity-fault-management sla-iterator-statistics \(MX Series routers\) - Synthetic loss measurement \(SLM\) statistics in non-Metro Ethernet Forum \(MEF\) mode on page 1966](#)

[show oam ethernet connectivity-fault-management sla-iterator-statistics \(MX Series routers\) - Delay Measurement \(DM\) with “legacy-pm-display” option in enhanced-cfm mode on page 1967](#)

[show oam ethernet connectivity-fault-management state - To verify the Connectivity Fault Management \(CFM\) state on page 1968](#)

Output Fields Table 244 on page 1960 lists the output fields for the **show oam ethernet connectivity-fault-management sla-iterator-statistics** command. Output fields are listed in the approximate order in which they appear.

Table 244: show oam ethernet connectivity-fault-management sla-iterator-statistics Output Fields

Output Field Name	Output Field Description
Maintenance domain	Name of the maintenance domain.
Level	Level of the maintenance domain level configured.
Maintenance association	Name of the maintenance association.
Local MEP id	Numeric identifier of the local MEP.
Remote MEP id	Numeric identifier of the remote MEP.
Remote MAC address	Unicast MAC address of the remote MEP.
Iterator name	Name of iterator.
Iterator Id	Numeric identifier of the iterator.
Iterator cycle time	Number of cycles (in milliseconds) taken between back-to-back transmission of SLA frames for this connection
Iteration period	Maximum number of cycles per iteration
Iterator status	Current status of iterator whether running or stopped.
Infinite iterations	Status of iteration as infinite or finite.
Counter reset time	Date and time when the counter was reset.
Reset reason	Reason to reset counter.
Delay weight	Calculation weight of delay.

Table 244: show oam ethernet connectivity-fault-management sla-iterator-statistics Output Fields (continued)

Output Field Name	Output Field Description
Delay variation weight	Calculation weight of delay variation.
DMM sent	Delay measurement message (DMM) PDU frames sent to the peer MEP in this session.
DMM skipped for threshold hit	Number of DMM frames sent to the peer MEP in this session skipped during threshold hit.
DMM skipped for threshold hit window	Number of DMM frames sent to the peer MEP in this session skipped during the last threshold hit window.
DMR received	Number of delay measurement reply (DMR) frames received.
DMR out of sequence	Total number of DMR out of sequence packets received.
DMR received with invalid time stamps	Total number of DMR frames received with invalid timestamps.
Average two-way delay	Average two-way frame delay for the statistics displayed.
Average two-way delay variation	Average two-way "frame jitter" for the statistics displayed.
Average one-way forward delay variation	Average one-way forward delay variation for the statistics displayed in microseconds.
Average one-way backward delay variation	Average one-way backward delay variation for the statistics displayed in microseconds.
Weighted average two-way delay	Weighted average two-way delay for the statistics displayed in microseconds.
Weighted average two-way delay variation	Weighted average two-way delay variation for the statistics displayed in microseconds.
Weighted average one-way backward delay variation	Weighted average one-way backward delay variation for the statistics displayed in microseconds.
Weighted average one-way forward delay variation	Weighted average one-way forward delay variation for the statistics displayed in microseconds.
SLM packets sent	Total number of synthetic loss message (SLM) PDU frames sent from the source MEP to the remote MEP during this ETH-SLM session.
SLM packets received	Total number of synthetic loss message (SLM) PDU frames that the remote MEP received from the source MEP during this ETH-SLM session.
SLR packets sent	Total number of synthetic loss reply (SLR) PDU frames that the remote MEP sent to the source MEP during this measurement session.

Table 244: show oam ethernet connectivity-fault-management sla-iterator-statistics Output Fields (continued)

Output Field Name	Output Field Description
SLR packets received	Total number of synthetic loss reply (SLR) PDU frames that the source MEP received from the remote MEP during this measurement session.
Local TXFC1 value	Number of synthetic frames transmitted to the peer MEP for a test ID. A test ID is used to distinguish each synthetic loss measurement because multiple measurements can be simultaneously activated also on a given CoS and MEP pair. It must be unique at least within the context of any SLM for the MEG and initiating MEP.
Local RXFC1 value	Number of synthetic frames received from the peer MEP for a test ID. The MEP generates a unique Test ID for the session, adds the source MEP ID, and initializes the local counters for the session before SLM initiation. For each SLM PDU transmitted for the session (test ID), the local counter TXFC1 is sent in the packet.
Last Received SLR frame TXFCf(tc)	Value of the local counter TxFC1 at the time of SLM frame transmission.
Last Received SLR frame TXFCb(t)	Value of the local counter RxFC1 at the time of SLR frame transmission.
Frame loss (near-end)	Count of frame loss associated with ingress data frames.
Frame loss (far-end)	Count of frame loss associated with egress data frames.

Sample Output

show oam ethernet connectivity-fault-management sla-iterator-statistics

```
user@switch> show oam ethernet connectivity-fault-management sla-iterator-statistics
sla-iterator il maintenance-domain default-1 maintenance-association ma1 local-mep 1
remote-mep 2
```

```
Iterator statistics:
Maintenance domain: md6, Level: 6
Maintenance association: ma6, Local MEP id: 1000
Remote MEP id: 103, Remote MAC address: 00:90:69:0a:43:92
Iterator name: il, Iterator Id: 1
Iterator cycle time: 10ms, Iteration period: 1 cycles
Iterator status: running, Infinite iterations: true
Counter reset time: 2010-03-19 20:42:39 PDT (2d 18:24 ago)
Reset reason: Adjacency flap

Iterator delay measurement statistics:
Delay weight: 1, Delay variation weight: 1
DMM sent : 23898520
DMM skipped for threshold hit : 11000
DMM skipped for threshold hit window : 0
DMR received : 23851165
DMR out of sequence : 1142
DMR received with invalid time stamps : 36540
Average two-way delay : 129 usec
Average two-way delay variation : 15 usec
```



```

Average one-way forward delay variation      : 22 usec
Average one-way backward delay variation    : 22 usec
Weighted average two-way delay              : 134 usec
Weighted average two-way delay variation    : 8 usec
Weighted average one-way forward delay variation : 6 usec
Weighted average one-way backward delay variation : 2 usec

```

Sample Output

show oam ethernet connectivity-fault-management sla-iterator-statistics (MX Series routers)

```

user@router> show oam ethernet connectivity-fault-management sla-iterator-statistics
maintenance-domain mdu maintenance-association mau local-mep 4 remote-mep 3 sla-iterator
lm

```

```

Iterator statistics:
Maintenance domain: 2, Level: 2
Maintenance association: W-160432000-001, Local MEP id: 2
Remote MEP id: 1, Remote MAC address: 00:90:69:0a:43:39
Iterator name: iter1, Iterator Id: 1
Iterator cycle time: 100ms, Iteration period: 10 cycles
Iterator status: running, Infinite iterations: true
Counter reset time: 2012-09-25 02:15:31 PDT (00:00:45 ago)
Reset reason: Adjacency flap
Iterator loss measurement statistics:
  LMM sent : 444
  LMM skipped for threshold hit : 0
  LMM skipped for threshold hit window: 0
  LMR received : 444
  LMR out of sequence : 0
  LMR forwarding-class mismatch : 0
Accumulated transmit statistics:
  Near-end (CIR) : 0
  Far-end (CIR) : 0
  Near-end (EIR) : 0
  Far-end (EIR) : 0
Accumulated receive statistics:
  Near-end (CIR) : 0
  Far-end (CIR) : 0
  Near-end (EIR) : 0
  Far-end (EIR) : 0
Accumulated loss statistics:
  Near-end loss (CIR) : 0
  Near-end loss-ratio (CIR) : 0 (0.00000%)
  Far-end loss (CIR) : 0
  Far-end loss-ratio (CIR) : 0 (0.00000%)
  Near-end loss (EIR) : 0
  Near-end loss-ratio (EIR) : 0 (0.00000%)
  Far-end loss (EIR) : 0
  Far-end loss-ratio (EIR) : 0 (0.00000%)
Last loss measurement statistics:
  Near-end (CIR) : 0
  Far-end (CIR) : 0
  Near-end (EIR) : 0
  Far-end (EIR) : 0

```

Sample Output

show oam ethernet connectivity-fault-management sla-iterator-statistics (MX Series routers) - Delay Measurement (DM)in Metro Ethernet Forum (MEF) mode

```
user@router> show oam ethernet connectivity-fault-management sla-iterator-statistics
maintenance-domain md6-1 maintenance-association ma1 local-mep 1 remote-mep 2 sla-iterator
DM
```

Iterator statistics:

```
Maintenance domain: md6-1, Level: 6
Maintenance association: ma1, Local MEP id: 1
Remote MEP id: 2, Remote MAC address: 00:23:9c:db:0d:7a
Iterator name: Test_DM, Iterator Id: 1
Iterator cycle time: 1000ms, Iteration period: 2000 cycles
Iterator status: running, Infinite iterations: true
Counter reset time: 2018-12-05 19:48:23 PST (00:00:54 ago)
Reset reason: Adjacency flap
Current delay measurement statistics:
  Measurement Interval Index          : 2 (Suspect status : 1)
  Measurement Interval Start Time     : 2018-12-05 19:48:23 PST (Elapsed
time : 53011 msec)
  Frame Delay two way (min, max, avg)  : 251 , 295 , 262 (usec)
  Frame Delay forward (min, max, avg)  : 125 , 147 , 131 (usec)
  Frame Delay backward (min, max, avg) : 125 , 147 , 131 (usec)
  Inter Frame Delay two way (min, max, avg) : 0 , 42 , 7 (usec)
  Inter Frame Delay forward (min, max, avg) : 0 , 21 , 3 (usec)
  Inter Frame Delay backward (min, max, avg) : 0 , 21 , 3 (usec)
  Frame Delay Range two way (max, avg)  : 0 , 0 (usec)
  Frame Delay Range forward (max, avg)  : 0 , 0 (usec)
  Frame Delay Range backward (max, avg) : 0 , 0 (usec)
  SOAM TXed                           : 52
  SOAM RXed                           : 52
```

Delay measurement bin statistics:

```
Measurement Interval Index      : 2
Two Way Frame Delay
  [0 - 4999 ] (usec) : 52
  [5000 - 9999 ] (usec) : 0
  [10000 - Infinity ] (usec) : 0
Forward Frame Delay
  [0 - 4999 ] (usec) : 52
  [5000 - 9999 ] (usec) : 0
  [10000 - Infinity ] (usec) : 0
Backward Frame Delay
  [0 - 4999 ] (usec) : 52
  [5000 - 9999 ] (usec) : 0
  [10000 - Infinity ] (usec) : 0
Two Way Inter Frame Delay Variation
  [0 - 4999 ] (usec) : 51
  [5000 - 9999 ] (usec) : 0
  [10000 - Infinity ] (usec) : 0
Forward Inter Frame Delay Variation
  [0 - 4999 ] (usec) : 51
  [5000 - 9999 ] (usec) : 0
  [10000 - Infinity ] (usec) : 0
Backward Inter Frame Delay Variation
  [0 - 4999 ] (usec) : 51
  [5000 - 9999 ] (usec) : 0
  [10000 - Infinity ] (usec) : 0
```

```

Two Way Frame Delay Range
[0          - 4999      ] (usec)  : 0
[5000       - 9999      ] (usec)  : 0
[10000      - Infinity   ] (usec)  : 0
Forward Frame Delay Range
[0          - 4999      ] (usec)  : 0
[5000       - 9999      ] (usec)  : 0
[10000      - Infinity   ] (usec)  : 0
Backward Frame Delay Range
[0          - 4999      ] (usec)  : 0
[5000       - 9999      ] (usec)  : 0
[10000      - Infinity   ] (usec)  : 0

```

show oam ethernet connectivity-fault-management sla-iterator-statistics (MX Series routers) - Synthetic loss measurement (SLM) in Metro Ethernet Forum (MEF) mode

```

user@router> show oam ethernet connectivity-fault-management sla-iterator-statistics
maintenance-domain md6-1 maintenance-association ma1 local-mep 1 remote-mep 2 sla-iterator
SLM

```

Iterator statistics:

```

Maintenance domain: md6-1, Level: 6
Maintenance association: ma1, Local MEP id: 1
Remote MEP id: 2, Remote MAC address: 00:23:9c:db:0d:7a
Iterator name: Test_SLM, Iterator Id: 2
Iterator cycle time: 1000ms, Iteration period: 2000 cycles
Iterator status: running, Infinite iterations: true
Counter reset time: 2018-12-05 19:48:23 PST (00:00:11 ago)
Reset reason: Adjacency flap

```

Iterator synthetic loss measurement statistics:

```

SLM skipped for threshold hit          : 0
SLM skipped for threshold hit window   : 0
SLR out of sequence                    : 0
SLM Sample Size                        : 180 SLMs
Local packet Stats (TxFCI, RxFCI)      : 11, 11
Last SLR packet stats (TxFCf, TxFCb)   : 11, 11
Last measured FLR (fwd, bkwd)          : 0.000%, 0.000% (Sample #NA)

```

Current Measurement Interval loss statistics:

```

Measurement Interval Index              : 2 (Suspect Status: 1)
Measurement Interval Start Time         : 2018-12-05 19:48:23 PST (Elapsed time:
10042 msec)
SOAM Frames (Tx, Rx)                   : 10, 10
Forward Frame Stats (Tx, Rx)            : 10, 10
Backward Frame Stats (Tx, Rx)           : 10, 10
Frame Loss (fwd, bkwd)                  : 0, 0
Forward FLR minimum                     : 0.000%
Forward FLR maximum                     : 0.000%
Forward FLR average                     : 0.000%
Backward FLR minimum                    : 0.000%
Backward FLR maximum                    : 0.000%
Backward FLR average                    : 0.000%

```

Current Measurement Interval availability statistics:

```

Measurement Interval Index              : 2 (Suspect Status: 1)
Measurement Interval Start Time         : 2018-12-05 19:48:23 PST (Elapsed time:
10042 msec)
High loss (fwd, bkwd)                   : 0 , 0

```

```

Consecutive high loss (fwd, bkwd) : 0 , 0
Available (fwd, bkwd) : 0 , 0
Unavailable (fwd, bkwd) : 0 , 0
Forward FLR minimum : 0.000%
Forward FLR maximum : 0.000%
Forward FLR average : 0.000%
Backward FLR minimum : 0.000%
Backward FLR maximum : 0.000%
Backward FLR average : 0.000%

Last known available status (fwd, bkwd) : unknown, unknown
Last known forward availability transition : NA
Last known backward availability transition : NA

```

show oam ethernet connectivity-fault-management sla-iterator-statistics (MX Series routers) - Delay measurement (DM) statistics in non-Metro Ethernet Forum (MEF) mode

```

user@router> show oam ethernet connectivity-fault-management sla-iterator-statistics
maintenance-domain md6-1 maintenance-association ma1 local-mep 1 remote-mep 2 sla-iterator
DM

```

```

Iterator statistics:
Maintenance domain: md6-1, Level: 6
Maintenance association: ma1, Local MEP id: 1
Remote MEP id: 2, Remote MAC address: 00:23:9c:db:0d:7a
Iterator name: Test_DM, Iterator Id: 1
Iterator cycle time: 1000ms, Iteration period: 2000 cycles
Iterator status: running, Infinite iterations: true
Counter reset time: 2018-12-05 19:43:47 PST (00:02:44 ago)
Reset reason: Adjacency flap
Iterator delay measurement statistics:
Calculation weight: Delay: 1, Delay variation: 1
DMM sent : 164
DMM skipped for threshold hit : 0
DMM skipped for threshold hit window : 0
DMR received : 164
DMR out of sequence : 0
DMR forwarding-class mismatch : 0
DMR received with invalid time stamps : 0
Average two-way delay : 234 usec
Average two-way delay variation : 9 usec
Average one-way forward delay variation : 346 usec
Average one-way backward delay variation : 346 usec
Weighted average two-way delay : 221 usec
Weighted average two-way delay variation : 2 usec
Weighted average one-way forward delay variation : 357 usec
Weighted average one-way backward delay variation : 355 usec
Bestcase two-way delay : 210 usec
Worstcase two-way delay : 283 usec
Weighted Bestcase two-way delay : 210 usec
Weighted Worstcase two-way delay : 283 usec

```

show oam ethernet connectivity-fault-management sla-iterator-statistics (MX Series routers) - Synthetic loss measurement (SLM) statistics in non-Metro Ethernet Forum (MEF) mode

```

user@router> show oam ethernet connectivity-fault-management sla-iterator-statistics
maintenance-domain md6-1 maintenance-association ma1 local-mep 1 remote-mep 2 sla-iterator
SLM

```

```

Iterator statistics:
Maintenance domain: md6-1, Level: 6
Maintenance association: ma1, Local MEP id: 1
Remote MEP id: 2, Remote MAC address: 00:23:9c:db:0d:7a
Iterator name: Test_SLM, Iterator Id: 2
Iterator cycle time: 1000ms, Iteration period: 2000 cycles
Iterator status: running, Infinite iterations: true
Counter reset time: 2018-12-05 19:43:47 PST (00:03:23 ago)
Reset reason: Adjacency flap
Iterator synthetic loss measurement statistics:
  SLM sent : 202
  SLM skipped for threshold hit : 0
  SLM skipped for threshold hit window: 0
  SLR received : 202
  SLR out of sequence : 0
SLM transmit statistics:
  SLM TXed : 202
  SLM RXed : 202
  SLM Last packet Tx count : 202
  SLM Last packet Rx count : 202
Last loss measurement statistics:
  Near-end loss : 0 (0.00%)
  Far-end loss : 0 (0.00%)

```

show oam ethernet connectivity-fault-management sla-iterator-statistics (MX Series routers) - Delay Measurement (DM) with “legacy-pm-display” option in enhanced-cfm mode

```

user@router> show oam ethernet connectivity-fault-management sla-iterator-statistics
maintenance-domain md6-1 maintenance-association ma1 local-mep 1 remote-mep 2 sla-iterator
Legacy

```

```

Iterator statistics:
Maintenance domain: md6-1, Level: 6
Maintenance association: ma1, Local MEP id: 1
Remote MEP id: 2, Remote MAC address: 00:23:9c:db:0d:7a
Iterator name: Test_DM_Legacy, Iterator Id: 3
Iterator cycle time: 1000ms, Iteration period: 2000 cycles
Iterator status: running, Infinite iterations: true
Counter reset time: 2018-12-05 19:51:33 PST (00:00:15 ago)
Reset reason: Adjacency flap
Iterator delay measurement statistics:
  Calculation weight: Delay: 1, Delay variation: 1
  DMM sent : 14
  DMM skipped for threshold hit : 0
  DMM skipped for threshold hit window : 0
  DMR received : 14
  DMR out of sequence : 0
  DMR forwarding-class mismatch : 0
  DMR received with invalid time stamps : 0
  Average two-way delay : 324 usec
  Average two-way delay variation : 7 usec
  Average one-way forward delay variation : 240 usec
  Average one-way backward delay variation : 240 usec
  Weighted average two-way delay : 324 usec
  Weighted average two-way delay variation : 6 usec
  Weighted average one-way forward delay variation : 222 usec
  Weighted average one-way backward delay variation : 222 usec
  Bestcase two-way delay : 312 usec

```

Worstcase two-way delay	: 333 usec
Weighted Bestcase two-way delay	: 312 usec
Weighted Worstcase two-way delay	: 333 usec

show oam ethernet connectivity-fault-management state - To verify the Connectivity Fault Management (CFM) state

The following command is to verify whether the CFM state is in enhanced-cfm mode or not.

```
user@router> show oam ethernet connectivity-fault-management state
```

```
Connectivity fault management state:
  CFM Mode Of Operation: Enhanced
  Enhanced IP Mode: Enabled
  CFM Config State: Ok
  CFM Cleanup State: Ok
  CFM Restart Timer State: Cleanup Timer State stopped Rebooting in 0 sec
  CFM CFMMAN Job State: Not Pending
  Number of sessions: 1
  Number of sessions created: 1
  Number of sessions deleted: 0
  Number of sessions freed: 0
  Number of sessions enqueued: 1
  Number of sessions dequeued: 1
  VPLS feature: enabled
  Token based forwarding feature: enabled
  Forwarding table filtering simulation feature: disabled
  Hardware assisted flooding feature: enabled
  Flood resynchronization for GRES feature: enabled
  Shared interface filter feature: disabled
  Hardware timestamping feature: disabled
  Marking of connection protection TLV feature: disabled
  CFMD config memory resource limit(in bytes): 3221225472
  CFMD max resident set (peak) size (in bytes): 24158208

Packet processing state:
  State of the connection to packet processing daemon: down
  State of the flow to packet processing daemon: ready
  State of the packet processing job: ready
  Number of times the connection to packet processing daemon was blocked: 0
  State of the connection to cfmmman: slots: 2 3 4 5

Filter state:
  State of the connection to firewall daemon: Connected
  Number of reconnects made to firewall daemon: 0
  Number of requests sent to firewall daemon: 13
  Number of requests accepted by firewall daemon: 13
  Number of requests rejected by firewall daemon: 0
  Number of requests lost due to disconnection: 0
```

CHAPTER 80

Operational Commands: Ethernet OAM Link Fault Management

- `show oam ethernet link-fault-management`

show oam ethernet link-fault-management

Syntax `show oam ethernet link-fault-management
<brief | detail>
<interface-name>`

Release Information Command introduced in Junos OS Release 9.4 for EX Series switches.

Description Displays Operation, Administration, and Maintenance (OAM) link fault management (LFM) information for Ethernet interfaces.

Options **brief | detail**—(Optional) Display the specified level of output.

interface-name —(Optional) Display link fault management information for the specified Ethernet interface only.

Required Privilege Level view

Related Documentation

- *Example: Configuring Ethernet OAM Link Fault Management*
- [Configuring Ethernet OAM Link Fault Management on page 48](#)

List of Sample Output [show oam ethernet link-fault-management brief on page 1974](#)
[show oam ethernet link-fault-management detail on page 1974](#)

Output Fields [Table 245 on page 1970](#) lists the output fields for the **show oam ethernet link-fault-management** command. Output fields are listed in the approximate order in which they appear.

Table 245: show oam ethernet link-fault-management Output Fields

Field Name	Field Description	Level of Output
Status	Indicates the status of the established link. <ul style="list-style-type: none"> • Fail—A link fault condition exists. • Running—A link fault condition does not exist. 	All levels
Discovery state	State of the discovery mechanism: <ul style="list-style-type: none"> • Passive Wait • Send Any • Send Local Remote • Send Local Remote Ok 	All levels
Peer address	Address of the OAM peer.	All levels

Table 245: show oam ethernet link-fault-management Output Fields (continued)

Field Name	Field Description	Level of Output
Flags	Information about the interface. <ul style="list-style-type: none"> • Remote-Stable—Indicates remote OAM client acknowledgment of, and satisfaction with local OAM state information. False indicates that remote DTE has either not seen or is unsatisfied with local state information. True indicates that remote DTE has seen and is satisfied with local state information. • Local-Stable—Indicates local OAM client acknowledgment of, and satisfaction with remote OAM state information. False indicates that local DTE either has not seen or is unsatisfied with remote state information. True indicates that local DTE has seen and is satisfied with remote state information. • Remote-State-Valid—Indicates the OAM client has received remote state information found within Local Information TLVs of received Information OAM PDUs. False indicates that OAM client has not seen remote state information. True indicates that the OAM client has seen remote state information. 	All levels
Remote loopback status	Indicates the remote loopback status. An OAM entity can put its remote peer into loopback mode using the Loopback control OAM PDU. In loopback mode, every frame received is transmitted back on the same port (except for OAM PDUs, which are needed to maintain the OAM session).	All levels
Remote entity information	Remote entity information. <ul style="list-style-type: none"> • Remote MUX action—Indicates the state of the multiplexer functions of the OAM sublayer. Device is forwarding non-OAM PDUs to the lower sublayer or discarding non-OAM PDUs. • Remote parser action—Indicates the state of the parser function of the OAM sublayer. Device is forwarding non-OAM PDUs to higher sublayer, looping back non-OAM PDUs to the lower sublayer, or discarding non-OAM PDUs. • Discovery mode—Indicates whether discovery mode is active or inactive. • Unidirectional mode—Indicates the ability to operate a link in a unidirectional mode for diagnostic purposes. • Remote loopback mode—Indicates whether remote loopback is supported or not supported. • Link events—Indicates whether interpreting link events is supported or not supported on the remote peer. • Variable requests—Indicates whether variable requests are supported or not supported. The Variable Request OAM PDU, is used to request one or more MIB variables from the remote peer. 	All levels
OAM Receive Statistics		
Information	The number of information PDUs received.	detail
Event	The number of loopback control PDUs received.	detail
Variable request	The number of variable request PDUs received.	detail
Variable response	The number of variable response PDUs received.	detail
Loopback control	The number of loopback control PDUs received.	detail

Table 245: show oam ethernet link-fault-management Output Fields (continued)

Field Name	Field Description	Level of Output
Organization specific	The number of vendor organization specific PDUs received.	detail
OAM Transmit Statistics		
Information	The number of information PDUs transmitted.	detail
Event	The number of event notification PDUs transmitted.	detail
Variable request	The number of variable request PDUs transmitted.	detail
Variable response	The number of variable response PDUs transmitted.	detail
Loopback control	The number of loopback control PDUs transmitted.	detail
Organization specific	The number of vendor organization specific PDUs transmitted.	detail
OAM Received Symbol Error Event information		
Events	The number of symbol error event TLVs that have been received after the OAM sublayer was reset.	detail
Window	The symbol error event window in the received PDU. The protocol default value is the number of symbols that can be received in one second on the underlying physical layer.	detail
Threshold	The number of errored symbols in the period required for the event to be generated.	detail
Errors in period	The number of symbol errors in the period reported in the received event PDU.	detail
Total errors	The number of errored symbols that have been reported in received event TLVs after the OAM sublayer was reset. Symbol errors are coding symbol errors.	detail
OAM Received Frame Error Event Information		
Events	The number of errored frame event TLVs that have been received after the OAM sublayer was reset.	detail
Window	The duration of the window in terms of the number of 100 ms period intervals.	detail
Threshold	The number of detected errored frames required for the event to be generated.	detail
Errors in period	The number of detected errored frames in the period.	detail

Table 245: show oam ethernet link-fault-management Output Fields (continued)

Field Name	Field Description	Level of Output
Total errors	The number of errored frames that have been reported in received event TLVs after the OAM sublayer was reset. A frame error is any frame error on the underlying physical layer.	detail
OAM Received Frame Period Error Event Information		
Events	The number of frame seconds errors event TLVs that have been received after the OAM sublayer was reset.	detail
Window	The duration of the frame seconds window.	detail
Threshold	The number of frame seconds errors in the period.	detail
Errors in period	The number of frame seconds errors in the period.	detail
Total errors	The number of frame seconds errors that have been reported in received event TLVs after the OAM sublayer was reset.	detail
OAM Transmitted Symbol Error Event Information		
Events	The number of symbol error event TLVs that have been transmitted after the OAM sublayer was reset.	detail
Window	The symbol error event window in the transmitted PDU.	detail
Threshold	The number of errored symbols in the period required for the event to be generated.	detail
Errors in period	The number of symbol errors in the period reported in the transmitted event PDU.	detail
Total errors	The number of errored symbols reported in event TLVs that have been transmitted after the OAM sublayer was reset.	detail
OAM Transmitted Frame Error Event Information		
Events	The number of errored frame event TLVs that have been transmitted after the OAM sublayer was reset.	detail
Window	The duration of the window in terms of the number of 100 ms period intervals.	detail
Threshold	The number of detected errored frames required for the event to be generated.	detail
Errors in period	The number of detected errored frames in the period.	detail
Total errors	The number of errored frames that have been detected after the OAM sublayer was reset.	detail

Sample Output

show oam ethernet link-fault-management brief

```
user@host> show oam ethernet link-fault-management brief
```

```
Interface: ge-0/0/1
Status: Running, Discovery state: Send Any
Peer address: 00:90:69:72:2c:83
Flags:Remote-Stable Remote-State-Valid Local-Stable 0x50
Remote loopback status: Disabled on local port, Enabled on peer port
Remote entity information:
  Remote MUX action: discarding, Remote parser action: loopback
  Discovery mode: active, Unidirectional mode: unsupported
  Remote loopback mode: supported, Link events: supported
  Variable requests: unsupported
```

show oam ethernet link-fault-management detail

```
user@host> show oam ethernet link-fault-management detail
```

```
Interface: ge-0/0/1
Status: Running, Discovery state: Send Any
Peer address: 00:90:69:0a:07:14
Flags:Remote-Stable Remote-State-Valid Local-Stable 0x50
OAM receive statistics:
  Information: 186365, Event: 0, Variable request: 0, Variable response: 0
  Loopback control: 0, Organization specific: 0
OAM transmit statistics:
  Information: 186347, Event: 0, Variable request: 0, Variable response: 0
  Loopback control: 0, Organization specific: 0
OAM received symbol error event information:
  Events: 0, Window: 0, Threshold: 0
  Errors in period: 0, Total errors: 0
OAM received frame error event information:
  Events: 0, Window: 0, Threshold: 0
  Errors in period: 0, Total errors: 0
OAM received frame period error event information:
  Events: 0, Window: 0, Threshold: 0
  Errors in period: 0, Total errors: 0
OAM transmitted symbol error event information:
  Events: 0, Window: 0, Threshold: 1
  Errors in period: 0, Total errors: 0
OAM transmitted frame error event information:
  Events: 0, Window: 0, Threshold: 1
  Errors in period: 0, Total errors: 0
Remote entity information:
  Remote MUX action: forwarding, Remote parser action: forwarding
  Discovery mode: active, Unidirectional mode: unsupported
  Remote loopback mode: supported, Link events: supported
  Variable requests: unsupported
```

CHAPTER 81

Operational Commands: Uplink Failure Detection

- `show uplink-failure-detection`

show uplink-failure-detection

Syntax	<code>show uplink-failure-detection</code> <code><group group-name></code>
Release Information	Command introduced in Junos OS Release 11.1 for EX Series switches.
Description	Display information about the uplink-failure-detection group, the member interfaces, and their status.
Options	none —Display information about all groups configured for uplink failure detection. group group-name —(Optional) Display information about the specified group only.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> Configuring Interfaces for Uplink Failure Detection (CLI Procedure) on page 69
List of Sample Output	show uplink-failure-detection on page 1976
Output Fields	Table 246 on page 1976 lists the output fields for the show uplink-failure-detection command. Output fields are listed in the approximate order in which they appear.

Table 246: show uplink-failure-detection Output Fields

Field Name	Field Description
Group	Name of the group.
Uplink	The uplink interface or interfaces configured as link-to-monitor. NOTE: The asterisk (*) indicates that the link is up.
Downlink	The downlink interface or interfaces configured as link-to-disable. NOTE: The asterisk (*) indicates that the link is up.
Failure Action	Status of uplink failure detection: <ul style="list-style-type: none"> Active—The switch has detected an uplink failure and has brought the downlink down. Inactive—The uplink or uplinks are up.

Sample Output

show uplink-failure-detection

```
user@switch> show uplink-failure-detection
```

```
Group      : group1
Uplink     : ge-0/0/0*
Downlink   : ge-0/0/1*
Failure Action : Inactive
```

```
Group      : group2
Uplink     : ge-0/0/3.0
Downlink   : ge-0/0/4.0
Failure Action : Active
```


CHAPTER 82

Operational Commands: RPM

- `show services rpm active-servers`
- `show services rpm history-results`
- `show services rpm probe-results`

show services rpm active-servers

Syntax `show services rpm active-servers`

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 for EX Series switches.
 Command introduced in Junos OS Release 13.2 for PTX Series Packet Transport routers.
 Command introduced in Junos OS Release 18.1 for QFX Series switches.

Description Display the protocols and corresponding ports for which a router or switch is configured as a real-time performance monitoring (RPM) server.

Options This command has no options.

Required Privilege Level view

List of Sample Output [show services rpm active-servers on page 1980](#)

Output Fields [Table 226 on page 1888](#) lists the output fields for the **show services rpm active-servers** command. Output fields are listed in the approximate order in which they appear.

Table 247: show services rpm active-servers Output Fields

Field Name	Field Description
Protocol	Protocol configured on the receiving probe server. The protocol can be the User Datagram Protocol (UDP) or the Transmission Control Protocol (TCP).
Port	Port configured on the receiving probe server.
Destination interface name	Output interface name for the probes.

Sample Output

`show services rpm active-servers`

```
user@host> show services rpm active-servers
```

```
Protocol: TCP, Port: 50000, Destination interface name: lt-0/0/0.0
Protocol: UDP, Port: 50001, Destination interface name: lt-0/0/0.0
```

show services rpm history-results

Syntax show services rpm history-results
 <brief | detail>
 <dst-interface *interface-name*>
 <owner *owner*>
 <limit *number*>
 <since *time*>
 <source-address *address*>
 <target-address *address*>
 <test *name*>

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 on EX Series switches.
 Command introduced in Junos OS Release 13.2 on PTX Series Packet Transport routers.
dst-interface, **limit**, **source-address**, and **target-address** options introduced in Junos OS Release 18.1R1 on MX Series.
owner and **test** options became optional in Junos OS Release 18.1R1 on MX Series.
 Command introduced in Junos OS Release 18.1 on QFX Series switches.

Description Display the results stored for the specified real-time performance monitoring (RPM) probes.

Options **none**—(Optional) Display the results of the last 50 probes for all RPM instances.

brief | detail—(Optional) Display the specified level of output.

dst-interface *interface-name*—(Optional) Display information only for RPM probes that are generated on this MS-MPC or MS-MIC services interface. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface. You must also configure the **owner** option.

limit *number*—(Optional) Limit the number of results that are displayed. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface. You must also configure the **owner** option.

Range: 1 through 4,294,967,295

Default: 100

owner *owner*—(Optional) Display information only for probes with the specified probe owner. You must configure **owner** if you configure any of the following options: **dst-interface**, **limit**, **source-address**, or **target-address**.

since *time*—(Optional) Display information from the specified time. Specify time as *yyyy-mm-dd.hh:mm:ss*.

source-address *address*—(Optional) Display information only for probes with the specified source address. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface. You must also configure the **owner** option.

target-address address—(Optional) Display information only for probes with the specified target address. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface. You must also configure the **owner** option.

test name—(Optional starting in Junos OS Release 18.1R1) Display information only for the specified test.

Do not configure **test** if you configure any of the following options: **dst-interface**, **limit**, **source-address**, or **target-address**. These options do not work when you configure **test**.

Required Privilege Level view

List of Sample Output [show services rpm history-results owner test on page 1983](#)
[show services rpm history-results owner test detail on page 1983](#)

Output Fields [Table 227 on page 1890](#) lists the output fields for the **show services rpm history-results** command. Output fields are listed in the approximate order in which they appear.

Table 248: show services rpm history-results Output Fields

Field Name	Field Description	Level of Output
Owner	Probe owner.	All levels
Test	Name of a test for a probe instance.	All levels
Probe received	Timestamp when the probe result was determined.	All levels
Round trip time	Average ping round-trip time (RTT), in microseconds.	All levels
Probe results	Result of a particular probe performed by a remote host. The following information is contained in the results: <ul style="list-style-type: none"> Response received—Timestamp when the probe result was determined. Rtt—Average ping round-trip time (RTT), in microseconds. 	detail
Results over current test	Displays the results for the current test by probe at the time each probe was completed, as well as the status of the current test at the time the probe was completed.	detail
Probes sent	Number of probes sent with the current test.	detail
Probes received	Number of probe responses received within the current test.	detail
Loss percentage	Percentage of lost probes for the current test.	detail

Table 248: *show services rpm history-results* Output Fields (continued)

Field Name	Field Description	Level of Output
Measurement	<p>Increment of measurement. Possible values are round-trip time delay and, for the probe type icmp-pin-timestamp, the egress and ingress delay:</p> <ul style="list-style-type: none"> Minimum—Minimum RTT, ingress delay, or egress delay measured over the course of the current test. Maximum—Maximum RTT, ingress delay, or egress delay measured over the course of the current test. Average—Average RTT, ingress delay, or egress delay measured over the course of the current test. Jitter—Difference, in microseconds, between the maximum and minimum RTT measured over the course of the current test. Stddev—Standard deviation of the round-trip time, in microseconds, measured over the course of the current test. 	detail

Sample Output

show services rpm history-results owner test

```
user@host> show services rpm history-results owner p1 test t1
```

Owner, Test	Probe received	Round trip time
p1, t1	Wed Aug 12 01:02:35 2009	315 usec
p1, t1	Wed Aug 12 01:02:36 2009	266 usec
p1, t1	Wed Aug 12 01:02:37 2009	314 usec
p1, t1	Wed Aug 12 01:02:38 2009	388 usec
p1, t1	Wed Aug 12 01:02:39 2009	316 usec
p1, t1	Wed Aug 12 01:02:40 2009	271 usec
p1, t1	Wed Aug 12 01:02:41 2009	314 usec
p1, t1	Wed Aug 12 01:02:42 2009	1180 usec

show services rpm history-results owner test detail

```
user@host> show services rpm history-results owner p1 test t1 detail
```

```

Owner: p1, Test: t1, Probe type: icmp-ping-timestamp
Probe results:
  Response received, Wed Aug 12 01:02:35 2009,
  Client and server hardware timestamps
  Rtt: 315 usec
Results over current test:
  Probes sent: 1, Probes received: 1, Loss percentage: 0
  Measurement: Round trip time
    Samples: 1, Minimum: 315 usec, Maximum: 315 usec, Average: 315 usec,
    Peak to peak: 0 usec, Stddev: 0 usec, Sum: 315 usec

Owner: p1, Test: t1, Probe type: icmp-ping-timestamp
Probe results:
  Response received, Wed Aug 12 01:02:36 2009,
  Client and server hardware timestamps
  Rtt: 266 usec, Round trip jitter: -50 usec,
```

```
Round trip interarrival jitter: 3 usec
Results over current test:
Probes sent: 2, Probes received: 2, Loss percentage: 0
Measurement: Round trip time
  Samples: 2, Minimum: 266 usec, Maximum: 315 usec, Average: 291 usec,
  Peak to peak: 49 usec, Stddev: 24 usec, Sum: 581 usec
Measurement: Negative round trip jitter
  Samples: 1, Minimum: 50 usec, Maximum: 50 usec, Average: 50 usec,
  Peak to peak: 0 usec, Stddev: 0 usec, Sum: 50 usec
```

```
Owner: p1, Test: t1, Probe type: icmp-ping-timestamp
```

```
Probe results:
```

```
Response received, Wed Aug 12 01:02:37 2009,
Client and server hardware timestamps
Rtt: 314 usec, Round trip jitter: 49 usec,
Round trip interarrival jitter: 6 usec
```

```
Results over current test:
```

```
Probes sent: 3, Probes received: 3, Loss percentage: 0
Measurement: Round trip time
  Samples: 3, Minimum: 266 usec, Maximum: 315 usec, Average: 298 usec,
  Peak to peak: 49 usec, Stddev: 23 usec, Sum: 895 usec
Measurement: Positive round trip jitter
  Samples: 1, Minimum: 49 usec, Maximum: 49 usec, Average: 49 usec,
  Peak to peak: 0 usec, Stddev: 0 usec, Sum: 49 usec
Measurement: Negative round trip jitter
  Samples: 1, Minimum: 50 usec, Maximum: 50 usec, Average: 50 usec,
  Peak to peak: 0 usec, Stddev: 0 usec, Sum: 50 usec
```

```
Owner: p1, Test: t1, Probe type: icmp-ping-timestamp
```

```
Probe results:
```

```
Response received, Wed Aug 12 01:02:38 2009,
Client and server hardware timestamps
Rtt: 388 usec, Round trip jitter: 74 usec,
Round trip interarrival jitter: 10 usec
```

```
Results over current test:
```

```
Probes sent: 4, Probes received: 4, Loss percentage: 0
Measurement: Round trip time
  Samples: 4, Minimum: 266 usec, Maximum: 388 usec, Average: 321 usec,
  Peak to peak: 122 usec, Stddev: 44 usec, Sum: 1283 usec
Measurement: Positive round trip jitter
  Samples: 2, Minimum: 49 usec, Maximum: 74 usec, Average: 62 usec,
  Peak to peak: 25 usec, Stddev: 12 usec, Sum: 123 usec
Measurement: Negative round trip jitter
  Samples: 1, Minimum: 50 usec, Maximum: 50 usec, Average: 50 usec,
  Peak to peak: 0 usec, Stddev: 0 usec, Sum: 50 usec
```

show services rpm probe-results

Syntax show services rpm probe-results
 <dst-interface *interface-name*>
 <limit *number*>
 <owner *owner*>
 <source-address *address*>
 <status (fail | pass) >
 <target-address *address*>
 <terse>
 <test *name*>

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 on EX Series switches.
 Command introduced in Junos OS Release 13.2 on PTX Series Packet Transport Series routers.
dst-interface, **limit**, **source-address**, **status**, **target-address**, and **terse** options introduced in Junos OS Release 18.1R1 on MX Series.
 Command introduced in Junos OS Release 18.1 on QFX Series switches.

Description Display the results of the most recent real-time performance monitoring (RPM) probes.

Options All the following options require that you also configure the **owner** option.

dst-interface *interface-name*—(Optional) Display information only for RPM probes that are configured on this MS-MPC or MS-MIC services interface. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface.

limit *number*—(Optional) Limit the number of results that are displayed. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface.

Range: 1 through 4,294,967,295

Default: 100

none—Display information for all of the most recent RPM probes.

owner *owner*—(Optional) Display information only for probes with the specified probe owner. You must configure **owner** if you configure any other options.

source-address *address*—(Optional) Display information only for probes with the specified source address. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface.

status—(Optional) Display information only for probes with the specified type of test result. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface. Specify one of the following:

fail—Failed tests

pass—Passed tests

target-address *address*—(Optional) Display information only for probes with the specified target address. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface.

terse—(Optional) Display summary information. This option works only for RPM probes generated on an MS-MPC or MS-MIC services interface.

test *name*—(Optional) Display information only for the specified test.

Do not configure **test** if you configure any of the following options: **dst-interface**, **source-address**, or **target-address**. These options do not work when you configure **test**.

Required Privilege Level

view

List of Sample Output

[show services rpm probe-results \(IPv4 Targets\) on page 1991](#)
[show services rpm probe-results \(IPv6 Targets\) on page 1992](#)
[show services rpm probe-results owner terse on page 1993](#)
[show services rpm probe-results owner status fail on page 1993](#)
[show services rpm probe-results \(BGP Neighbor Discovery\) on page 1994](#)

Output Fields

[Table 228 on page 1894](#) lists the output fields for the **show services rpm probe-results** command. Output fields are listed in the approximate order in which they appear.

Table 249: show services rpm probe-results Output Fields

Field Name	Field Description	Level of Output
Owner	Owner name. When you configure the probe owner statement at the [edit services rpm] hierarchy level, this field displays the configured owner name. When you configure BGP neighbor discovery through RPM, the output for this field is Rpm-Bgp-Owner .	none dst-interface limit owner source-address target-address test
Test	Name of a test representing a collection of probes. When you configure the test test-name statement at the [edit services rpm probe owner] hierarchy level, the field displays the configured test name. When you configure BGP neighbor discovery through RPM, the output for this field is Rpm-BGP-Test- n , where <i>n</i> is a cumulative number.	All levels
Target address	Destination IPv4 address used for the probes. This field is displayed when the probes are sent to the configured IPv4 or IPv6 targets or RPM servers.	none dst-interface limit owner source-address target-address terse test
Target inet6-address	Destination IPv6 address used for the probes. This field is displayed when the probes are sent to the configured IPv6 targets or RPM servers.	none dst-interface limit owner source-address target-address terse test

Table 249: *show services rpm probe-results* Output Fields (continued)

Field Name	Field Description	Level of Output
Source address	Source address used for the probes.	none dst-interface limit owner source-address target-address test
Probe type	Protocol configured on the receiving probe server: http-get , http-metadata-get , icmp-ping , icmp-ping-timestamp , tcp-ping , udp-ping , or udp-ping-timestamp .	none dst-interface limit owner source-address target-address test
Test size	Number of probes within a test.	none dst-interface limit owner source-address target-address test
Routing Instance Name	<p>(BGP neighbor discovery) Name of the configured (if any) routing instance, logical system name, or both, in which the probe is configured:</p> <ul style="list-style-type: none"> When a routing instance is defined within a logical system, the logical system name is followed by the routing instance name. A slash (/) is used to separate the two entities. For example, if the routing instance called R1 is configured within the logical system called LS, the name in the output field is LS/R1. When a routing instance is configured but the default logical system is used, the name in the output field is the name of the routing instance. When a logical system is configured but the default routing instance is used, the name in the output field is the name of the logical system followed by default. A slash (/) is used to separate the two entities. For example, LS/default. 	none dst-interface limit owner source-address target-address test
Probe results	<p>Raw measurement of a particular probe sample done by a remote host. This data is provided separately from the calculated results. The following information is contained in the raw measurement:</p> <ul style="list-style-type: none"> Response received—Timestamp when the probe result was determined. Client and server hardware timestamps—If timestamps are configured, an entry appears at this point. Rtt—Average ping round-trip time (RTT), in microseconds. Egress jitter—Egress jitter, in microseconds. Ingress jitter—Ingress jitter, in microseconds. Round trip jitter—Round-trip jitter, in microseconds. Egress interarrival jitter—Egress interarrival jitter, in microseconds. Ingress interarrival jitter—Ingress interarrival jitter, in microseconds. Round trip interarrival jitter—Round-trip interarrival jitter, in microseconds. 	none dst-interface limit owner source-address target-address test

Table 249: *show services rpm probe-results Output Fields (continued)*

Field Name	Field Description	Level of Output
Results over current test	<p>Probes are grouped into tests, and the statistics are calculated for each test. If a test contains 10 probes, the average, minimum, and maximum results are calculated from the results of those 10 probes. If the command is issued while the test is in progress, the statistics use information from the completed probes.</p> <ul style="list-style-type: none"> • Probes sent—Number of probes sent within the current test. • Probes received—Number of probe responses received within the current test. • Loss percentage—Percentage of lost probes for the current test. • Measurement—Measurement type. Possible values are round-trip time, positive round-trip jitter, negative round-trip jitter, egress time, positive egress jitter, negative egress jitter, ingress time, positive ingress jitter, negative ingress jitter, and, for the probe type icmp-ping-timestamp, the egress delay and ingress delay. <p>For each measurement type, the following individual calculated results are provided:</p> <ul style="list-style-type: none"> • Samples—Number of probes. • Minimum—Minimum RTT, ingress delay, or egress delay measured over the course of the current test. • Maximum—Maximum RTT, ingress delay, or egress delay measured over the course of the current test. • Average—Average RTT, ingress delay, or egress delay measured over the course of the current test. • Peak to peak—Peak-to-peak difference, in microseconds. • Stddev—Standard deviation, in microseconds. • Sum—Statistical sum. 	<p>none dst-interface limit owner source-address target-address test</p>

Table 249: *show services rpm probe-results* Output Fields (continued)

Field Name	Field Description	Level of Output
Results over last test	<p>Results for the most recently completed test. If the command is issued while the first test is in progress, this information is not displayed</p> <ul style="list-style-type: none"> • Probes sent—Number of probes sent for the most recently completed test. • Probes received—Number of probe responses received for the most recently completed test. • Loss percentage—Percentage of lost probes for the most recently completed test. • Test completed—Time the most recent test was completed. • Measurement—Measurement type. Possible values are round-trip time, positive round-trip jitter, negative round-trip jitter, egress time, positive egress jitter, negative egress jitter, ingress time, positive ingress jitter, negative ingress jitter, and, for the probe type icmp-ping-timestamp, the egress delay and ingress delay. For each measurement type, the following individual calculated results are provided: <ul style="list-style-type: none"> • Samples—Number of probes. • Minimum—Minimum RTT, ingress delay, or egress delay measured for the most recently completed test. • Maximum—Maximum RTT, ingress delay, or egress delay measured for the most recently completed test. • Average—Average RTT, ingress delay, or egress delay measured for the most recently completed test. • Peak to peak—Peak-to-peak difference, in microseconds. • Stddev—Standard deviation, in microseconds. • Sum—Statistical sum. 	<p>none dst-interface limit owner source-address target-address test</p>

Table 249: *show services rpm probe-results Output Fields (continued)*

Field Name	Field Description	Level of Output
Results over all tests	<p>Displays statistics made for all the probes, independently of the grouping into tests, as well as statistics for the current test.</p> <ul style="list-style-type: none"> • Probes sent—Number of probes sent in all tests. • Probes received—Number of probe responses received in all tests. • Loss percentage—Percentage of lost probes in all tests. • Measurement—Measurement type. Possible values are round-trip time, positive round-trip jitter, negative round-trip jitter, egress time, positive egress jitter, negative egress jitter, ingress time, positive ingress jitter, negative ingress jitter, and, for the probe types icmp-ping-timestamp and udp-ping-timestamp, the egress delay and ingress delay. <p>For each measurement type, the following individual calculated results are provided:</p> <ul style="list-style-type: none"> • Samples—Number of probes. • Minimum—Minimum RTT, ingress delay, or egress delay measured over the course of the current test. • Maximum—Maximum RTT, ingress delay, or egress delay measured over the course of the current test. • Average—Average RTT, ingress delay, or egress delay measured over the course of the current test. • Peak to peak—Peak-to-peak difference, in microseconds. • Stddev—Standard deviation, in microseconds. • Sum—Statistical sum. 	none dst-interface limit owner source-address target-address test
Error Stats	<p>Displays error statistics for each probe.</p> <ul style="list-style-type: none"> • Invalid client rcv timestamp—Number of client receive timestamp less than client send timestamp. • Invalid server send timestamp—Number of server send timestamp less than server receive timestamp. • Invalid server processing time—Number of server side spent time greater than RTT. <p>NOTE: Error Stats is displayed in the output only if non-zero statistics exists.</p>	none dst-interface limit owner source-address target-address test
Last Probe Status	Status of the last probe that was sent for the current test (fail or pass).	status
Status	Status of the last completed test (up or down).	status terse
Source-IF	The MS-MPC or MS-MIC services interface that generates the RPM probes.	terse

Sample Output

show services rpm probe-results (IPv4 Targets)

```
user@host> show services rpm probe-results
```

```
Owner: ADSN-J4300.ADSN-J2300.D2, Test: 75300002
Target address: 172.16.54.172, Source address: 10.206.0.1,
Probe type: udp-ping-timestamp, Test size: 10 probes
Probe results:
  Response received, Tue Feb  6 14:53:15 2007,
  Client and server hardware timestamps
  Rtt: 575 usec, Egress jitter: 5 usec, Ingress jitter: 8 usec,
  Round trip jitter: 12 usec, Egress interarrival jitter: 8 usec,
  Ingress interarrival jitter: 7 usec, Round trip interarrival jitter: 7 usec,

  Round trip interarrival jitter: 669 usec
Results over current test:
  Probes sent: 10, Probes received: 10, Loss percentage: 0
  Measurement: Round trip time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
  Measurement: Positive round trip jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
  Measurement: Negative round trip jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
  Measurement: Egress time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
  Measurement: Positive Egress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
  Measurement: Negative Egress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
  Measurement: Ingress time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
  Measurement: Positive Ingress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
  Measurement: Negative Ingress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
Results over last test:
  Probes sent: 10, Probes received: 10, Loss percentage: 0
  Test completed on Tue Feb  6 14:53:16 2007
  Measurement: Round trip time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
  Measurement: Positive round trip jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
  Measurement: Negative round trip jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
  Measurement: Egress time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
```

```

    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
Measurement: Positive Egress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
Measurement: Negative Egress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
Measurement: Ingress time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
Measurement: Positive Ingress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
Measurement: Negative Ingress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
Results over all tests:
Probes sent: 560, Probes received: 560, Loss percentage: 0
Measurement: Round trip time
    Samples: 560, Minimum: 805 usec, Maximum: 3114 usec, Average: 1756 usec,

    Peak to peak: 2309 usec, Stddev: 519 usec, Sum: xxxx usec
Measurement: Positive round trip jitter
    Samples: 257, Minimum: 0 usec, Maximum: 2054 usec, Average: 597 usec,
    Peak to peak: 2054 usec, Stddev: 427 usec, Sum: xxxx usec
Measurement: Negative round trip jitter
    Samples: 302, Minimum: 1 usec, Maximum: 1812 usec, Average: 511 usec,
    Peak to peak: 1811 usec, Stddev: 408 usec, Sum: xxxx usec
Measurement: Egress time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
Measurement: Positive Egress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
Measurement: Negative Egress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
Measurement: Ingress time
    Samples: 10, Minimum: 805 usec, Maximum: 2859 usec, Average: 1644 usec,
    Peak to peak: 2054 usec, Stddev: 738 usec, Sum: xxxx usec
Measurement: Positive Ingress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 2054 usec, Average: 876 usec,
    Peak to peak: 2049 usec, Stddev: 679 usec, Sum: xxxx usec
Measurement: Negative Ingress jitter
    Samples: 5, Minimum: 5 usec, Maximum: 1812 usec, Average: 926 usec,
    Peak to peak: 1807 usec, Stddev: 665 usec, Sum: xxxx usec
Error Stats:
    Invalid client recv timestamp: 3, Invalid server send timestamp: 0
    Invalid server processing time: 0

```

show services rpm probe-results (IPv6 Targets)

```
user@host> show services rpm probe-results
```

```

Owner: p, Test: t1
Target inet6-address: 2001:db8:0:1:2a0:a502:0:1da,
Target Port : 34567 Test size: 1000000 probes
Probe results:
    Response received, Mon Dec 16 10:48:07 2013, Client and server hardware
    timestamps

```

```

    Rtt: 236 usec, Round trip jitter: -10 usec, Round trip interarrival jitter:
484 usec
    Results over current test:
      Probes sent: 10, Probes received: 10, Loss percentage: 0
      Measurement: Round trip time
        Samples: 10, Minimum: 231 usec, Maximum: 298 usec, Average: 268 usec,
Peak to peak: 67 usec, Stddev: 24 usec, Sum: 2682 usec
      Measurement: Positive round trip jitter
        Samples: 3, Minimum: 15 usec, Maximum: 1841 usec, Average: 750 usec, Peak
to peak: 1826 usec, Stddev: 787 usec, Sum: 2251 usec
      Measurement: Negative round trip jitter
        Samples: 7, Minimum: 10 usec, Maximum: 1244 usec, Average: 709 usec, Peak
to peak: 1234 usec, Stddev: 466 usec, Sum: 4961 usec
    Results over last test:
      Probes sent: 10, Probes received: 10, Loss percentage: 0
      Test completed on Mon Dec 16 10:48:07 2013
      Measurement: Round trip time
        Samples: 10, Minimum: 231 usec, Maximum: 298 usec, Average: 268 usec,
Peak to peak: 67 usec, Stddev: 24 usec, Sum: 2682 usec
      Measurement: Positive round trip jitter
        Samples: 3, Minimum: 15 usec, Maximum: 1841 usec, Average: 750 usec, Peak
to peak: 1826 usec, Stddev: 787 usec, Sum: 2251 usec
      Measurement: Negative round trip jitter
        Samples: 7, Minimum: 10 usec, Maximum: 1244 usec, Average: 709 usec, Peak
to peak: 1234 usec, Stddev: 466 usec, Sum: 4961 usec
    Results over all tests(From start of current control session):
      Probes sent: 490, Probes received: 488, Loss percentage: 0
      Measurement: Round trip time
        Samples: 488, Minimum: 231 usec, Maximum: 306 usec, Average: 270 usec,
Peak to peak: 75 usec, Stddev: 16 usec, Sum: 131586 usec
      Measurement: Positive round trip jitter
        Samples: 254, Minimum: 0 usec, Maximum: 10151 usec, Average: 157 usec,
Peak to peak: 10151 usec, Stddev: 873 usec, Sum: 39817 usec
      Measurement: Negative round trip jitter
        Samples: 233, Minimum: 1 usec, Maximum: 10170 usec, Average: 171 usec,
Peak to peak: 10169 usec, Stddev: 888 usec, Sum: 39889 usec

```

show services rpm probe-results owner terse

```
user@host> show services rpm probe-results owner owner1 terse
```

Test Name	Source-IP	Target Address	Status	Last Change
t_1	ms-2/2/0.10	192.0.2.1	UP	0D0H1M29S
t_2	ms-2/2/0.10	192.0.2.1	UP	0D0H1M29S
t_3	ms-2/2/0.10	192.0.2.1	UP	0D0H1M29S

show services rpm probe-results owner status fail

```
user@host> show services rpm probe-results owner owner1 status fail
```

Test Name	Last Probe Status	Status
t_1	FAIL	DOWN
t_2	FAIL	DOWN
t_3	FAIL	DOWN

show services rpm probe-results (BGP Neighbor Discovery)

```
user@host> show services rpm probe-results
```

```
Owner: Rpm-Bgp-Owner, Test: Rpm-Bgp-Test-1
Target address: 10.209.152.37, Probe type: icmp-ping, Test size: 5 probes
Routing Instance Name: LS1/RI1
Probe results:
  Response received, Fri Oct 28 05:20:23 2005
  Rtt: 662 usec
Results over current test:
  Probes sent: 5, Probes received: 5, Loss percentage: 0
  Measurement: Round trip time
    Minimum: 529 usec, Maximum: 662 usec, Average: 585 usec,
    Jitter: 133 usec, Stddev: 53 usec
Results over all tests:
  Probes sent: 5, Probes received: 5, Loss percentage: 0
  Measurement: Round trip time
    Minimum: 529 usec, Maximum: 662 usec, Average: 585 usec,
    Jitter: 133 usec, Stddev: 53 usec
```


CHAPTER 83

Operational Commands: SNMP

- `clear snmp statistics`
- `request snmp spoof-trap`
- `show snmp health-monitor`
- `show snmp inform-statistics`
- `show snmp mib`
- `show snmp rmon`
- `show snmp rmon history`
- `show snmp statistics`
- `show snmp v3`

clear snmp statistics

Syntax	clear snmp statistics
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Clear Simple Network Management Protocol (SNMP) statistics.
Options	This command has no options.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none">• show snmp statistics on page 2026
List of Sample Output	clear snmp statistics on page 1996
Output Fields	See show snmp statistics for an explanation of output fields.

Sample Output

clear snmp statistics

In the following example, SNMP statistics are displayed before and after the **clear snmp statistics** command is issued:

```
user@host> show snmp statistics
```

```
SNMP statistics:
```

```
Input:
```

```
Packets: 8, Bad versions: 0, Bad community names: 0,  
Bad community uses: 0, ASN parse errors: 0,  
Too bigs: 0, No such names: 0, Bad values: 0,  
Read onlys: 0, General errors: 0,  
Total request varbinds: 8, Total set varbinds: 0,  
Get requests: 0, Get nexts: 8, Set requests: 0,  
Get responses: 0, Traps: 0,  
Silent drops: 0, Proxy drops 0
```

```
Output:
```

```
Packets: 2298, Too bigs: 0, No such names: 0,  
Bad values: 0, General errors: 0,  
Get requests: 0, Get nexts: 0, Set requests: 0,  
Get responses: 8, Traps: 2290
```

```
user@host> clear snmp statistics
```

```
user@host> show snmp statistics
```

```
SNMP statistics:
```

```
Input:
```

```
Packets: 0, Bad versions: 0, Bad community names: 0,  
Bad community uses: 0, ASN parse errors: 0,  
Too bigs: 0, No such names: 0, Bad values: 0,  
Read onlys: 0, General errors: 0,  
Total request varbinds: 0, Total set varbinds: 0,  
Get requests: 0, Get nexts: 0, Set requests: 0,  
Get responses: 0, Traps: 0,  
Silent drops: 0, Proxy drops 0
```

```
Output:
```

```
Packets: 0, Too bigs: 0, No such names: 0,  
Bad values: 0, General errors: 0,  
Get requests: 0, Get nexts: 0, Set requests: 0,  
Get responses: 0, Traps: 0
```

request snmp spoof-trap

Syntax	request snmp spoof-trap <trap> variable-bindings <object> <instance> <value>
Release Information	Command introduced in Junos OS Release 8.2. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Spoof (mimic) the behavior of a Simple Network Management Protocol (SNMP) trap.
Options	<p><trap>—Name of the trap to spoof.</p> <p>variable-bindings <object> <instance> <value>—(Optional) List of variables and values to include in the trap. Each variable binding is specified as an object name, the object instance, and the value (for example, ifIndex[14] = 14). Enclose the list of variable bindings in quotation marks (" ") and use a comma to separate each object name, instance, and value definition (for example, variable-bindings "ifIndex[14] = 14, ifAdminStatus[14] = 1, ifOperStatus[14] = 2"). Objects included in the trap definition that do not have instances and values specified as part of the command are included in the trap and spoofed with automatically generated instances and values.</p> <p><dummy name>—A dummy trap name to display the list of available traps.</p> <p>Question mark (?)—Question mark? to display possible completions.</p>
Required Privilege Level	request
List of Sample Output	request snmp spoof-trap (with Variable Bindings) on page 1998 request snmp spoof-trap (Illegal Trap Name) on page 1998 request snmp spoof-trap (Question Mark ?) on page 2003

Sample Output

request snmp spoof-trap (with Variable Bindings)

```
user@host> request snmp spoof-trap linkUp variable-bindings "ifIndex[14] = 14, ifAdminStatus[14] = 1, ifOperStatus[14] = 2"
Spoof trap request result: trap sent successfully
```

request snmp spoof-trap (Illegal Trap Name)

```
user@host> request snmp spoof-trap xx
Spoof trap request result: trap not found

Allowed Traps:
```

```
adslAtucInitFailureTrap
adslAtucPerfESsThreshTrap
adslAtucPerfLofsThreshTrap
adslAtucPerfLolsThreshTrap
adslAtucPerfLossThreshTrap
adslAtucPerfLprsThreshTrap
adslAtucRateChangeTrap
adslAturPerfESsThreshTrap
adslAturPerfLofsThreshTrap
adslAturPerfLossThreshTrap
adslAturPerfLprsThreshTrap
adslAturRateChangeTrap
apsEventChannelMismatch
apsEventFEPLF
apsEventModeMismatch
apsEventPSBF
apsEventSwitchover
authenticationFailure
bfdSessDown
bfdSessUp
bgpBackwardTransition
bgpEstablished
coldStart
dlswTrapCircuitDown
dlswTrapCircuitUp
dlswTrapTConnDown
dlswTrapTConnPartnerReject
dlswTrapTConnProtViolation
dlswTrapTConnUp
dsx1LineStatusChange
dsx3LineStatusChange
entConfigChange
fallingAlarm
frDLCIStatusChange
ggsnTrapChanged
ggsnTrapCleared
ggsnTrapNew
gmplsTunnelDown
ifMauJabberTrap
ipv6IfStateChange
isisAreaMismatch
isisAttemptToExceedMaxSequence
isisAuthenticationFailure
isisAuthenticationTypeFailure
isisCorruptedLSPDetected
isisDatabaseOverload
isisIDLenMismatch
isisLSPTooLargeToPropagate
isisManualAddressDrops
isisMaxAreaAddressesMismatch
isisOriginatingLSPBufferSizeMismatch
isisOwnLSPPurge
isisProtocolsSupportedMismatch
isisRejectedAdjacency
isisSequenceNumberSkip
isisVersionSkew
jnxAccessAuthServerDisabled
jnxAccessAuthServerEnabled
jnxAccessAuthServiceDown
jnxAccessAuthServiceUp
```

```
jnxBfdSessDetectionTimeHigh
jnxBfdSessTxIntervalHigh
jnxBgpM2BackwardTransition
jnxBgpM2Established
jnxCmCfgChange
jnxCmRescueChange
jnxCollFlowOverload
jnxCollFlowOverloadCleared
jnxCollFtpSwitchover
jnxCollMemoryAvailable
jnxCollMemoryUnavailable
jnxCollUnavailableDest
jnxCollUnavailableDestCleared
jnxCollUnsuccessfulTransfer
jnxDfcHardMemThresholdExceeded
jnxDfcHardMemUnderThreshold
jnxDfcHardPpsThresholdExceeded
jnxDfcHardPpsUnderThreshold
jnxDfcSoftMemThresholdExceeded
jnxDfcSoftMemUnderThreshold
jnxDfcSoftPpsThresholdExceeded
jnxDfcSoftPpsUnderThreshold
jnxEventTrap
jnxExampleStartup
jnxFEBSwitchover
jnxFanFailure
jnxFanOK
jnxFruCheck
jnxFruFailed
jnxFruInsertion
jnxFruOK
jnxFruOffline
jnxFruOnline
jnxFruPowerOff
jnxFruPowerOn
jnxFruRemoval
jnxHardDiskFailed
jnxHardDiskMissing
jnxJsAvPatternUpdateTrap
jnxJsChassisClusterSwitchover
jnxJsFwAuthCapacityExceeded
jnxJsFwAuthFailure
jnxJsFwAuthServiceDown
jnxJsFwAuthServiceUp
jnxJsNatAddrPoolThresholdStatus
jnxJsScreenAttack
jnxJsScreenCfgChange
jnxLdpLspDown
jnxLdpLspUp
jnxLdpSesDown
jnxLdpSesUp
jnxMIMstCistPortLoopProtectStateChangeTrap
jnxMIMstCistPortRootProtectStateChangeTrap
jnxMIMstErrTrap
jnxMIMstGenTrap
jnxMIMstInvalidBpduRxdTrap
jnxMIMstMstiPortLoopProtectStateChangeTrap
jnxMIMstMstiPortRootProtectStateChangeTrap
jnxMIMstNewRootTrap
jnxMIMstProtocolMigrationTrap
```

```
jnxMIMstRegionConfigChangeTrap
jnxMIMstTopologyChgTrap
jnxMacChangedNotification
jnxMplsLdpInitSesThresholdExceeded
jnxMplsLdpPathVectorLimitMismatch
jnxMplsLdpSessionDown
jnxMplsLdpSessionUp
jnxOspfv3IfConfigError
jnxOspfv3IfRxBadPacket
jnxOspfv3IfStateChange
jnxOspfv3LsdbApproachingOverflow
jnxOspfv3LsdbOverflow
jnxOspfv3NbrRestartHelperStatusChange
jnxOspfv3NbrStateChange
jnxOspfv3NssaTranslatorStatusChange
jnxOspfv3RestartStatusChange
jnxOspfv3VirtIfConfigError
jnxOspfv3VirtIfRxBadPacket
jnxOspfv3VirtIfStateChange
jnxOspfv3VirtNbrRestartHelperStatusChange
jnxOspfv3VirtNbrStateChange
jnxOtnAlarmCleared
jnxOtnAlarmSet
jnxOverTemperature
jnxPMonOverloadCleared
jnxPMonOverloadSet
jnxPingEgressJitterThresholdExceeded
jnxPingEgressStdDevThresholdExceeded
jnxPingEgressThresholdExceeded
jnxPingIngressJitterThresholdExceeded
jnxPingIngressStddevThresholdExceeded
jnxPingIngressThresholdExceeded
jnxPingRttJitterThresholdExceeded
jnxPingRttStdDevThresholdExceeded
jnxPingRttThresholdExceeded
jnxPortBpduErrorStatusChangeTrap
jnxPortLoopProtectStateChangeTrap
jnxPortRootProtectStateChangeTrap
jnxPowerSupplyFailure
jnxPowerSupplyOK
jnxRedundancySwitchover
jnxRmonAlarmGetFailure
jnxRmonGetOk
jnxSecAccessIfMacLimitExceeded
jnxSecAccessdsRateLimitCrossed
jnxSonetAlarmCleared
jnxSonetAlarmSet
jnxSpSvcSetCpuExceeded
jnxSpSvcSetCpuOk
jnxSpSvcSetZoneEntered
jnxSpSvcSetZoneExited
jnxStormEventNotification
jnxSyslogTrap
jnxTemperatureOK
jnxVccpPortDown
jnxVccpPortUp
jnxVpnIfDown
jnxVpnIfUp
jnxVpnPwDown
jnxVpnPwUp
```

```
jnx12aldGlobalMacLimit
jnx12aldInterfaceMacLimit
jnx12aldRoutingInstMacLimit
linkDown
linkUp
lldpRemTablesChange
mfrMibTrapBundleLinkMismatch
mplsLspChange
mplsLspDown
mplsLspInfoChange
mplsLspInfoDown
mplsLspInfoPathDown
mplsLspInfoPathUp
mplsLspInfoUp
mplsLspPathDown
mplsLspPathUp
mplsLspUp
mplsNumVrfRouteMaxThreshExceeded
mplsNumVrfRouteMidThreshExceeded
mplsNumVrfSecIllglLb1ThrshExcd
mplsTunnelDown
mplsTunnelReoptimized
mplsTunnelRerouted
mplsTunnelUp
mplsVrfIfDown
mplsVrfIfUp
mplsXCDown
mplsXCUp
msdpBackwardTransition
msdpEstablished
newRoot
ospfIfAuthFailure
ospfIfConfigError
ospfIfRxBadPacket
ospfIfStateChange
ospfLsdbApproachingOverflow
ospfLsdbOverflow
ospfMaxAgeLsa
ospfNbrStateChange
ospfOriginateLsa
ospfTxRetransmit
ospfVirtIfAuthFailure
ospfVirtIfConfigError
ospfVirtIfRxBadPacket
ospfVirtIfStateChange
ospfVirtIfTxRetransmit
ospfVirtNbrStateChange
pethMainPowerUsageOffNotification
pethMainPowerUsageOnNotification
pethPsePortOnOffNotification
pingProbeFailed
pingTestCompleted
pingTestFailed
ptopoConfigChange
risingAlarm
rpMauJabberTrap
sd1cLSStatusChange
sd1cPortStatusChange
topologyChange
traceRoutePathChange
```



```

traceRouteTestCompleted
traceRouteTestFailed
vrrpTrapAuthFailure
vrrpTrapNewMaster
warmStart

```

request snmp spoof-trap (Question Mark ?)

```
user@host> request snmp spoof-trap ?
```

Possible completions:

```

<trap>           The name of the trap to spoof
adslAtucInitFailureTrap
adslAtucPerfESsThreshTrap
adslAtucPerfLofsThreshTrap
adslAtucPerfLolsThreshTrap
adslAtucPerfLossThreshTrap
adslAtucPerfLprsThreshTrap
adslAtucRateChangeTrap
adslAturPerfESsThreshTrap
adslAturPerfLofsThreshTrap
adslAturPerfLossThreshTrap
adslAturPerfLprsThreshTrap
adslAturRateChangeTrap
apsEventChannelMismatch
apsEventFEPLF
apsEventModeMismatch
apsEventPSBF
apsEventSwitchover
authenticationFailure
bfdSessDown
bfdSessUp
bgpBackwardTransition
bgpEstablished
coldStart
dlsWTrapCircuitDown
dlsWTrapCircuitUp
---(more 10%)---

```

show snmp health-monitor

Syntax	<code>show snmp health-monitor</code> <code><alarms <detail>> <logs></code>
Release Information	Command introduced in Junos OS Release 8.0. Command introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Display information about Simple Network Management Protocol (SNMP) health monitor alarms and logs.
Options	none —Display information about all health monitor alarms and logs. alarms <detail> —(Optional) Display detailed information about health monitor alarms. logs —(Optional) Display information about health monitor logs.
Required Privilege Level	view
List of Sample Output	show snmp health-monitor on page 2006 show snmp health-monitor alarms detail on page 2008
Output Fields	Table 250 on page 2004 describes the output fields for the show snmp health-monitor command. Output fields are listed in the approximate order in which they appear.

Table 250: show snmp health-monitor Output Fields

Field Name	Field Description	Level of Output
Alarm Index	Alarm identifier.	All levels
Variable description	Description of the health monitor object instance being monitored.	All levels
Variable name	Name of the health monitor object instance being monitored.	All levels
Value	Current value of the monitored variable in the most recent sample interval.	All levels

Table 250: *show snmp health-monitor Output Fields (continued)*

Field Name	Field Description	Level of Output
State	<p>State of the alarm or event entry:</p> <ul style="list-style-type: none"> Alarms: <ul style="list-style-type: none"> active—Entry is fully configured and activated. falling threshold crossed—Value of the variable has crossed the lower threshold limit. rising threshold crossed—Value of the variable has crossed the upper threshold limit. under creation—Entry is being configured and is not yet activated. startup—Alarm is waiting for the first sample of the monitored variable. object not available—Monitored variable of that type is not available to the health monitor agent. instance not available—Monitored variable's instance is not available to the health monitor agent. object type invalid—Monitored variable is not a numeric value. object processing errored—An error occurred when the monitored variable was processed. unknown—State is not one of the above. 	All levels
Variable OID	Object ID to which the variable name is resolved. The format is x.x.x.x.	detail
Sample type	Method of sampling the monitored variable and calculating the value to compare against the upper and lower thresholds. It can have the value of absolute value or delta value .	detail
Startup alarm	<p>Alarm that might be sent when this entry is first activated, depending on the following criteria:</p> <ul style="list-style-type: none"> Alarm is sent when one of the following situations exists: <ul style="list-style-type: none"> Value of the alarm is above or equal to the rising threshold and the startup type is either rising alarm or rising or falling alarm. Value of the alarm is below or equal to the falling threshold and the startup type is either falling alarm or rising or falling alarm. Alarm is <i>not</i> sent when one of the following situations exists: <ul style="list-style-type: none"> Value of the alarm is above or equal to the rising threshold and the startup type is falling alarm. Value of the alarm is below or equal to the falling threshold and the startup type is rising alarm. Value of the alarm is between the thresholds. 	detail
Owner	Name of the entry configured by the user. If the entry was created through the CLI, the owner has monitor prepended to it.	detail
Creator	Mechanism by which the entry was configured (Health Monitor).	detail
Sample interval	Time period between samples (in seconds).	detail
Rising threshold	Upper limit threshold value as a percentage of the maximum possible value.	detail

Table 250: show snmp health-monitor Output Fields (continued)

Field Name	Field Description	Level of Output
Falling threshold	Lower limit threshold value as a percentage of the maximum possible value.	detail
Rising event index	Event triggered when the rising threshold is crossed.	detail
Falling event index	Event triggered when the falling threshold is crossed.	detail

Sample Output

show snmp health-monitor

```
user@host> show snmp health-monitor
```

```
Alarm
Index  Variable description                Value State

32768 Health Monitor: root file system utilization
      jnxHrStoragePercentUsed.1      58 active

32769 Health Monitor: /config file system utilization
      jnxHrStoragePercentUsed.2      0 active

32770 Health Monitor: RE 0 CPU utilization
      jnxOperatingCPU.9.1.0.0        0 active

32773 Health Monitor: RE 0 Memory utilization
      jnxOperatingBuffer.9.1.0.0     35 active

32775 Health Monitor: jkernel daemon CPU utilization
      Init daemon                    0 active
      Chassis daemon                 50 active
      Firewall daemon                0 active
      Interface daemon               5 active
      SNMP daemon                    11 active
      MIB2 daemon                    42 active
      Sonet APS daemon               0 active
      VRRP daemon                    0 active
      Alarm daemon                   3 active
      PFE daemon                     0 active
      CRAFT daemon                   0 active
      Traffic sampling control daemon 0 active
      Ilmi daemon                    0 active
      Remote operations daemon        0 active
      CoS daemon                     0 active
      Pic Services Logging daemon     0 active
      Internal Routing Service Daemon 3 active
      Network Access Service daemon   0 active
      Forwarding UDP daemon           0 active
      Routing socket proxy daemon     0 active
      Disk Monitoring daemon          1 active
      Inet daemon                    0 active
      Syslog daemon                   0 active
      Adaptive Services PIC daemon    0 active
      ECC parity errors logging Daemon 0 active
```

```

Layer 2 Tunneling Protocol daemon           0 active
PPPoE daemon                               3 active
Redundancy device daemon                   0 active
PPP daemon                                 0 active
Dynamic Flow Capture Daemon                0 active

32776 Health Monitor: jroute daemon CPU utilization
Routing protocol daemon                     1 active
Management daemon                          0 active
Management daemon                          0 active
Command line interface                     4 active
Periodic Packet Management daemon          0 active
Link Management daemon                     0 active
Pragmatic General Multicast daemon         0 active
Bidirectional Forwarding Detection daemon  0 active
SRC daemon                                0 active
audit daemon                              0 active
Event daemon                              0 active

32777 Health Monitor: jcrypto daemon CPU utilization
IPSec Key Management daemon                0 active

32779 Health Monitor: jkernel daemon Memory utilization
Init daemon                               47384 active
Chassis daemon                            20204 active
Firewall daemon                           1956 active
Interface daemon                          3340 active
SNMP daemon                               4540 active
MIB2 daemon                              3880 active
Sonet APS daemon                          2632 active
VRRP daemon                              2672 active
Alarm daemon                             1856 active
PFE daemon                               2600 active
CRAFT daemon                              2000 active
Traffic sampling control daemon            3164 active
Ilmi daemon                              2132 active
Remote operations daemon                   2964 active
CoS daemon                                3044 active
Pic Services Logging daemon                1944 active
Internal Routing Service Daemon            1392 active
Network Access Service daemon              1992 active
Forwarding UDP daemon                      1876 active
Routing socket proxy daemon                1296 active
Disk Monitoring daemon                     1180 active
Inet daemon                               1296 active
Syslog daemon                             1180 active
Adaptive Services PIC daemon               3220 active
ECC parity errors logging Daemon           1100 active
Layer 2 Tunneling Protocol daemon          3372 active
PPPoE daemon                              1424 active
Redundancy device daemon                   1820 active
PPP daemon                                2060 active
Dynamic Flow Capture Daemon                10740 active

32780 Health Monitor: jroute daemon Memory utilization
Routing protocol daemon                     8104 active
Management daemon                          13360 active
Management daemon                          19252 active
Command line interface                     9912 active
Periodic Packet Management daemon          1484 active
Link Management daemon                     2016 active

```

Pragmatic General Multicast daemon	1968 active
Bidirectional Forwarding Detection daemon	1956 active
SRC daemon	1772 active
audit daemon	1772 active
Event daemon	1808 active

32781 Health Monitor: jcrypto daemon Memory utilization	
IPSec Key Management daemon	5600 active

show snmp health-monitor alarms detail

```
user@host> show snmp health-monitor alarms detail
```

```
Alarm Index 32768:
  Variable name      jnxHrStoragePercentUsed.1
  Variable OID       1.3.6.1.4.1.2636.3.31.1.1.1.1.1
  Sample type        absolute value
  Startup alarm       rising alarm
  Owner               Health Monitor: root file system
                     utilization
  Creator             Health Monitor
  State               active
  Sample interval     300 seconds
  Rising threshold    80
  Falling threshold   70
  Rising event index  32768
  Falling event index 32768
  Instance Value: 58
  Instance State: active

Alarm Index 32769:
  Variable name      jnxHrStoragePercentUsed.2
  Variable OID       1.3.6.1.4.1.2636.3.31.1.1.1.1.2
  Sample type        absolute value
  Startup alarm       rising alarm
  Owner               Health Monitor: /config file system
                     utilization
  Creator             Health Monitor
  State               active
  Sample interval     300 seconds
  Rising threshold    80
  Falling threshold   70
  Rising event index  32768
  Falling event index 32768
  Instance Value: 0
  Instance State: active

Alarm Index 32770:
  Variable name      jnxOperatingCPU.9.1.0.0
  Variable OID       1.3.6.1.4.1.2636.3.1.13.1.8.9.1.0.0
  Sample type        absolute value
  Startup alarm       rising alarm
  Owner               Health Monitor: RE 0 CPU utilization

  Creator             Health Monitor
  State               active
  Sample interval     300 seconds
  Rising threshold    80
```

```

Falling threshold          70
Rising event index        32768
Falling event index        32768
  Instance Value: 0
  Instance State: active

```

Alarm Index 32773:

```

Variable name              jnxOperatingBuffer.9.1.0.0
Variable OID               1.3.6.1.4.1.2636.3.1.13.1.11.9.1.0.0
Sample type                absolute value
Startup alarm              rising alarm
Owner                      Health Monitor: RE 0 Memory utilization

```

```

Creator                    Health Monitor
State                      active
Sample interval            300 seconds
Rising threshold           80
Falling threshold          70
Rising event index        32768
Falling event index        32768
  Instance Value: 35
  Instance State: active

```

Alarm Index 32775:

```

Variable name              sysAppElmtRunCPU.3
Variable OID               1.3.6.1.2.1.54.1.2.3.1.9.3
Sample type                delta value
Startup alarm              rising alarm
Owner                      Health Monitor: jkernel daemon CPU
                           utilization

```

```

Creator                    Health Monitor
State                      active
Sample interval            300 seconds
Rising threshold           24000
Falling threshold          21000
Rising event index        32768
Falling event index        32768
  Instance Name: sysAppElmtRunCPU.3.1.1
  Instance Description: Init daemon
  Instance Value: 0
  Instance State: active

```

```

Instance Name: sysAppElmtRunCPU.3.2.2786
Instance Description: Chassis daemon
Instance Value: 50
Instance State: active

```

```

Instance Name: sysAppElmtRunCPU.3.3.2938
Instance Description: Firewall daemon
Instance Value: 0
Instance State: active

```

```

Instance Name: sysAppElmtRunCPU.3.4.2942
Instance Description: Interface daemon
Instance Value: 5
Instance State: active

```

```

Instance Name: sysAppElmtRunCPU.3.7.7332
Instance Description: SNMP daemon

```

```
Instance Value: 11
Instance State: active

Instance Name: sysAppElemRunCPU.3.9.2914
Instance Description: MIB2 daemon
Instance Value: 42
Instance State: active

Instance Name: sysAppElemRunCPU.3.12.2916
Instance Description: Sonet APS daemon
Instance Value: 0
Instance State: active

Instance Name: sysAppElemRunCPU.3.13.2917
Instance Description: VRRP daemon
Instance Value: 0
Instance State: active

Instance Name: sysAppElemRunCPU.3.14.2787
Instance Description: Alarm daemon
Instance Value: 3
Instance State: active

Instance Name: sysAppElemRunCPU.3.15.2940
Instance Description: PFE daemon
Instance Value: 0
Instance State: active

Instance Name: sysAppElemRunCPU.3.16.2788
Instance Description: CRAFT daemon
Instance Value: 0
Instance State: active

Instance Name: sysAppElemRunCPU.3.17.2918
Instance Description: Traffic sampling control daemon
---(more 23%)---
```


show snmp inform-statistics

Syntax	show snmp inform-statistics
Release Information	<p>Command introduced in Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
Description	Display information about Simple Network Management Protocol (SNMP) inform requests.
Options	This command has no options.
Required Privilege Level	view
List of Sample Output	show snmp inform-statistics on page 2011
Output Fields	Table 251 on page 2011 describes the output fields for the show snmp inform-statistics command. Output fields are listed in the approximate order in which they appear.

Table 251: show snmp inform-statistics Output Fields

Field Name	Field Description
Target Name	Name of the device configured to receive and respond to SNMP informs.
Address	IP address of the target device.
Sent	Number of informs sent to the target device and acknowledged by the target device.
Pending	Number of informs held in memory pending a response from the target device.
Discarded	Number of informs discarded after the specified number of retransmissions to the target device were attempted.
Timeouts	Number of informs that did not receive an acknowledgement from the target device within the timeout specified.
Probe Failures	Connection failures that occurred (for example, when the target server returned invalid content or you incorrectly configured the target address).

Sample Output

show snmp inform-statistics

```
user@host> show snmp inform-statistics
```

Inform Request Statistics:

Target Name: TA1_v3_md5_none Address: 172.17.20.184

Sent: 176, Pending: 0

Discarded: 0, Timeouts: 0, Probe Failures: 0

Target Name: TA2_v3_sha_none Address: 192.168.110.59

Sent: 0, Pending: 4

Discarded: 84, Timeouts: 0, Probe Failures: 258

Target Name: TA5_v2_none Address: 172.17.20.184

Sent: 0, Pending: 0

Discarded: 2, Timeouts: 10, Probe Failures: 0

show snmp mib

Syntax `show snmp mib (get | get-next | walk) (ascii | decimal) object-id`

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 for EX Series switches.
ascii and **decimal** options introduced in Junos OS Release 9.6.
ascii and **decimal** options introduced in Junos OS Release 9.6 for EX Series switches.
 Command introduced in Junos OS Release 11.1 for the QFX Series.
 Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

Description Display local Simple Network Management Protocol (SNMP) Management Information Base (MIB) object values.



NOTE: Starting in Junos OS Release 18.3R1, SNMP queue statistics reporting for static interface-sets configured over Aggregate Ethernet (AE) interfaces is supported.

Options **get**—Retrieve and display one or more SNMP object values.

get-next—Retrieve and display the next SNMP object values.

walk—Retrieve and display the SNMP object values that are associated with the requested object identifier (OID). When you use this option, the Junos OS displays the objects below the subtree that you specify.

ascii—Display the SNMP object's string indices as an ASCII-key representation.

decimal—Display the SNMP object values in the decimal (default) format. The **decimal** option is the default option for this command. Therefore, issuing the **show snmp mib (get | get-next | walk) decimal object-id** and the **show snmp mib (get | get-next | walk) object-id** commands display the same output.

object-id—The object can be represented by a sequence of dotted integers (such as 1.3.6.1.2.1.2) or by its subtree name (such as **interfaces**). When entering multiple objects, enclose the objects in quotation marks.

Required Privilege Level **snmp**—To view this statement in the configuration.

List of Sample Output [show snmp mib get on page 2014](#)
[show snmp mib get \(Multiple Objects\) on page 2014](#)
[show snmp mib get \(Layer 2 Policer\) on page 2014](#)
[show snmp mib get-next on page 2014](#)
[show snmp mib get-next \(Specify an OID\) on page 2014](#)

[show snmp mib walk on page 2015](#)
[show snmp mib walk \(QFX Series\) on page 2015](#)
[show snmp mib walk decimal on page 2015](#)
[show snmp mib walk \(ASCII\) on page 2015](#)
[show snmp mib walk \(Multiple Indices\) on page 2015](#)
[show snmp mib walk decimal \(Multiple Indices\) on page 2015](#)
[show snmp mib walk \(Queue Statistics\) on page 2016](#)

Output Fields [Table 252 on page 2014](#) describes the output fields for the **show snmp mib** command. Output fields are listed in the approximate order in which they appear.

Table 252: show snmp mib Output Fields

Field Name	Field Description
<i>name</i>	Object name and numeric instance value.
<i>object value</i>	Object value. The Junos OS translates OIDs into the corresponding object names.

Sample Output

show snmp mib get

```
user@host> show snmp mib get sysObjectID.0
sysObjectID.0 = jnxProductNameM20
```

show snmp mib get (Multiple Objects)

```
user@host> show snmp mib get "sysObjectID.0 sysUpTime.0"
sysObjectID.0 = jnxProductNameM20
sysUpTime.0 = 1640992
```

show snmp mib get (Layer 2 Policer)

```
user@host> show snmp mib get ifInOctets.25970
ifInOctets.25970 = 7545720
```

show snmp mib get-next

```
user@host> show snmp mib get-next jnxMibs
jnxBoxClass.0 = jnxProductLineM20.0
```

show snmp mib get-next (Specify an OID)

```
user@host> show snmp mib get-next 1.3.6.1
sysDescr.0 = Juniper Networks, Inc. m20 internet router, kernel
Junos OS Release: 2004-1 Build date: build date UTC Copyright (c) 1996-2004 Juniper
Networks, Inc.
```

show snmp mib walk

```

user@host> show snmp mib walk system

sysDescr.0      = Juniper Networks, Inc. m20 internet router, kernel
Junos OS Release #0: 2004-1 Build date: build date UTC Copyright (c) 1996-2004
Juniper Networks, Inc.
sysObjectID.0   = jnxProductNameM20
sysUpTime.0     = 1640992
sysContact.0    = Your contact
sysName.0       = my router
sysLocation.0   = building 1
sysServices.0   = 4

```

show snmp mib walk (QFX Series)

```

user@switch> show snmp mib walk system

sysDescr.0      = Juniper Networks, Inc. qfx3500s internet router, kernel JUNOS
11.1-20100926.0 #0: 2010-09-26 06:17:38 UTC Build date: 2010-09-26 06:00:10
sysObjectID.0   = jnxProductQFX3500
sysUpTime.0     = 138980301
sysContact.0    = System Contact
sysName.0       = LabQFX3500
sysLocation.0   = Lab
sysServices.0   = 4

```

show snmp mib walk decimal

```

user@host> show snmp mib walk decimal jnxUtilData

jnxUtilCounter32Value.102.114.101.100 = 100

```

show snmp mib walk (ASCII)

```

show snmp mib walk ascii jnxUtilData

jnxUtilCounter32Value."fred" = 100

```

show snmp mib walk (Multiple Indices)

```

show snmp mib walk ascii jnxFWCounterByteCount

jnxFWCounterByteCount."fe-1/3/0.0-i"."CLASS_BE-fe-1/3/0.0-i".2 = 0
jnxFWCounterByteCount."fe-1/3/0.0-i"."CLASS_CC-fe-1/3/0.0-i".2 = 0
jnxFWCounterByteCount."fe-1/3/0.0-i"."CLASS_RT-fe-1/3/0.0-i".2 = 0
.....

```

show snmp mib walk decimal (Multiple Indices)

```

show snmp mib walk ascii jnxFWCounterByteCount

jnxFWCounterByteCount."fe-1/3/0.0-i"."CLASS_BE-fe-1/3/0.0-i".2 = 0
jnxFWCounterByteCount."fe-1/3/0.0-i"."CLASS_CC-fe-1/3/0.0-i".2 = 0
jnxFWCounterByteCount."fe-1/3/0.0-i"."CLASS_RT-fe-1/3/0.0-i".2 = 0
.....

```

show snmp mib walk (Queue Statistics)

To get interface-set queue statistics from jnxCosQstatQedPkts MIB with using interface-set SNMP index, use the following command:

```
show snmp mib walk jnxCosQstatQedPkts.interface-set snmp index
```

For example, if the interface-set SNMP index is 67108866

```
show snmp mib walk jnxCosQstatQedPkts.67108866
```

```
jnxCosQstatQedPkts.67108866.0 = 10
jnxCosQstatQedPkts.67108866.1 = 0
jnxCosQstatQedPkts.67108866.2 = 0
jnxCosQstatQedPkts.67108866.3 = 0
jnxCosQstatQedPkts.67108866.4 = 0
jnxCosQstatQedPkts.67108866.5 = 0
jnxCosQstatQedPkts.67108866.6 = 0
jnxCosQstatQedPkts.67108866.7 = 0
```

To get interface-set queue statistics from jnxCosIfsetQstatQedPkts MIB with using interface-set SNMP index, use the following command:

```
show snmp mib walk jnxCosIfsetQstatQedPkts.interface-set snmp index
```

For example, if the interface-set snmp index is 67108866

```
show snmp mib walk jnxCosIfsetQstatQedPkts.67108866
```

```
jnxCosIfsetQstatQedPkts.67108866.0 = 10
jnxCosIfsetQstatQedPkts.67108866.1 = 0
jnxCosIfsetQstatQedPkts.67108866.2 = 0
jnxCosIfsetQstatQedPkts.67108866.3 = 0
jnxCosIfsetQstatQedPkts.67108866.4 = 0
jnxCosIfsetQstatQedPkts.67108866.5 = 0
jnxCosIfsetQstatQedPkts.67108866.6 = 0
jnxCosIfsetQstatQedPkts.67108866.7 = 0
```

To get Interface-set queue statistics from jnxCosIfsetQstatQedPkts MIB using interface-set member IFL SNMP index, use the following command:

```
show snmp mib walk jnxCosIfsetQstatQedPkts.interface-set member IFL SNMP index
```

For example, if the interface-set member IFL SNMP is 519

```
show snmp mib walk jnxCosIfsetQstatQedPkts.519
```

```
jnxCosIfsetQstatQedPkts.519.0 = 10
jnxCosIfsetQstatQedPkts.519.1 = 0
jnxCosIfsetQstatQedPkts.519.2 = 0
jnxCosIfsetQstatQedPkts.519.3 = 0
jnxCosIfsetQstatQedPkts.519.4 = 0
jnxCosIfsetQstatQedPkts.519.5 = 0
jnxCosIfsetQstatQedPkts.519.6 = 0
jnxCosIfsetQstatQedPkts.519.7 = 0
```

show snmp rmon

Syntax	<code>show snmp rmon</code> <code><alarms <brief detail> events <brief detail> logs></code>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
Description	Display information about Simple Network Management Protocol (SNMP) Remote Monitoring (RMON) alarms, events, and logs.
Options	<p>none—Display information about all RMON alarms and events.</p> <p>alarms—(Optional) Display information about RMON alarms.</p> <p>brief detail—(Optional) Display brief or detailed information about RMON alarms or events.</p> <p>events—(Optional) Display information about RMON events.</p> <p>logs—(Optional) Display information about RMON monitoring logs.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • RMON MIB Event, Alarm, Log, and History Control Tables on page 382 • Monitoring RMON MIB Tables on page 264 • Configuring RMON Alarms and Events on page 276 • Understanding RMON on page 377 • clear snmp statistics on page 1996 • clear snmp history on page 2076 • show snmp rmon history on page 2022
List of Sample Output	<p>show snmp rmon on page 2019</p> <p>show snmp rmon (QFX Series) on page 2020</p> <p>show snmp rmon alarms detail on page 2020</p> <p>show snmp rmon events detail on page 2020</p> <p>show snmp rmon logs (QFX Series) on page 2020</p>
Output Fields	<p>Table 253 on page 2018 describes the output fields for the show snmp rmon command. Output fields are listed in the approximate order in which they appear.</p>

Table 253: *show snmp rmon Output Fields*

Field Name	Field Description	Level of Output
Alarm Index	Alarm identifier.	All levels
State	<p>State of the alarm or event entry:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • active—Entry is fully configured and activated. • falling threshold crossed—Value of the variable has crossed the lower threshold limit. • rising threshold crossed—Value of the variable has crossed the upper threshold limit. • under creation—Entry is being configured and is not yet activated. • startup—Alarm is waiting for the first sample of the monitored variable. • object not available—Monitored variable of that type is not available to the SNMP agent. • instance not available—Monitored variable's instance is not available to the SNMP agent. • object type invalid—Monitored variable is not a numeric value. • object processing errored—An error occurred when the monitored variable was processed. • unknown—State is not one of the above. <p>Events:</p> <ul style="list-style-type: none"> • active—Entry has been fully configured and activated. • under creation—Entry is being configured and is not yet activated. • unknown—State is not one of the above. 	All levels
Variable name	Name of the SNMP object instance being monitored.	All levels
Event Index	Event identifier.	All levels
Type	<p>Type of notification made when an event is triggered. It can be one of the following:</p> <ul style="list-style-type: none"> • log—A system log message is generated and an entry is made to the log table. • snmptrap—An SNMP trap is sent to the configured destination. • log and trap—A system log message is generated, an entry is made to the log table, and an SNMP trap is sent to the configured destination. • none—Neither log nor trap will be sent. 	detail
Last Event	Date and time of the last event. It has the format <i>yyyy-mm-dd hh:mm:ss timezone</i> .	brief
Community	Trap group used for sending the SNMP trap.	detail
Variable OID	Object ID to which the variable name is resolved. The format is <i>x.x.x.x</i> .	detail
Sample type	Method of sampling the monitored variable and calculating the value to compare against the upper and lower thresholds. It can have the value of absolute value or delta value .	detail

Table 253: *show snmp rmon Output Fields (continued)*

Field Name	Field Description	Level of Output
Startup alarm	Alarm that might be sent when this entry is first activated, depending on the following criteria: <ul style="list-style-type: none"> Alarm is sent when one of the following situations exists: <ul style="list-style-type: none"> Value of the alarm is above or equal to the rising threshold and the startup type is either rising alarm or rising or falling alarm. Value of the alarm is below or equal to the falling threshold and the startup type is either falling alarm or rising or falling alarm. Alarm is <i>not</i> sent when one of the following situations exists: <ul style="list-style-type: none"> Value of the alarm is above or equal to the rising threshold and the startup type is falling alarm. Value of the alarm is below or equal to the falling threshold and the startup type is rising alarm. Value of the alarm is between the thresholds. 	detail
Owner	Name of the entry configured by the user. If the entry was created through the CLI, the owner has monitor prepended to it.	detail
Creator	Mechanism by which the entry was configured (CLI or SNMP).	detail
Sample interval	Time period between samples (in seconds).	detail
Rising threshold	Upper limit threshold value configured by the user.	detail
Falling threshold	Lower limit threshold value configured by the user.	detail
Rising event index	Event triggered when the rising threshold is crossed.	detail
Falling event index	Event triggered when the falling threshold is crossed.	detail
Current value	Current value of the monitored variable in the most recent sample interval.	detail

Sample Output

show snmp rmon

```
user@host> show snmp rmon
```

```
Alarm
Index  State                      Variable name
   1   falling threshold crossed  ifInOctets.1

Event
Index  Type                        Last Event
   1   log and trap              2002-01-30 01:13:01 PST
```

show snmp rmon (QFX Series)

```
user@host> show snmp rmon
```

Alarm		Value	State
Index	Variable description		
5	monitor jnxOperatingCPU.9.1.0.0	5	falling threshold

Event		Last Event
Index	Type	
1	log and trap	2009-07-10 11:34:17 PDT

Event Index: 1

Description: Event 1 triggered by Alarm 5, rising threshold (90) crossed, (variable: jnxOperatingCPU.9.1.0.0, value: 100)

Time: 2009-07-10 11:34:07 PDT

Description: Event 1 triggered by Alarm 5, falling threshold (75) crossed, (variable: jnxOperatingCPU.9.1.0.0, value: 5)

Time: 2009-07-10 11:34:17 PDT

show snmp rmon alarms detail

```
user@host> show snmp rmon alarms detail
```

Alarm Index 1:	
Variable name	ifInOctets.1
Variable OID	1.3.6.1.2.1.2.2.1.10.1
Sample type	delta value
Startup alarm	rising or falling alarm
Owner	monitor
Creator	CLI
State	falling threshold crossed
Sample interval	60 seconds
Rising threshold	100000
Falling threshold	80000
Rising event index	1
Falling event index	1
Current value	0

show snmp rmon events detail

```
user@host> show snmp rmon events detail
```

Event Index 1:	
Description	rmon event
Type	log and trap
Community	rmon-trap-group
Last event	2009-07-10 11:34:17 PDT
Creator	CLI
State	active

show snmp rmon logs (QFX Series)

```
user@host> show snmp rmon logs
```

Event Index: 1

Description: Event 1 triggered by Alarm 5, rising threshold (90) crossed, (variable: jnxOperatingCPU.9.1.0.0, value: 100)

```
Time: 2009-07-10 11:34:07 PDT
Description: Event 1 triggered by Alarm 5, falling threshold (75) crossed,
(variable: jnxOperatingCPU.9.1.0.0, value: 5)
Time: 2009-07-10 11:34:17 PDT
```

show snmp rmon history

Syntax	show snmp rmon history <history-index> sample-index <sample-index>
Release Information	Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Display the contents of the RMON history group.
Options	<p>none—Display all the entries in the RMON history group.</p> <p>history-index—(Optional) Display the contents of the specified entry in the RMON history group.</p> <p>sample-index sample-index—(Optional) Display the statistics collected for the specified sample within the specified entry in the RMON history group.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear snmp history on page 2076 • RMON MIB Event, Alarm, Log, and History Control Tables on page 382 • Monitoring RMON MIB Tables on page 264 • Configuring RMON Alarms and Events on page 276
List of Sample Output	show snmp rmon history 1 on page 2023 show snmp rmon history 1 sample-index 15 on page 2024
Output Fields	Table 254 on page 2022 lists the output fields for the show smp rmon history command. Output fields are listed in the approximate order in which they appear.

Table 254: show smp rmon history Output Fields

Field Name	Field Description
History Index	Identifies this RMON history entry within the RMON history group.
Owner	The entity that configured this entry. Range is 0 to 32 alphanumeric characters.
Status	The status of the RMON history entry.
Interface or Data Source	The ifindex object that identifies the interface that is being monitored.

Table 254: show snmp rmon history Output Fields (continued)

Field Name	Field Description
Interval	The interval (in seconds) configured for this RMON history entry.
Buckets Requested	The requested number of buckets (intervals) configured for this RMON history entry.
Buckets Granted	The number of buckets granted for this RMON history entry.
Sample Index	<p>The sample statistics taken at the specified interval.</p> <ul style="list-style-type: none"> • Drop Events—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. • Octets—Total number of octets and packets. For Gigabit Ethernet IQ PICs, the received octets count varies by interface type. • Packets—Total number of packets. • Broadcast Packets—Number of broadcast packets. • Multicast Packets—Number of multicast packets. • CRC errors—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). • Undersize Pkts—Number of packets received during this sampling interval that were less than 64 octets long (excluding framing bits but including FCS octets) and were otherwise well formed. • Oversize Pkts—Number of packets received during the sampling interval that were longer than 1518 octets (excluding framing bits, but including FCS octets) but were otherwise well formed. • Fragments—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. • Jabbers—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. • Collisions—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. • Utilization(%)—The best estimate of the mean physical layer network utilization on this interface during this sampling interval, in hundredths of a percent.

Sample Output

```
show snmp rmon history 1
```

```
user@host> show snmp rmon history 1
```

```
History Index 1:
Interface          171
Requested Buckets  50
Interval          10

Sample Index 1: Interval Start: Tue Feb 12 04:12:32 2008
Drop Events        0
Octets             486
Packets            2
Broadcast Packet    0
Multicast Packets  2
CRC errors         0
Undersize Pkts     0
Oversize Pkts      0
Fragments          0
Jabbers            0
Collisions         0
Utilization(%)     0

Sample Index 2: Interval Start: Tue Feb 12 04:12:42 2008
Drop Events        0
Octets             486
Packets            2
Broadcast Packet    0
Multicast Packets  2
CRC errors         0
Undersize Pkts     0
Oversize Pkts      0
Fragments          0
Jabbers            0
Collisions         0
Utilization(%)     0

Sample Index 3: Interval Start: Tue Feb 12 04:12:52 2008
Drop Events        0
Octets             486
Packets            2
Broadcast Packet    0
Multicast Packets  2
CRC errors         0
Undersize Pkts     0
Oversize Pkts      0
Fragments          0
Jabbers            0
Collisions         0
Utilization(%)     0
```

show snmp rmon history 1 sample-index 15

```
user@host> show snmp rmon history 1 sample-index 15
```

```
Index 1
Owner   = monitor
Status  = valid
Data Source = ifIndex.17
Interval = 1800
Buckets Requested = 50
Buckets Granted = 50
```

```
Sample Index 44: Interval Start: Thu Jan  1 00:08:35 1970
Drop Events    = 0
Octetes       = 0
Packets       = 0
Broadcast Pkts = 0
Multicast Pkts = 0
CRC Errors    = 0
Undersize Pkts = 0
Oversize Pkts = 0
Fragments     = 0
Jabbers       = 0
Collisions    = 0
Utilization (%) = 0
```

show snmp statistics

Syntax	<code>show snmp statistics <subagents></code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for OCX Series switches. Option subagents introduced in Junos OS Release 14.2.
Description	Display statistics about Simple Network Management Protocol (SNMP) packets sent and received by the router or switch.
Options	subagents —(Optional) Display the statistics of the protocol data unit (PDU), the number of SNMP requests and responses per subagent, and the SNMP statistics received from each subagent per logical system.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• clear snmp statistics on page 1996
List of Sample Output	show snmp statistics on page 2031 show snmp statistics subagents on page 2031
Output Fields	Table 255 on page 2027 describes the output fields for the show snmp statistics command. Output fields are listed in the approximate order in which they appear.

Table 255: *show snmp statistics Output Fields*

Field Name	Field Description
Input	<p>Information about received packets:</p> <ul style="list-style-type: none"> • Packets(snmplnPkts)—Total number of messages delivered to the SNMP entity from the transport service. • Bad versions—(snmplnBadVersions) Total number of messages delivered to the SNMP entity that were for an unsupported SNMP version. • Bad community names—(snmplnBadCommunityNames) Total number of messages delivered to the SNMP entity that used an SNMP community name not known to the entity. • Bad community uses—(snmplnBadCommunityUses) Total number of messages delivered to the SNMP entity that represented an SNMP operation that was not allowed by the SNMP community named in the message. • ASN parse errors—(snmplnASNParseErrs) Total number of ASN.1 or BER errors encountered by the SNMP entity when decoding received SNMP messages. • Too bigs—(snmplnTooBigs) Total number of SNMP PDUs delivered to the SNMP entity with an error status field of tooBig. • No such names—(snmplnNoSuchNames) Total number of SNMP PDUs delivered to the SNMP entity with an error status field of noSuchName. • Bad values—(snmplnBadValues) Total number of SNMP PDUs delivered to the SNMP entity with an error status field of badValue. • Read onlys—(snmplnReadOnlys) Total number of valid SNMP PDUs delivered to the SNMP entity with an error status field of readOnly. Only incorrect implementations of SNMP generate this error.

Table 255: *show snmp statistics Output Fields (continued)*

Field Name	Field Description
Input (continued)	<ul style="list-style-type: none"> • General errors—(snmpInGenErrs) Total number of SNMP PDUs delivered to the SNMP entity with an error status field of genErr. • Total requests varbinds—(snmpInTotalReqVars) Total number of MIB objects retrieved successfully by the SNMP entity as a result of receiving valid SNMP GetRequest and GetNext PDUs. • Total set varbinds—(snmpInSetVars) Total number of MIB objects modified successfully by the SNMP entity as a result of receiving valid SNMP SetRequest PDUs. • Get requests—(snmpInGetRequests) Total number of SNMP GetRequest PDUs that have been accepted and processed by the SNMP entity. • Get nexts—(snmpInGetNexts) Total number of SNMP GetNext PDUs that have been accepted and processed by the SNMP entity. • Set requests—(snmpInSetRequests) Total number of SNMP SetRequest PDUs that have been accepted and processed by the SNMP entity. • Get responses—(snmpInGetResponses) Total number of SNMP GetResponse PDUs that have been accepted and processed by the SNMP entity. • Traps—(snmpInTraps) Total number of SNMP traps generated by the SNMP entity. • Silent drops—(snmpSilentDrops) Total number of GetRequest, GetNextRequest, GetBulkRequest, SetRequests, and InformRequest PDUs delivered to the SNMP entity that were silently dropped because the size of a reply containing an alternate response PDU with an empty variable-bindings field was greater than either a local constraint or the maximum message size associated with the originator of the requests. • Proxy drops—(snmpProxyDrops) Total number of GetRequest, GetNextRequest, GetBulkRequest, SetRequests, and InformRequest PDUs delivered to the SNMP entity that were silently dropped because the transmission of the message to a proxy target failed in such a way (other than a timeout) that no response PDU could be returned. • Commit pending drops—Number of SNMP packets for Set requests dropped because of a previous pending SNMP Set request on the committed configuration. • Throttle drops—Number of SNMP packets for any requests dropped reaching the throttle limit.

Table 255: *show snmp statistics Output Fields (continued)*

Field Name	Field Description
V3 Input	<p>Information about SNMP version 3 packets:</p> <ul style="list-style-type: none"> • Unknown security models—(snmpUnknownSecurityModels) Total number of packets received by the SNMP engine that were dropped because they referenced a security model that was not known to or supported by the SNMP engine. • Invalid messages—(snmpInvalidMsgs) Number of packets received by the SNMP engine that were dropped because there were invalid or inconsistent components in the SNMP message. • Unknown pdu handlers—(snmpUnknownPDUHandlers) Number of packets received by the SNMP engine that were dropped because the PDU contained in the packet could not be passed to an application responsible for handling the PDU type. • Unavailable contexts—(snmpUnavailableContexts) Number of requests received for a context that is known to the SNMP engine, but is currently unavailable. • Unknown contexts—(snmpUnknownContexts) Total number of requests received for a context that is unknown to the SNMP engine. • Unsupported security levels—(usmStatsUnsupportedSecLevels) Total number of packets received by the SNMP engine that were dropped because they requested a security level unknown to the SNMP engine (or otherwise unavailable). • Not in time windows—(usmStatsNotInTimeWindows) Total number of packets received by the SNMP engine that were dropped because they appeared outside the authoritative SNMP engine's window. • Unknown user names—(usmStatsUnknownUserNames) Total number of packets received by the SNMP engine that were dropped because they referenced a user that was not known to the SNMP engine. • Unknown engine ids—(usmStatsUnknownEngineIDs) Total number of packets received by the SNMP engine that were dropped because they referenced an SNMP engine ID that was not known to the SNMP engine. • Wrong digests—(usmStatsWrongDigests) Total number of packets received by the SNMP engine that were dropped because they did not contain the expected digest value. • Decryption errors—(usmStatsDecryptionErrors) Total number of packets received by the SNMP engine that were dropped because they could not be decrypted.

Table 255: *show snmp statistics Output Fields (continued)*

Field Name	Field Description
Output	<p>Information about transmitted packets:</p> <ul style="list-style-type: none"> • Packets—(snmpOutPkts) Total number of messages passed from the SNMP entity to the transport service. • Too big—(snmpOutTooBigs) Total number of SNMP PDUs generated by the SNMP entity with an error status field of tooBig. • No such names—(snmpOutNoSuchNames) Total number of SNMP PDUs delivered to the SNMP entity with an error status field of noSuchName. • Bad values—(snmpOutBadValues) Total number of SNMP PDUs generated by the SNMP entity with an error status field of badValue. • General errors—(snmpOutGenErrs) Total number of SNMP PDUs generated by the SNMP entity with an error status field of genErr. • Get requests—(snmpOutGetRequests) Total number of SNMP GetRequest PDUs generated by the SNMP entity. • Get nexts—(snmpOutGetNexts) Total number of SNMP GetNext PDUs generated by the SNMP entity. • Set requests—(snmpOutSetRequests) Total number of SNMP SetRequest PDUs generated by the SNMP entity. • Get responses—(snmpOutGetResponses) Total number of SNMP GetResponse PDUs generated by the SNMP entity. • Traps—(snmpOutTraps) Total number of SNMP traps generated by the SNMP entity.

Table 256 on page 2030 describes the output fields for the **show snmp statistics subagents** command. Output fields are listed in the approximate order in which they appear.

Table 256: *show snmp statistics subagents Output Fields*

Field Name	Field Description
Subagent	Location of the SNMP subagent.
Request PDUs	Number of PDUs requested by the SNMP manager.
Response PDUs	Number of response PDUs sent by the SNMP subagent.
Request Variables	Number of variable bindings on the PDUs requested by the SNMP manager.
Response Variables	Number of variable bindings on the PDUs sent by the SNMP subagent.
Average Response Time	Average time taken by the SNMP subagent to send statistics response.
Maximum Response Time	Maximum time taken by the SNMP subagent to send the statistics response.

Sample Output

show snmp statistics

```
user@host> show snmp statistics
```

```
SNMP statistics:
```

```
Input:
```

```
Packets: 246213, Bad versions: 12, Bad community names: 12,
Bad community uses: 0, ASN parse errors: 96,
Too big: 0, No such names: 0, Bad values: 0,
Read only: 0, General errors: 0,
Total request varbinds: 227084, Total set varbinds: 67,
Get requests: 44942, Get nexts: 190371, Set requests: 10712,
Get responses: 0, Traps: 0,
Silent drops: 0, Proxy drops: 0, Commit pending drops: 0,
Throttle drops: 0,
```

```
V3 Input:
```

```
Unknown security models: 0, Invalid messages: 0
Unknown pdu handlers: 0, Unavailable contexts: 0
Unknown contexts: 0, Unsupported security levels: 1
Not in time windows: 0, Unknown user names: 0
Unknown engine ids: 44, Wrong digests: 23, Decryption errors: 0
```

```
Output:
```

```
Packets: 246093, Too big: 0, No such names: 31561,
Bad values: 0, General errors: 2,
Get requests: 0, Get nexts: 0, Set requests: 0,
Get responses: 246025, Traps: 0
```

show snmp statistics subagents

```
user@host> show snmp statistics subagents
```

```
Subagent: /var/run/cosd-20
```

```
Request PDUs: 0, Response PDUs: 0,
Request Variables: 0, Response Variables: 0,
Average Response Time(ms): 0.00,
Maximum Response Time(ms): 0.00
```

```
Subagent: /var/run/pfed-30
```

```
Request PDUs: 0, Response PDUs: 0,
Request Variables: 0, Response Variables: 0,
Average Response Time(ms): 0.00,
Maximum Response Time(ms): 0.00
```

```
Subagent: /var/run/rmopd-15
```

```
Request PDUs: 0, Response PDUs: 0,
Request Variables: 0, Response Variables: 0,
Average Response Time(ms): 0.00,
Maximum Response Time(ms): 0.00
```

```
Subagent: /var/run/chassisd-30
```

```
Request PDUs: 33116, Response PDUs: 33116,
Request Variables: 33116, Response Variables: 33116,
Average Response Time(ms): 1.83,
Maximum Response Time(ms): 203.48
```

```
Subagent: /var/run/pkid-13
```

```
Request PDUs: 0, Response PDUs: 0,
```

```
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00
```

```
Subagent: /var/run/apspd-13  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00
```

```
Subagent: /var/run/dfcd-32  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00
```

```
Subagent: /var/run/mib2d-33  
Request PDUs: 74211, Response PDUs: 74211,  
Request Variables: 74211, Response Variables: 74211,  
Average Response Time(ms): 2.30,  
Maximum Response Time(ms): 51.04
```

```
Subagent: /var/run/license-check-16  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00
```

```
Subagent: /var/run/craftd-14  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00
```

```
Subagent: /var/run/bfdd-19  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00
```

```
Subagent: /var/run/smihelperd-24  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00
```

```
Subagent: /var/run/cfmd-18  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00
```

```
Subagent: /var/run/rpd_snmp  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00
```

```
Subagent: /var/run/l2tpd-18  
Request PDUs: 0, Response PDUs: 0,
```

```
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00
```

show snmp v3

Syntax	<code>show snmp v3 <access <brief detail> community general groups notify <filter> target <address parameters> users></code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Display the Simple Network Management Protocol version 3 (SNMPv3) operating configuration.
Options	<p>none—Display all of the SNMPv3 operating configuration.</p> <p>access—(Optional) Display SNMPv3 access information.</p> <p>brief detail—(Optional) Display brief or detailed information about SNMPv3 access information.</p> <p>community—(Optional) Display SNMPv3 community information.</p> <p>general—(Optional) Display SNMPv3 general information.</p> <p>groups—(Optional) Display SNMPv3 security-to-group information.</p> <p>notify <filter>—(Optional) Display SNMPv3 notify and, optionally, notify filter information.</p> <p>target <address parameters>—(Optional) Display SNMPv3 target and, optionally, either target address or target parameter information.</p> <p>users—(Optional) Display SNMPv3 user information.</p>
Additional Information	To edit the default display of the show snmp v3 command, specify options in the show statement at the [edit snmp v3] hierarchy level.
Required Privilege Level	view
List of Sample Output	show snmp v3 on page 2036
Output Fields	Table 257 on page 2035 describes the output fields for the show snmp v3 command. Output fields are listed in the approximate order in which they appear.

Table 257: *show snmp v3 Output Fields*

Field Name	Field Description
Access control	<p>Information about access control:</p> <ul style="list-style-type: none"> • Group—Group name for which the configured access privileges apply. The group, together with the context prefix and the security model and security level, forms the index for this table. • Context prefix—SNMPv3 context for which the configured access privileges apply. • Security model/level—Security model and security level for which the configuration access privileges apply. • Read view—Identifies the MIB view applied to SNMPv3 read operations. • Write view—Identifies the MIB view applied to SNMPv3 write operations. • Notify view—Identifies the MIB view applied to outbound SNMP notifications.
Engine	<p>Information about local engine configuration:</p> <ul style="list-style-type: none"> • Local engine ID—Identifier that uniquely and unambiguously identifies the local SNMPv3 engine. • Engine boots—Number of times the local SNMPv3 engine has rebooted or reinitialized since the engine ID was last changed. • Engine time—Number of seconds since the local SNMPv3 engine was last rebooted or reinitialized. • Max msg size—Maximum message size the sender can accommodate.
Engine ID	<p>Information about engine ID:</p> <ul style="list-style-type: none"> • Local engine ID—Identifier that uniquely and unambiguously identifies the local SNMPv3 engine. • Engine boots—Number of times the local SNMPv3 engine has rebooted or reinitialized since the engine ID was last changed. • Engine time—Number of seconds since the local SNMPv3 engine was last rebooted or reinitialized. • Max msg size—Maximum message size the sender can accommodate. • Engine ID—SNMPv3 engine ID associated with each user. • User—SNMPv3 user. • Auth/Priv—Authentication and encryption algorithm available for use by each user. • Storage—Indicates whether a user is saved to the configuration file (nonvolatile) or not (volatile). Applies only to users with active status. • Status—Status of the conceptual row. Only rows with an active status are used by the SNMPv3 engine.
Group name	Name of the group to which this entry belongs.
Security model	Identifies the security model context for the security name.
Security name	Used with the security model; identifies a specific security name instance. Each security model/security name combination can be assigned to a specific group.
Storage type	Indicates whether a user is saved to the configuration file (nonvolatile) or not (volatile). Applies only to users with active status.
Status	Status of the conceptual row. Only rows with active status are used by the SNMPv3 engine.

Sample Output

show snmp v3

```
user@host> show snmp v3
```

```
Local engine ID: 80 00 0a 4c e04 31 32 33 34
Engine boots:      38
Engine time:       64583 seconds
Max msg size:      2048 bytes
```

```
Engine ID: local
```

User	Auth/Priv	Storage	Status
user1	md5/des	nonvolatile	active
user2	sha/none	nonvolatile	active
user3	none/none	nonvolatile	active

```
Engine ID: 81 00 0a 4c 04 64 64 64 64
```

User	Auth/Priv	Storage	Status
UNEW	md5/none	nonvolatile	active

Group name	Security model	Security name	Storage type	Status
g1	usm	user1	nonvolatile	active
g2	usm	user2	nonvolatile	active
g3	usm	user3	nonvolatile	active

```
Access control:
```

Group	Context prefix	Security model/level	Read view	Write view	Notify view
g1		usm/privacy	v1	v1	
g2		usm/authent	v1	v1	
g3		usm/none	v1	v1	

CHAPTER 84

Operational Commands: Port Mirroring

- `show analyzer`

show analyzer

Syntax	show analyzer <i>analyzer-name</i>
Release Information	Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Display information about analyzers configured for mirroring.
Options	<i>analyzer-name</i> —(Optional) Displays the status of a specific analyzer on the switch.
Required Privilege Level	view
List of Sample Output	show analyzer on page 2038
Output Fields	Table 229 on page 1904 lists the output fields for the command-name command. Output fields are listed in the approximate order in which they appear.

Table 258: show analyzer Output Fields

Field Name	Field Description
Analyzer name	Displays the name of the analyzer.
Output interface	Specifies a local interface to which mirrored packets are sent. An analyzer can have output to either an interface or a VLAN, not both.
Output VLAN	Specifies a VLAN to which mirrored packets are sent. An analyzer can have output to either an interface or a VLAN, not both.
Mirror ratio	Displays the ratio of packets to be mirrored.
Egress monitored interfaces	Displays interfaces for which traffic exiting the interfaces is mirrored.
Ingress monitored interfaces	Displays interfaces for which traffic entering the interfaces is mirrored.
Ingress monitored VLANs	Displays VLANs for which traffic entering the VLAN is mirrored.

Sample Output

show analyzer

```

user@host> show analyzer
Analyzer name       : employee-monitor
Output interface    : ge-0/0/10.0
Output VLAN         : remote-analyzer
Mirror ratio        : 1
Loss priority       : High

```

```
Egress monitored interfaces : ge-0/0/3.0  
Ingress monitored interfaces : ge-0/0/0.0  
Ingress monitored interfaces : ge-0/0/1.0
```


CHAPTER 85

Operational Commands: Network Analytics

- `show services analytics agent`

show services analytics agent

Syntax	<code>show services analytics agent</code> <code><brief detail></code>
Release Information	Command introduced in Junos OS Release 18.3R1 on MX Series routers. Command introduced in Junos OS Release 18.4R1 on PTX Series routers.
Description	Display information about running instances of Network Telemetry Framework (NTF) agent.
Options	none —(Same as brief) Display summary information about analytics agents. brief detail —(Optional) Display information about analytics agents for the specified level of output.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • <i>IPFIX Mediation on the BNG</i> • <i>Configuring NTF Agent</i>
List of Sample Output	show services analytics agent on page 2043 show services analytics agent (Brief) on page 2043 show services analytics agent (Detail) on page 2043
Output Fields	Table 259 on page 2042 lists the output fields for the show services analytics agent command. Output fields are listed in the approximate order in which they appear.

Table 259: show services analytics agent Output Fields

Field Name	Field Description	Level of Output
Agent ID	Name of the agent.	brief none
Output Plugins	Number of output plug-ins configured for the agent.	brief none
Input Plugins	Number of input plug-ins configured for the agent.	brief none
Process ID	Number that uniquely identifies the active process for the service agent at the brief and none levels. At the detail level, the process ID is displayed for the analytics agent (the parent NTF agent) and for the active service agents.	All levels
Analytics agent	Information about the parent NTF agent.	detail
Configuration File	Path where the NTF agent configuration file is located.	detail

Table 259: show services analytics agent Output Fields (continued)

Field Name	Field Description	Level of Output
Log File	Path where logs are stored for the NTF agent.	detail
Service Agent Count	Number of active service agents.	detail
Analytics Service agent(s)	Information about the active service agents.	detail
Agent Name	Name of the service agent.	detail
Input Plugin/s	Name of all input plug-ins configured for the service agent.	detail
Output Plugin/s	Name of all output plug-ins configured for the service agent.	detail

Sample Output

show services analytics agent

```
user@host> show services analytics agent
```

Agent ID	Output Plugins	Input Plugins	Process ID
ipfix	1	2	8368

show services analytics agent (Brief)

```
user@host> show services analytics agent brief
```

Agent ID	Output Plugins	Input Plugins	Process ID
ipfix	1	2	8368

show services analytics agent (Detail)

```
user@host> show services analytics agent detail
```

```
Analytics agent:
Process ID      : 6246
Configuration File : /var/etc/ntf-agent.conf
Log File       : /var/log/ntf-agent.log
Service Agent Count : 1
Analytics service agent(s):
Agent Name      : ipfix
Input Plugin/s  : input-ipfix
Output Plugin/s : output-ipfix
Process ID      : 8368
```


CHAPTER 86

Operational Commands: System Logging

- clear log
- clear security log
- clear security log file
- clear security log stream file
- monitor list
- monitor start
- monitor stop
- show log
- show security log
- show security log file
- show security log severity
- show security log query

clear log

Syntax	<code>clear log <i>filename</i></code> <code><all></code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.
Description	Remove contents of a log file.
Options	<i>filename</i> —Name of the specific log file to delete. all —(Optional) Delete the specified log file and all archived versions of it.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none"> show log on page 2057
List of Sample Output	clear log on page 2046
Output Fields	See <i>file list</i> for an explanation of output fields.

Sample Output

clear log

The following sample commands list log file information, clear the contents of a log file, and then display the updated log file information:

```
user@host> file list lcc0-re0:/var/log/sampled detail
```

```
lcc0-re0:
```

```
-----
-rw-r----- 1 root  wheel      26450 Jun 23 18:47 /var/log/sampled
total 1
```

```
user@host> clear log lcc0-re0:sampled
```

```
lcc0-re0:
```

```
user@host> file list lcc0-re0:/var/log/sampled detail
```

```
lcc0-re0:
```

```
-----
-rw-r----- 1 root  wheel        57 Sep 15 03:44 /var/log/sampled
total 1
```


clear security log

Syntax clear security log
<all>
<destination-address>
<destination-port>
<event-id>
<failure>
<interface-name>
<newer-than>
<older--than>
<process>
<protocol>
<report>
<severity>
<source-address>
<source-port>
<success>
<username>

Release Information Command introduced in Junos OS Release 11.2.

Description Delete the event log.

Options **all**—Clear all audit event logs stored in the device memory.

destination-address—Clear audit event logs with the specified destination address.

destination-port—Clear audit event logs with the specified destination port.

event-id—Clear audit event logs with the specified event identification number.

failure—Clear failed audit event logs.

interface-name—Clear audit event logs with the specified interface.

newer-than—Clear audit event logs newer than the specified date and time.

older-than—Clear audit event logs older than the specified date and time

process—Clear audit event logs with the specified process that generated the event.

protocol—Clear audit event logs generated through the specified protocol.

report—Clear on-box reports for system traffic logs.

severity—Clear audit event logs generated with the specified severity.

source-address—Clear audit event logs with the specified source address.

source-port—Clear audit event logs with the specified source port.

success—Clear successful audit event logs.

username—Clear audit event logs generated for the specified user.

**Required Privilege
Level**

clear

**Related
Documentation**

- [exclude \(Security Log\) on page 1807](#)
- [show security log on page 2061](#)

Sample Output

clear security log all

```
user@host> clear security log all
7905 security log events cleared
```

clear security log file

Syntax	clear security log file
Release Information	Command introduced in Junos OS Release 12.1.
Description	Deletes the content of an event mode security log file stored on the device in binary format.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none">• show security log file on page 2064

Sample Output

clear security log file

```
user@host> clear security log file
7905 security log events cleared
```

clear security log stream file

Syntax clear security log query
clear security log stream
file <file-name>

Release Information Command introduced in Junos OS Release 15.1X49-D70 for SRX1500, SRX4100, and SRX4200 Series devices and vSRX instances.

Description

- **clear security log query**—Clear the content of the database.
- **clear security log stream file**—Clear the content of the current log file.

Required Privilege Level clear

Output Fields The following outputs are occurred in two conditions:

- Clear log stream file successfully, when there is log file.
- Clear log stream file error or does not exists, when there is no log file.

monitor list

Syntax	<code>monitor list</code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Display the status of monitored log and trace files.
Options	This command has no options.
Additional Information	Log files are generated by the routing protocol process or by system logging. The log files generated by system logging are configured with the syslog statement at the [edit system] hierarchy level and the options statement at the [edit routing-options] hierarchy level. The trace files generated by the routing protocol process are those configured with traceoptions statements at the [edit routing-options] , [edit interfaces] , and [edit protocols protocol] hierarchy levels.
Required Privilege Level	trace
Related Documentation	<ul style="list-style-type: none"> • monitor start on page 2054 • monitor stop on page 2056

List of Sample Output [monitor list on page 2052](#)

Output Fields [Table 260 on page 2052](#) describes the output fields for the **monitor list** command. Output fields are listed in the approximate order in which they appear.

Table 260: monitor list Output Fields

Field Name	Field Description
monitor start	Indicates the file is being monitored.
"filename"	Name of the file that is being monitored.
Last changed	Date and time at which the file was last modified.

Sample Output

monitor list

```
user@host> monitor list
```

```
monitor start "vrrpd" (Last changed Dec 03:11:06 20)
monitor start "cli-commands" (Last changed Nov 07:3)
```

monitor start

Syntax	<code>monitor start <i>filename</i></code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Start displaying the system log or trace file and additional entries being added to those files.
Options	<i>filename</i> —Specific log or trace file.
Additional Information	Log files are generated by the routing protocol process or by system logging. The log files generated by system logging are configured with the syslog statement at the [edit system] hierarchy level and the options statement at the [edit routing-options] hierarchy level. The trace files generated by the routing protocol process are configured with traceoptions statements at the [edit routing-options] , [edit interfaces] , and [edit protocols protocol] hierarchy levels.



NOTE: To monitor a log file within a logical system, issue the `monitor start logical-system-name/filename` command.

Required Privilege Level	trace
Related Documentation	<ul style="list-style-type: none"> monitor list on page 2052 monitor stop on page 2056
List of Sample Output	monitor start on page 2055
Output Fields	Table 261 on page 2054 describes the output fields for the monitor start command. Output fields are listed in the approximate order in which they appear.

Table 261: monitor start Output Fields

Field Name	Field Description
<i>filename</i>	Name of the file from which entries are being displayed. This line is displayed initially and when the command switches between log files.
<i>Date and time</i>	Timestamp for the log entry.

Sample Output

monitor start

```
user@host> monitor start system-log
```

```
*** system-log***
```

```
Jul 20 15:07:34 hang sshd[5845]: log: Generating 768 bit RSA key.
```

```
Jul 20 15:07:35 hang sshd[5845]: log: RSA key generation complete.
```

```
Jul 20 15:07:35 hang sshd[5845]: log: Connection from 204.69.248.180 port 912
```

```
Jul 20 15:07:37 hang sshd[5845]: log: RSA authentication for root accepted.
```

```
Jul 20 15:07:37 hang sshd[5845]: log: ROOT LOGIN as 'root' from host.example.com
```

```
Jul 20 15:07:37 hang sshd[5845]: log: Closing connection to 204.69.248.180
```

monitor stop

Syntax	<code>monitor stop <i>filename</i></code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Stop displaying the system log or trace file.
Options	<i>filename</i> —Specific log or trace file.
Additional Information	Log files are generated by the routing protocol process or by system logging. The log files generated by system logging are those configured with the syslog statement at the [edit system] hierarchy level and the options statement at the [edit routing-options] hierarchy level. The trace files generated by the routing protocol process are those configured with traceoptions statements at the [edit routing-options] , [edit interfaces] , and [edit protocols <i>protocol</i>] hierarchy levels.
Required Privilege Level	trace
Related Documentation	<ul style="list-style-type: none">• monitor list on page 2052• monitor start on page 2054
List of Sample Output	monitor stop on page 2056
Output Fields	This command produces no output.

Sample Output

monitor stop

```
user@host> monitor stop
```

show log

List of Syntax [Syntax on page 2057](#)
 [Syntax \(QFX Series and OCX Series\) on page 2057](#)
 [Syntax \(TX Matrix Router\) on page 2057](#)

Syntax `show log`
 `<filename | user <username>>`

Syntax (QFX Series and OCX Series) `show log filename`
 `<device-type (device-id | device-alias)>`

Syntax (TX Matrix Router) `show log`
 `<all-lcc | lcc number | scc>`
 `<filename | user <username>>`

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 for EX Series switches.
 Command introduced in Junos OS Release 11.1 for the QFX Series.
 Option *device-type (device-id | device-alias)* is introduced in Junos OS Release 13.1 for the QFX Series.
 Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

Description List log files, display log file contents, or display information about users who have logged in to the router or switch.



NOTE: On MX Series routers, modifying a configuration to replace a service interface with another service interface is treated as a catastrophic event. When you modify a configuration, the entire configuration associated with the service interface—including NAT pools, rules, and service sets—is deleted and then re-created for the newly specified service interface. If there are active sessions associated with the service interface that is being replaced, these sessions are deleted and the NAT pools are then released, which leads to the generation of the NAT_POOL_RELEASE system log messages. However, because NAT pools are already deleted as a result of the catastrophic configuration change and no longer exist, the NAT_POOL_RELEASE system log messages are not generated for the changed configuration.

Options **none**—List all log files.

<all-lcc | lcc number | scc>—(Routing matrix only)(Optional) Display logging information about all T640 routers (or line-card chassis) or a specific T640 router (replace

number with a value from 0 through 3) connected to a TX Matrix router. Or, display logging information about the TX Matrix router (or switch-card chassis).

device-type—(QFabric system only) (Optional) Display log messages for only one of the following device types:

- **director-device**—Display logs for Director devices.
- **infrastructure-device**—Display logs for the logical components of the QFabric system infrastructure, including the diagnostic Routing Engine, fabric control Routing Engine, fabric manager Routing Engine, and the default network Node group and its backup (NW-NG-0 and NW-NG-0-backup).
- **interconnect-device**—Display logs for Interconnect devices.
- **node-device**—Display logs for Node devices.



NOTE: If you specify the **device-type** optional parameter, you must also specify either the **device-id** or **device-alias** optional parameter.

(device-id | device-alias)—If a device type is specified, display logs for a device of that type. Specify either the device ID or the device alias (if configured).

filename—(Optional) Display the log messages in the specified log file. For the routing matrix, the filename must include the chassis information.



NOTE: The **filename** parameter is mandatory for the QFabric system. If you did not configure a syslog filename, specify the default filename of messages.

user <username>—(Optional) Display logging information about users who have recently logged in to the router or switch. If you include **username**, display logging information about the specified user.

Required Privilege Level

trace

Related Documentation

- [syslog \(System\) on page 1840](#)

List of Sample Output

[show log on page 2059](#)
[show log filename on page 2059](#)
[show log filename \(QFabric System\) on page 2059](#)
[show log user on page 2060](#)

Sample Output

show log

```
user@host> show log

total 57518
-rw-r--r-- 1 root bin      211663 Oct  1 19:44 dcd
-rw-r--r-- 1 root bin      999947 Oct  1 19:41 dcd.0
-rw-r--r-- 1 root bin      999994 Oct  1 17:48 dcd.1
-rw-r--r-- 1 root bin      238815 Oct  1 19:44 rpd
-rw-r--r-- 1 root bin     1049098 Oct  1 18:00 rpd.0
-rw-r--r-- 1 root bin     1061095 Oct  1 12:13 rpd.1
-rw-r--r-- 1 root bin     1052026 Oct  1 06:08 rpd.2
-rw-r--r-- 1 root bin     1056309 Sep 30 18:21 rpd.3
-rw-r--r-- 1 root bin     1056371 Sep 30 14:36 rpd.4
-rw-r--r-- 1 root bin     1056301 Sep 30 10:50 rpd.5
-rw-r--r-- 1 root bin     1056350 Sep 30 07:04 rpd.6
-rw-r--r-- 1 root bin     1048876 Sep 30 03:21 rpd.7
-rw-rw-r-- 1 root bin       19656 Oct  1 19:37 wtmp
```

show log filename

```
user@host> show log rpd

Oct  1 18:00:18 trace_on: Tracing to ?/var/log/rpd? started
Oct  1 18:00:18 EVENT <MTU> ds-5/2/0.0 index 24 <Broadcast PointToPoint Multicast
Oct  1 18:00:18
Oct  1 18:00:19 KRT rcv len 56 V9 seq 148 op add Type route/if af 2 addr
192.0.2.21 nhop type local nhop 192.0.2.21
Oct  1 18:00:19 KRT rcv len 56 V9 seq 149 op add Type route/if af 2 addr
192.0.2.22 nhop type unicast nhop 192.0.2.22
Oct  1 18:00:19 KRT rcv len 48 V9 seq 150 op add Type ifaddr index 24 devindex
43
Oct  1 18:00:19 KRT rcv len 144 V9 seq 151 op chnge Type ifdev devindex 44
Oct  1 18:00:19 KRT rcv len 144 V9 seq 152 op chnge Type ifdev devindex 45
Oct  1 18:00:19 KRT rcv len 144 V9 seq 153 op chnge Type ifdev devindex 46
Oct  1 18:00:19 KRT rcv len 1272 V9 seq 154 op chnge Type ifdev devindex 47
...
```

show log filename (QFabric System)

```
user@qfabric> show log messages

Mar 28 18:00:06 qfabric chassisd: QFABRIC_INTERNAL_SYSLOG: Mar 28 18:00:06 ED1486
chassisd: CHASSISD_SNMP_TRAP10: SNMP trap generated: FRU power on
(jnxFruContentsIndex 8, jnxFruL1Index 1, jnxFruL2Index 1, jnxFruL3Index 0,
jnxFruName PIC: 48x 10G-SFP+ @ 0/0/*, jnxFruType 11, jnxFruSlot 0,
jnxFruOfflineReason 2, jnxFruLastPowerOff 0, jnxFruLastPowerOn 2159)
Mar 28 18:00:07 qfabric chassisd: QFABRIC_INTERNAL_SYSLOG: Mar 28 18:00:07 ED1486
chassisd: CHASSISD_SNMP_TRAP10: SNMP trap generated: FRU power on
(jnxFruContentsIndex 8, jnxFruL1Index 1, jnxFruL2Index 2, jnxFruL3Index 0,
jnxFruName PIC: @ 0/1/*, jnxFruType 11, jnxFruSlot 0, jnxFruOfflineReason 2,
jnxFruLastPowerOff 0, jnxFruLastPowerOn 2191)
Mar 28 18:00:07 qfabric chassisd: QFABRIC_INTERNAL_SYSLOG: Mar 28 18:00:07 ED1492
chassisd: CHASSISD_SNMP_TRAP10: SNMP trap generated: FRU power on
(jnxFruContentsIndex 8, jnxFruL1Index 1, jnxFruL2Index 1, jnxFruL3Index 0,
jnxFruName PIC: 48x 10G-SFP+ @ 0/0/*, jnxFruType 11, jnxFruSlot 0,
jnxFruOfflineReason 2, jnxFruLastPowerOff 0, jnxFruLastPowerOn 242726)
```

```

Mar 28 18:00:07 qfabric chassisd: QFABRIC_INTERNAL_SYSLOG: Mar 28 18:00:07 ED1492
chassisd: CHASSISD_SNMP_TRAP10: SNMP trap generated: FRU power on
(jnxFruContentsIndex 8, jnxFruL1Index 1, jnxFruL2Index 2, jnxFruL3Index 0,
jnxFruName PIC: @ 0/1/*, jnxFruType 11, jnxFruSlot 0, jnxFruOfflineReason 2,
jnxFruLastPowerOff 0, jnxFruLastPowerOn 242757)
Mar 28 18:00:16 qfabric file: QFABRIC_INTERNAL_SYSLOG: Mar 28 18:00:16 ED1486
file: UI_COMMIT: User 'root' requested 'commit' operation (comment: none)
Mar 28 18:00:27 qfabric file: QFABRIC_INTERNAL_SYSLOG: Mar 28 18:00:27 ED1486
file: UI_COMMIT: User 'root' requested 'commit' operation (comment: none)
Mar 28 18:00:50 qfabric file: QFABRIC_INTERNAL_SYSLOG: Mar 28 18:00:50
_DCF_default__NW-INE-0_REO_ file: UI_COMMIT: User 'root' requested 'commit'
operation (comment: none)
Mar 28 18:00:50 qfabric file: QFABRIC_INTERNAL_SYSLOG: Mar 28 18:00:50
_DCF_default__NW-INE-0_REO_ file: UI_COMMIT: User 'root' requested 'commit'
operation (comment: none)
Mar 28 18:00:55 qfabric file: QFABRIC_INTERNAL_SYSLOG: Mar 28 18:00:55 ED1492
file: UI_COMMIT: User 'root' requested 'commit' operation (comment: none)
Mar 28 18:01:10 qfabric file: QFABRIC_INTERNAL_SYSLOG: Mar 28 18:01:10 ED1492
file: UI_COMMIT: User 'root' requested 'commit' operation (comment: none)
Mar 28 18:02:37 qfabric chassisd: QFABRIC_INTERNAL_SYSLOG: Mar 28 18:02:37 ED1491
chassisd: CHASSISD_SNMP_TRAP10: SNMP trap generated: FRU power on
(jnxFruContentsIndex 8, jnxFruL1Index 1, jnxFruL2Index 1, jnxFruL3Index 0,
jnxFruName PIC: 48x 10G-SFP+ @ 0/0/*, jnxFruType 11, jnxFruSlot 0,
jnxFruOfflineReason 2, jnxFruLastPowerOff 0, jnxFruLastPowerOn 33809)

```

show log user

```
user@host> show log user
```

usera	mg2546		Thu Oct 1 19:37	still logged in
usera	mg2529		Thu Oct 1 19:08 - 19:36	(00:28)
usera	mg2518		Thu Oct 1 18:53 - 18:58	(00:04)
root	mg1575		Wed Sep 30 18:39 - 18:41	(00:02)
root	ttyp2	aaa.bbbb.com	Wed Sep 30 18:39 - 18:41	(00:02)
userb	ttyp1	192.0.2.0	Wed Sep 30 01:03 - 01:22	(00:19)

show security log

Syntax	<code>show security log {all destination-address destination-port event-id failure interface-name newer-than older-than process protocol report severity sort-by source-address source-port success user}</code>
Release Information	Command introduced in Junos OS Release 11.2 .
Description	Display security event logs. This command continuously displays security events on the screen. To stop the display, press Ctrl+c.
Options	<p>all—Display all audit event logs stored in the device memory.</p> <p>destination-address—Display audit event logs with the specified destination address.</p> <p>destination-port—Display audit event logs with the specified destination port.</p> <p>event-id—Display audit event logs with the specified event identification number.</p> <p>failure—Display failed audit event logs.</p> <p>interface-name—Display audit event logs with the specified interface.</p> <p>newer-than—Display audit event logs newer than the specified date and time.</p> <p>older-than—Display audit event logs older than the specified date and time.</p> <p>process—Display audit event logs with the specified process that generated the event.</p> <p>protocol—Display audit event logs generated through the specified protocol.</p> <p>report—Display on-box reports for system traffic logs.</p> <p>severity—Display audit event logs generated with the specified severity.</p> <p>sort-by—Display audit event logs generated sorted with the specified options.</p> <p>source-address—Display audit event logs with the specified source address.</p> <p>source-port—Display audit event logs with the specified source port.</p> <p>success—Display successful audit event logs.</p> <p>username—Display audit event logs generated for the specified user.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • exclude (Security Log) on page 1807 • clear security log on page 2048

List of Sample Output [show security log on page 2062](#)

Output Fields [Table 262 on page 2062](#) lists the output fields for the **show security log** command. Output fields are listed in the approximate order in which they appear.

Table 262: show security log Output Fields

Field Name	Field Description
Event time	The timestamp of the events received. On SRX Series devices, security logs were always timestamped using the UTC time zone by running set system time-zone utc and set security log utc-timestamp CLI commands. Now, time zone can be defined using the local time zone by running the set system time-zone time-zone command to specify the local time zone that the system should use when timestamping the security logs.
Message	Security events are listed.

Sample Output

show security log

```
user@host> show security log
```

```
Event time      Message
2010-10-22 13:28:37 CST session created 1.1.1.2/1-->2.2.2.2/1308
icmp 1.1.1.2/1-->2.2.2.2/1308
None None 1 policy1 trustZone untrustZone 52 N/A(N/A) ge-0/0/1.0
2010-10-22 13:28:38 CST session created 1.1.1.2/1-->2.2.2.2/1308 icmp
1.1.1.2/1-->2.2.2.2/1308 None None 1 policy1 trustZone untrustZone 54 N/A(N/A)
ge-0/0/1.0
```

```
...
```

```
2010-10-22 13:36:12 CST session denied m icmp 1(8) policy1 trustZone untrustZone
N/A(N/A) ge-0/0/1.0
2010-10-22 13:36:14 CST session denied 1.1.1.2/2-->2.2.2.2/54812 icmp 1(8)
policy1 trustZone untrustZone N/A(N/A) ge-0/0/1.0
```

```
...
```

```
2010-10-27 15:50:11 CST IP spoofing! source: 2.2.2.20, destination: 2.2.2.2,
protocol-id: 17, zone name: trustZone, interface name: ge-0/0/1.0, action: drop
2010-10-27 15:50:11 CST IP spoofing! source: 2.2.2.20, destination:
2.2.2.2, protocol-id: 17, zone name: trustZone, interface name: ge-0/0/1.0, action:
drop
```

```
...
```

```
2011-02-18 15:53:34 CST PKID_PV_OBJECT_READ: A PKI object was read into memory
from /var/db/certs/common/certification-authority/ca-profile1-ca1.cert
2011-02-18 15:53:35 CST PKID_PV_OBJECT_READ: A PKI object was read into memory
from /var/db/certs/common/crl/ca-profile1.crl
2011-02-18 15:53:35 CST PKID_PV_OBJECT_READ: A PKI object was read into memory
from /var/db/certs/system-key-pair/system-generated.priv
```

```

2011-02-18 15:53:35 CST  PKID_PV_OBJECT_READ: A PKI object was read into memory
from /var/db/certs/system-cert/system-generated.cert
2011-02-18 15:53:35 CST  PKID_PV_OBJECT_READ: A PKI object was read into memory
from /var/db/certs/common/key-pair/cert1.priv
2011-02-18 15:53:42 CST  PKID_PV_OBJECT_READ: A PKI object was read into memory
from /var/db/certs/common/key-pair/test2.priv

```

```
...
```

```

2011-03-14 23:00:40 PDT  IDP_COMMIT_COMPLETED: IDP policy commit is complete.
                        IDP_POLICY_LOAD_FAILED: IDP policy loading failed ;poli
cy[/var/db/idpd/bins/.bin.gz.v], detector[/usr/libdata/libidp-detector.so.tgz.v]

, failure detail[Policy loading failed :: Policy file not found
2011-03-14 23:00:58 PDT  ]
                        IDP_POLICY_LOAD_FAILED: IDP policy loading failed ;poli
cy[/var/db/idpd/bins/.bin.gz.v], detector[/usr/libdata/libidp-detector.so.tgz.v]

, failure detail[Policy loading failed :: Policy file not found
2011-03-14 23:00:58 PDT  ]
                        IDP_POLICY_LOAD_FAILED: IDP policy loading failed ;poli
cy[/var/db/idpd/bins/.bin.gz.v], detector[/usr/libdata/libidp-detector.so.tgz.v]

, failure detail[Policy loading failed :: Policy file not found
2011-03-14 23:00:58 PDT  ]

```

```
...
```

Event time	Message
2011-03-21 14:21:49 CST	UI_CMDLINE_READ_LINE: User 'root', command 'set date ntp 9.9.9.1 source-address 6.6.6.1 '
2011-03-21 14:23:01 CST	UI_CMDLINE_READ_LINE: User 'root', command 'set date ntp 9.9.9.1 source-address 6.6.6.1 .5 '
2011-03-21 14:23:05 CST	KMD_PM_SA_ESTABLISHED: Local gateway: 7.7.7.1, Remote gateway: 8.8.8.1, Local ID: ipv4(any:0,[0..3]=6.6.6.1), Remote ID: ipv4(any:0,[0..3]=9.9.9.1), Direction: inbound, SPI: 37a2a179, AUX-SPI: 0, Mode: tunnel, Type: dynamic
2011-03-21 14:23:05 CST	KMD_PM_SA_ESTABLISHED: Local gateway: 7.7.7.1, Remote gateway: 8.8.8.1, Local ID: ipv4(any:0,[0..3]=6.6.6.1), Remote ID: ipv4(any:0,[0..3]=9.9.9.1), Direction: outbound, SPI: b2231c1f, AUX-SPI: 0, Mode: tunnel, Type: dynamic
2011-03-21 14:23:08 CST	UI_CMDLINE_READ_LINE: User 'root', command 'set date ntp 9.9.9.1 source-address 6.6.6.1 '
2011-03-21 14:23:13 CST	UI_CMDLINE_READ_LINE: User 'root', command 'show security log '

show security log file

Syntax	show security log file
Release Information	Command introduced in Junos OS Release 12.1.
Description	Enables customers to view event-mode log files stored on the device in binary format.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> show security log on page 2061
List of Sample Output	show security log file on page 2064
Output Fields	Table 263 on page 2064 lists the output fields for the show security log file command. Output fields are listed in the approximate order in which they appear.

Table 263: show security log file Output Fields

Field Name	Field Description
Event time	The timestamp when the security event was received.
Message	The message describing the security event.

Sample Output

show security log file

```

user@host> show security log file

<14>1 2011-08-28T21:14:43 topstar RT_FLOW - RT_FLOW_SESSION_CREATE
[junos@2636.1.1.1.2.34 source-address="7.7.7.2" source-port="1"
destination-address="8.8.8.2" destination-port="5636" service-name="icmp"
nat-source-address="7.7.7.2" nat-source-port="1" nat-destination-address="8.8.8.2"
nat-destination-port="5636" src-nat-rule-name="None" dst-nat-rule-name="None"
protocol-id="1" policy-name="client-to-server" source-zone-name="client"
destination-zone-name="server" session-id-32="60000442" username="N/A" roles="N/A"
packet-incoming-interface="ge-0/0/0.0"]

<14>1 2011-08-28T21:14:45 topstar RT_FLOW - RT_FLOW_SESSION_CLOSE
[junos@2636.1.1.1.2.34 reason="response received" source-address="7.7.7.2"
source-port="0" destination-address="8.8.8.2" destination-port="5636"
service-name="icmp" nat-source-address="7.7.7.2" nat-source-port="0"
nat-destination-address="8.8.8.2" nat-destination-port="5636"
src-nat-rule-name="None" dst-nat-rule-name="None" protocol-id="1"
policy-name="client-to-server" source-zone-name="client"
destination-zone-name="server" session-id-32="60000441" packets-from-client="1"
bytes-from-client="84" packets-from-server="1" bytes-from-server="84"

```

```
elapsed-time="3" application="UNKNOWN" nested-application="UNKNOWN" username="N/A"
roles="N/A" packet-incoming-interface="ge-0/0/0.0"]
```

```
...
```

```
user@host> show security log file
```

```
<14>1 2011-11-17T23:41:46 topstar RT_FLOW - RT_FLOW_SESSION_CREATE_LS
[junos@2636.1.1.1.2.34 logical-system-name="LSYS1" source-address="3001::2"
source-port="0" destination-address="5001::2" destination-port="17420"
service-name="icmpv6" nat-source-address="3001::2" nat-source-port="0"
nat-destination-address="5001::2" nat-destination-port="17420"
src-nat-rule-name="None" dst-nat-rule-name="None" protocol-id="58"
policy-name="lsys1trust-to-lsys1trust" source-zone-name="lsys1-trust"
destination-zone-name="lsys1-trust" session-id-32="60000218" username="N/A"
roles="N/A" packet-incoming-interface="ge-0/0/2.0"]
```

```
<14>1 2011-11-17T23:41:48 topstar RT_FLOW - RT_FLOW_SESSION_CLOSE
[junos@2636.1.1.1.2.34 reason="response received" source-address="3001::2"
source-port="0" destination-address="5001::2" destination-port="17420"
service-name="icmpv6" nat-source-address="3001::2" nat-source-port="0"
nat-destination-address="5001::2" nat-destination-port="17420"
src-nat-rule-name="None" dst-nat-rule-name="None" protocol-id="58"
policy-name="lsys1trust-to-lsys1trust" source-zone-name="lsys1-trust"
destination-zone-name="lsys1-trust" session-id-32="60000218"
packets-from-client="1" bytes-from-client="104" packets-from-server="1"
bytes-from-server="104" elapsed-time="3" application="UNKNOWN"
nested-application="UNKNOWN" username="N/A" roles="N/A"
packet-incoming-interface="ge-0/0/2.0" encrypted="No "]
```

```
<14>1 2011-11-17T23:41:48 topstar RT_FLOW - RT_FLOW_SESSION_CLOSE_LS
[junos@2636.1.1.1.2.34 logical-system-name="LSYS1" reason="response received"
source-address="3001::2" source-port="0" destination-address="5001::2"
destination-port="17420" service-name="icmpv6" nat-source-address="3001::2"
nat-source-port="0" nat-destination-address="5001::2" nat-destination-port="17420"
src-nat-rule-name="None" dst-nat-rule-name="None" protocol-id="58"
policy-name="lsys1trust-to-lsys1trust" source-zone-name="lsys1-trust"
destination-zone-name="lsys1-trust" session-id-32="60000218"
packets-from-client="1" bytes-from-client="104" packets-from-server="1"
bytes-from-server="104" elapsed-time="3" application="UNKNOWN"
nested-application="UNKNOWN" username="N/A" roles="N/A"
packet-incoming-interface="ge-0/0/2.0" encrypted="No "]
```

```
...
```

show security log severity

Syntax show security log severity

Release Information Command introduced in Junos OS Release 15.1X49-D40.

Description Display severity information for the event.

Required Privilege Level view

Related Documentation

- [show security log on page 2061](#)

Output Fields [Table 263 on page 2064](#) lists the output fields for the **show security log severity** command. Output fields are listed in the approximate order in which they appear.

Table 264: show security log severity Output Fields

Field Name	Field Description
alert	Alert severity
crit	Critical severity
debug	Debug severity
emerg	Emergency severity
err	Error severity
info	Information severity
notice	Notice severity
warning	Warning severity

show security log query

List of Syntax [Show Security Log Query on page 2067](#)
[Show Security Log Stream on page 2067](#)

Show Security Log Query `show security log query {category all | utm | idp | alg | appqos | flow | fw-auth | gtp | ipsec | nat | pst-ds-lite | rtlog | screen | sctp | secintel} count < count > [src-ip <src-ip>] [dst-ip <dst-ip>] [src-port <src-port>] [dst-port <dst-port>] [application <application>] [user <user>] [event-type <event-type>] [service <service>] [start-time <start-time>] [stop-time <stop-time>]`

Show Security Log Stream `show security log stream file <filename>`

Release Information Command introduced in Junos OS Release 15.1X49-D70 for SRX1500, SRX4100, and SRX4200 Series devices and vSRX instances.

Description

- **show security log query**—View the security log from the database with query conditions.
- **show security log stream file**—View all the security log messages in the specified log file. Use the `/var/log/ hostlogs` directory to search the specified log file, and use the **show security log stream file** command to view logs in log files in the `/var/log/hostlogs` directory.

Options

- **count**—The log number to output.
- **scr-ip**—The source IP address of log messages.
- **dst-ip**—The destination IP address of log messages.
- **src-port**—The source port of log messages.
- **dst-port**—The destination port of log messages.
- **application**—The application of log messages.
- **user**—The user of log messages.
- **event-type**—The event type of log messages.
- **service**—The service of log messages.
- **start-time**—The earliest timestamp of log messages; the format for time is YYYY-MM-DDTHH:MM:SS.
- **stop-time**—The latest timestamp of log messages.

Required Privilege Level view

Related Documentation

- [clear security log query](#)
- [clear security log stream file](#)

List of Sample Output [show security log query on page 2068](#)
[show security log stream file <file-name> on page 2068](#)

Sample Output

show security log query

```
rootr@dut> show security log query category flow count 20 src-ip 211.0.0.2 start-time
2013-11-29T00:00:00 end-time 2013-11-29T23:59:00

<14>1 2013-11-29T16:01:26.820+08:00 plat02 RT_FLOW - RT_FLOW_SESSION_CLOSE
reason="CLI" source-address="211.0.0.2" source-port="20263"
destination-address="211.0.1.3" destination-port="4903" service-name="None"
nat-source-address="30.0.11.11" nat-source-port="27140"
nat-destination-address="211.0.1.3" nat-destination-port="4903"
src-nat-rule-name="src_rs2_rule1" dst-nat-rule-name="None" protocol-id="17"
policy-name="p1" source-zone-name="green" destination-zone-name="red"
session-id-32="30" packets-from-client="1" bytes-from-client="60"
packets-from-server="0" bytes-from-server="0" elapsed-time="92683"
application="UNKNOWN" nested-application="UNKNOWN" username="N/A" roles="N/A"
packet-incoming-interface="ge-0/0/1.0" encrypted="UNKNOWN"
```

show security log stream file <file-name>

```
root@dut> show security log stream file traffic.log

<14>1 2013-11-29T16:01:26.820+08:00 plat02 RT_FLOW - RT_FLOW_SESSION_CLOSE
reason="CLI" source-address="211.0.0.2" source-port="20263"
destination-address="211.0.1.3" destination-port="4903" service-name="None"
nat-source-address="30.0.11.11" nat-source-port="27140"
nat-destination-address="211.0.1.3" nat-destination-port="4903"
src-nat-rule-name="src_rs2_rule1" dst-nat-rule-name="None" protocol-id="17"
policy-name="p1" source-zone-name="green" destination-zone-name="red"
session-id-32="30" packets-from-client="1" bytes-from-client="60"
packets-from-server="0" bytes-from-server="0" elapsed-time="92683"
application="UNKNOWN" nested-application="UNKNOWN" username="N/A" roles="N/A"
packet-incoming-interface="ge-0/0/1.0" encrypted="UNKNOWN"] session closed CLI:
211.0.0.2/20263->211.0.1.3/4903 None 30.0.11.11/27140->211.0.1.3/4903 src_rs2_rule1
None 17 p1 green red 30 1(60) 0(0) 92683 UNKNOWN UNKNOWN N/A(N/A) ge-0/0/1.0
UNKNOWN
```

CHAPTER 87

Monitoring Operational Commands

- clear chassis cluster ip-monitoring failure-count
- clear chassis cluster ip-monitoring failure-count ip-address
- clear ilmi statistics
- clear interfaces statistics
- clear services rpm twamp server connection
- clear snmp history
- clear snmp statistics
- request pppoe connect
- request pppoe disconnect
- request services ip-monitoring preempt-restore policy
- request services rpm twamp start
- request services rpm twamp stop
- request snmp spoof-trap
- request support information
- show chassis alarms
- show chassis cluster ip-monitoring status redundancy-group
- show interfaces snmp-index
- show interfaces summary
- show ilmi statistics
- show security alarms
- show security datapath-debug capture
- show security datapath-debug counter
- show security monitoring
- show security monitoring fpc fpc-number
- show security monitoring performance session
- show security monitoring performance spu
- show services ip-monitoring status
- show services rpm twamp client connection

- `show services rpm twamp client history-results`
- `show services rpm twamp client probe-results`
- `show services rpm twamp client session`
- `show services rpm twamp server connection`
- `show services rpm twamp server session`
- `show snmp health-monitor`
- `show snmp inform-statistics`
- `show snmp mib`
- `show snmp rmon`
- `show snmp statistics`
- `show snmp stats-response-statistics`
- `show snmp v3`
- `show system alarms`
- `show system alarms`
- `show system resource-monitor fpc`

clear chassis cluster ip-monitoring failure-count

Syntax	clear chassis cluster ip-monitoring failure-count
Release Information	Command introduced in Junos OS Release 10.1.
Description	Clear the failure count for all IP addresses.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none">• clear chassis cluster ip-monitoring failure-count ip-address on page 2072
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

```
user@host> clear chassis cluster ip-monitoring failure-count
```

```
node0:
```

```
-----  
Cleared failure count for all IPs
```

```
node1:
```

```
-----  
Cleared failure count for all IPs
```

clear chassis cluster ip-monitoring failure-count ip-address

Syntax clear chassis cluster ip-monitoring failure-count ip-address 1.1.1.1

Release Information Command introduced in Junos OS Release 10.1.

Description Clear the failure count for a specified IP address.



NOTE: Entering an IP address at the end of this command is optional. If you do not specify an IP address, the failure count for all monitored IP addresses is cleared.

Required Privilege Level clear

Related Documentation

- *clear chassis cluster failover-count*
- [clear chassis cluster ip-monitoring failure-count on page 2071](#)

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

```
user@host> clear chassis cluster ip-monitoring failure-count ip-address 1.1.1.1
```

```
node0:
```

```
-----  
Cleared failure count for IP: 1.1.1.1
```

```
node1:
```

```
-----  
Cleared failure count for IP: 1.1.1.1
```

clear ilmi statistics

Syntax clear ilmi statistics

Release Information Command introduced before Junos OS Release 7.4.

Description Set Integrated Local Management Interface (ILMI) statistics to zero.

Options This command has no options.

Required Privilege Level clear

Related Documentation

- [show ilmi statistics on page 2108](#)

List of Sample Output [clear ilmi statistics on page 2073](#)

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear ilmi statistics

```
user@host> clear ilmi statistics
```

clear interfaces statistics

Syntax	<code>clear interfaces statistics (all <i>interface-name</i>)</code>
Release Information	Command introduced before Junos OS Release 7.4.
Description	<p>Set interface statistics to zero. If you issue the clear interfaces statistics <i>interface-name</i> command and then perform a graceful Routing Engine switchover, the interface statistics are not cleared on the new master. Reissue the command to clear the interface statistics again.</p> <p>Starting in Junos OS Release 17.3R1, this command supports the clearing of Packet Forwarding Engine accounting statistics on logical interfaces configured with accounting options. On these interfaces, the current statistics values are stored as the new current baseline values and then the counters are reset to zero. If the allow-clear statement is included in the interface profile, then the cleared statistics values are reported to the accounting options flat file associated with the interface. Reporting is disabled by default; if allow-clear is not configured, then the CLI displays cleared statistics counters, but they are not reported to the flat file.</p>
Options	<p>all—Set statistics on all interfaces to zero.</p> <p><i>interface-name</i>—Set statistics on a particular interface to zero.</p>
Required Privilege Level	clear
List of Sample Output	clear interfaces statistics on page 2074
Output Fields	When you enter this command, you are provided no feedback on the status of your request.

Sample Output

clear interfaces statistics

```
user@host> clear interfaces statistics
```

clear services rpm twamp server connection

Syntax `clear services rpm twamp server connection
<connection-id>`

Release Information Command introduced in Junos OS Release 15.1 for SRX Series devices.

Description Clear connections established between the real-time performance monitoring (RPM) Two-Way Active Measurement Protocol (TWAMP) server and control clients. By default all established connections are cleared (along with the sessions on those connections). To clear only a specific connection, specify the connection ID when you issue the command.

Options *connection-id*—(Optional) Clears specific connection as per the ID mentioned.

**Required Privilege
Level** clear

clear snmp history

Syntax	<code>clear snmp history (<i>index</i> all)</code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series.
Description	Delete the history record of collected samples of SNMP Ethernet statistics.
Options	all —Clear all the entries in the history index. <i>index</i> —Clear the contents of the specified entry in the history index.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none">• clear snmp statistics on page 1996• Configuring RMON History Sampling on page 391

clear snmp statistics

Syntax	clear snmp statistics
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
Description	Clear Simple Network Management Protocol (SNMP) statistics.
Options	This command has no options.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none"> • show snmp statistics on page 2026
List of Sample Output	clear snmp statistics on page 2077
Output Fields	See show snmp statistics for an explanation of output fields.

Sample Output

clear snmp statistics

In the following example, SNMP statistics are displayed before and after the **clear snmp statistics** command is issued:

```
user@host> show snmp statistics
```

```
SNMP statistics:
```

```
Input:
```

```
Packets: 8, Bad versions: 0, Bad community names: 0,
Bad community uses: 0, ASN parse errors: 0,
Too bigs: 0, No such names: 0, Bad values: 0,
Read onlys: 0, General errors: 0,
Total request varbinds: 8, Total set varbinds: 0,
Get requests: 0, Get nexts: 8, Set requests: 0,
Get responses: 0, Traps: 0,
Silent drops: 0, Proxy drops 0
```

```
Output:
```

```
Packets: 2298, Too bigs: 0, No such names: 0,
Bad values: 0, General errors: 0,
Get requests: 0, Get nexts: 0, Set requests: 0,
Get responses: 8, Traps: 2290
```

```
user@host> clear snmp statistics
```

```
user@host> show snmp statistics
```

```
SNMP statistics:
```

```
Input:
```

```
Packets: 0, Bad versions: 0, Bad community names: 0,  
Bad community uses: 0, ASN parse errors: 0,  
Too big: 0, No such names: 0, Bad values: 0,  
Read only: 0, General errors: 0,  
Total request varbinds: 0, Total set varbinds: 0,  
Get requests: 0, Get nexts: 0, Set requests: 0,  
Get responses: 0, Traps: 0,  
Silent drops: 0, Proxy drops 0
```

```
Output:
```

```
Packets: 0, Too big: 0, No such names: 0,  
Bad values: 0, General errors: 0,  
Get requests: 0, Get nexts: 0, Set requests: 0,  
Get responses: 0, Traps: 0
```

request pppoe connect

Syntax	request pppoe connect
Release Information	Statement supported on SRX300, SRX320, SRX340, and SRX345 is introduced in Junos OS Release 15.1X49-D60. Statement supported on SRX1500 and vSRX instances is introduced in Junos OS Release 15.1X49-D100.
Description	Connect all sessions that are down.
Options	pppoe interface name — (Optional) Connect to a specified session.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• <i>Understanding PPPoE Interfaces</i>• <i>Example: Configuring PPPoE Interfaces</i>
List of Sample Output	request pppoe connect on page 2079
Output Fields	When you enter this command, this command returns no output.

Sample Output

request pppoe connect

```
user@host> request pppoe connect
```

request pppoe disconnect

Syntax	<code>request pppoe disconnect</code>
Release Information	Statement supported on SRX300, SRX320, SRX340, and SRX345 is introduced in Junos OS Release 15.1X49-D60. Statement supported on SRX1500 and vSRX instances is introduced in Junos OS Release 15.1X49-D100.
Description	Disconnect all active sessions.
Options	session id — (Optional) Disconnect the session for which the session ID is specified. pppoe interface name — (Optional) Disconnect the session for a specific pppoe interface name.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• <i>Understanding PPPoE Interfaces</i>• <i>Example: Configuring PPPoE Interfaces</i>
List of Sample Output	request pppoe disconnect on page 2080
Output Fields	When you enter this command, this command returns no output.

Sample Output

request pppoe disconnect

```
user@host> request pppoe disconnect
```

request services ip-monitoring preempt-restore policy

Syntax `request services ip-monitoring preempt-restore policy
<policy-name>`

Release Information Command introduced in Junos OS Release 11.4.

Description If the no-preempt option is specified, the policy will not perform preemptive failback when it is in a failover state, and when the RPM probe test recovers from failure. To manually revert to the failback state, run the **request services ip-monitoring preempt-restore policy** command.



NOTE: The **request services ip-monitoring preempt-restore policy** command takes effect only when the RPM probe is in the pass state, and when the policy is in a failover state.

Options `policy name`—Name of the policy.

Required Privilege Level maintenance

Related Documentation

- [show services ip-monitoring status on page 2126](#)

List of Sample Output [run request services ip-monitoring preempt-restore policy <policy name> on page 2081](#)

Output Fields When you run this command, the policy is restored to the failback state.

Sample Output

`run request services ip-monitoring preempt-restore policy <policy name>`

```
user@host> run request services ip-monitoring preempt-restore policy policy1
Restore request succeeded: Policy policy1
```

request services rpm twamp start

Syntax	<code>request services rpm twamp start client <control-connection-name></code>
Release Information	Command introduced in Junos OS Release 15.1X49-D110 for SRX Series devices.
Description	Start the probes of a Two-Way Active Measurement Protocol (TWAMP) client. You can start all sessions for all TWAMP clients, or start a session for a specific TWAMP client. When you start test session configured for a particular TWAMP client, the control client initiates all requested testing with a start-sessions message, and the server sends an acknowledgment. If the control connection is not active between the server and the client, the control connection is also established and the test connections are started later. If the control client name is not specified, all the configured test sessions are commenced.
Options	<p>start client—Start the TWAMP session between the TWAMP client and the TWAMP server.</p> <p>control-connection-name—(Optional) Start or stop the TWAMP session with the server only for the specified control connection or TWAMP control client.</p>
Required Privilege Level	view
List of Sample Output	request services rpm twamp start client on page 2082
Output Fields	When you enter this command, you are not provided feedback on the status of your request.

Sample Output

request services rpm twamp start client

```
user@host> request services rpm twamp start client c1
```


request services rpm twamp stop

Syntax	<code>request services rpm twamp stop client <control-connection-name></code>
Release Information	Command introduced in Junos OS Release 15.1X49-D110 for SRX Series devices.
Description	Stop the Two-Way Active Measurement Protocol (TWAMP) session between the TWAMP client and the TWAMP server. You can stop all sessions for all TWAMP clients, or stop a session for a specific TWAMP client. When you stop the test session, the control connection is closed only after the stop-sessions message is sent from the TWAMP client to the TWAMP server. If the control client name is not specified, all the configured test sessions are closed.
Options	<p>stop client—Stop the TWAMP session between the TWAMP client and the TWAMP server.</p> <p>control-connection-name—(Optional) Start or stop the TWAMP session with the server only for the specified control connection or TWAMP control client.</p>
Required Privilege Level	view
List of Sample Output	request services rpm twamp stop client on page 2083
Output Fields	When you enter this command, you are not provided feedback on the status of your request.

Sample Output

request services rpm twamp stop client

```
user@host> request services rpm twamp stop client c1
```

request snmp spoof-trap

Syntax	request snmp spoof-trap <trap> variable-bindings <object> <instance> <value>
Release Information	Command introduced in Junos OS Release 8.2. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Spoof (mimic) the behavior of a Simple Network Management Protocol (SNMP) trap.
Options	<p><trap>—Name of the trap to spoof.</p> <p>variable-bindings <object> <instance> <value>—(Optional) List of variables and values to include in the trap. Each variable binding is specified as an object name, the object instance, and the value (for example, ifIndex[14] = 14). Enclose the list of variable bindings in quotation marks (" ") and use a comma to separate each object name, instance, and value definition (for example, variable-bindings "ifIndex[14] = 14, ifAdminStatus[14] = 1, ifOperStatus[14] = 2"). Objects included in the trap definition that do not have instances and values specified as part of the command are included in the trap and spoofed with automatically generated instances and values.</p> <p><dummy name>—A dummy trap name to display the list of available traps.</p> <p>Question mark (?)—Question mark? to display possible completions.</p>
Required Privilege Level	request
List of Sample Output	request snmp spoof-trap (with Variable Bindings) on page 2084 request snmp spoof-trap (Illegal Trap Name) on page 2084 request snmp spoof-trap (Question Mark ?) on page 2089

Sample Output

request snmp spoof-trap (with Variable Bindings)

```
user@host> request snmp spoof-trap linkUp variable-bindings "ifIndex[14] = 14, ifAdminStatus[14] = 1, ifOperStatus[14] = 2"
Spoof trap request result: trap sent successfully
```

request snmp spoof-trap (Illegal Trap Name)

```
user@host> request snmp spoof-trap xx
Spoof trap request result: trap not found

Allowed Traps:
```

```
adslAtucInitFailureTrap
adslAtucPerfESsThreshTrap
adslAtucPerfLofsThreshTrap
adslAtucPerfLolsThreshTrap
adslAtucPerfLossThreshTrap
adslAtucPerfLprsThreshTrap
adslAtucRateChangeTrap
adslAturPerfESsThreshTrap
adslAturPerfLofsThreshTrap
adslAturPerfLossThreshTrap
adslAturPerfLprsThreshTrap
adslAturRateChangeTrap
apsEventChannelMismatch
apsEventFEPLF
apsEventModeMismatch
apsEventPSBF
apsEventSwitchover
authenticationFailure
bfdSessDown
bfdSessUp
bgpBackwardTransition
bgpEstablished
coldStart
dlswTrapCircuitDown
dlswTrapCircuitUp
dlswTrapTConnDown
dlswTrapTConnPartnerReject
dlswTrapTConnProtViolation
dlswTrapTConnUp
dsx1LineStatusChange
dsx3LineStatusChange
entConfigChange
fallingAlarm
frDLCIStatusChange
ggsnTrapChanged
ggsnTrapCleared
ggsnTrapNew
gmplsTunnelDown
ifMauJabberTrap
ipv6IfStateChange
isisAreaMismatch
isisAttemptToExceedMaxSequence
isisAuthenticationFailure
isisAuthenticationTypeFailure
isisCorruptedLSPDetected
isisDatabaseOverload
isisIDLenMismatch
isisLSPTooLargeToPropagate
isisManualAddressDrops
isisMaxAreaAddressesMismatch
isisOriginatingLSPBufferSizeMismatch
isisOwnLSPPurge
isisProtocolsSupportedMismatch
isisRejectedAdjacency
isisSequenceNumberSkip
isisVersionSkew
jnxAccessAuthServerDisabled
jnxAccessAuthServerEnabled
jnxAccessAuthServiceDown
jnxAccessAuthServiceUp
```

```
jnxBfdSessDetectionTimeHigh
jnxBfdSessTxIntervalHigh
jnxBgpM2BackwardTransition
jnxBgpM2Established
jnxCmCfgChange
jnxCmRescueChange
jnxCollFlowOverload
jnxCollFlowOverloadCleared
jnxCollFtpSwitchover
jnxCollMemoryAvailable
jnxCollMemoryUnavailable
jnxCollUnavailableDest
jnxCollUnavailableDestCleared
jnxCollUnsuccessfulTransfer
jnxDfcHardMemThresholdExceeded
jnxDfcHardMemUnderThreshold
jnxDfcHardPpsThresholdExceeded
jnxDfcHardPpsUnderThreshold
jnxDfcSoftMemThresholdExceeded
jnxDfcSoftMemUnderThreshold
jnxDfcSoftPpsThresholdExceeded
jnxDfcSoftPpsUnderThreshold
jnxEventTrap
jnxExampleStartup
jnxFEBSwitchover
jnxFanFailure
jnxFanOK
jnxFruCheck
jnxFruFailed
jnxFruInsertion
jnxFruOK
jnxFruOffline
jnxFruOnline
jnxFruPowerOff
jnxFruPowerOn
jnxFruRemoval
jnxHardDiskFailed
jnxHardDiskMissing
jnxJsAvPatternUpdateTrap
jnxJsChassisClusterSwitchover
jnxJsFwAuthCapacityExceeded
jnxJsFwAuthFailure
jnxJsFwAuthServiceDown
jnxJsFwAuthServiceUp
jnxJsNatAddrPoolThresholdStatus
jnxJsScreenAttack
jnxJsScreenCfgChange
jnxLdpLspDown
jnxLdpLspUp
jnxLdpSesDown
jnxLdpSesUp
jnxMIMstCistPortLoopProtectStateChangeTrap
jnxMIMstCistPortRootProtectStateChangeTrap
jnxMIMstErrTrap
jnxMIMstGenTrap
jnxMIMstInvalidBpduRxdTrap
jnxMIMstMstiPortLoopProtectStateChangeTrap
jnxMIMstMstiPortRootProtectStateChangeTrap
jnxMIMstNewRootTrap
jnxMIMstProtocolMigrationTrap
```

```
jnxMIMstRegionConfigChangeTrap
jnxMIMstTopologyChgTrap
jnxMacChangedNotification
jnxMplsLdpInitSesThresholdExceeded
jnxMplsLdpPathVectorLimitMismatch
jnxMplsLdpSessionDown
jnxMplsLdpSessionUp
jnxOspfv3IfConfigError
jnxOspfv3IfRxBadPacket
jnxOspfv3IfStateChange
jnxOspfv3LsdbApproachingOverflow
jnxOspfv3LsdbOverflow
jnxOspfv3NbrRestartHelperStatusChange
jnxOspfv3NbrStateChange
jnxOspfv3NssaTranslatorStatusChange
jnxOspfv3RestartStatusChange
jnxOspfv3VirtIfConfigError
jnxOspfv3VirtIfRxBadPacket
jnxOspfv3VirtIfStateChange
jnxOspfv3VirtNbrRestartHelperStatusChange
jnxOspfv3VirtNbrStateChange
jnxOtnAlarmCleared
jnxOtnAlarmSet
jnxOverTemperature
jnxPMonOverloadCleared
jnxPMonOverloadSet
jnxPingEgressJitterThresholdExceeded
jnxPingEgressStdDevThresholdExceeded
jnxPingEgressThresholdExceeded
jnxPingIngressJitterThresholdExceeded
jnxPingIngressStddevThresholdExceeded
jnxPingIngressThresholdExceeded
jnxPingRttJitterThresholdExceeded
jnxPingRttStdDevThresholdExceeded
jnxPingRttThresholdExceeded
jnxPortBpduErrorStatusChangeTrap
jnxPortLoopProtectStateChangeTrap
jnxPortRootProtectStateChangeTrap
jnxPowerSupplyFailure
jnxPowerSupplyOK
jnxRedundancySwitchover
jnxRmonAlarmGetFailure
jnxRmonGetOk
jnxSecAccessIfMacLimitExceeded
jnxSecAccessdsRateLimitCrossed
jnxSonetAlarmCleared
jnxSonetAlarmSet
jnxSpSvcSetCpuExceeded
jnxSpSvcSetCpuOk
jnxSpSvcSetZoneEntered
jnxSpSvcSetZoneExited
jnxStormEventNotification
jnxSyslogTrap
jnxTemperatureOK
jnxVccpPortDown
jnxVccpPortUp
jnxVpnIfDown
jnxVpnIfUp
jnxVpnPwDown
jnxVpnPwUp
```

```
jnx12aldGlobalMacLimit
jnx12aldInterfaceMacLimit
jnx12aldRoutingInstMacLimit
linkDown
linkUp
lldpRemTablesChange
mfrMibTrapBundleLinkMismatch
mplsLspChange
mplsLspDown
mplsLspInfoChange
mplsLspInfoDown
mplsLspInfoPathDown
mplsLspInfoPathUp
mplsLspInfoUp
mplsLspPathDown
mplsLspPathUp
mplsLspUp
mplsNumVrfRouteMaxThreshExceeded
mplsNumVrfRouteMidThreshExceeded
mplsNumVrfSecIl1g1Lb1ThrshExcd
mplsTunnelDown
mplsTunnelReoptimized
mplsTunnelRerouted
mplsTunnelUp
mplsVrfIfDown
mplsVrfIfUp
mplsXCDown
mplsXCUp
msdpBackwardTransition
msdpEstablished
newRoot
ospfIfAuthFailure
ospfIfConfigError
ospfIfRxBadPacket
ospfIfStateChange
ospfLsdbApproachingOverflow
ospfLsdbOverflow
ospfMaxAgeLsa
ospfNbrStateChange
ospfOriginateLsa
ospfTxRetransmit
ospfVirtIfAuthFailure
ospfVirtIfConfigError
ospfVirtIfRxBadPacket
ospfVirtIfStateChange
ospfVirtIfTxRetransmit
ospfVirtNbrStateChange
pethMainPowerUsageOffNotification
pethMainPowerUsageOnNotification
pethPsePortOnOffNotification
pingProbeFailed
pingTestCompleted
pingTestFailed
ptopoConfigChange
risingAlarm
rpMauJabberTrap
sd1cLSStatusChange
sd1cPortStatusChange
topologyChange
traceRoutePathChange
```

```

traceRouteTestCompleted
traceRouteTestFailed
vrrpTrapAuthFailure
vrrpTrapNewMaster
warmStart

```

request snmp spoof-trap (Question Mark ?)

```
user@host> request snmp spoof-trap ?
```

Possible completions:

```

<trap>           The name of the trap to spoof
adslAtucInitFailureTrap
adslAtucPerfESsThreshTrap
adslAtucPerfLofsThreshTrap
adslAtucPerfLolsThreshTrap
adslAtucPerfLossThreshTrap
adslAtucPerfLprsThreshTrap
adslAtucRateChangeTrap
adslAturPerfESsThreshTrap
adslAturPerfLofsThreshTrap
adslAturPerfLossThreshTrap
adslAturPerfLprsThreshTrap
adslAturRateChangeTrap
apsEventChannelMismatch
apsEventFEPLF
apsEventModeMismatch
apsEventPSBF
apsEventSwitchover
authenticationFailure
bfdSessDown
bfdSessUp
bgpBackwardTransition
bgpEstablished
coldStart
dlsWTrapCircuitDown
dlsWTrapCircuitUp
---(more 10%)---

```

request support information

List of Syntax	Syntax on page 2090 Syntax (SRX Series devices) on page 2090 Syntax (EX Series Switch and MX Series Router) on page 2090 Syntax (TX Matrix Router) on page 2090 Syntax (TX Matrix Plus Router) on page 2090
Syntax	request support information <brief>
Syntax (SRX Series devices)	request support information <brief> <secure-gateway>
Syntax (EX Series Switch and MX Series Router)	request support information <brief> <all-members> <local> <member <i>member-id</i> >
Syntax (TX Matrix Router)	request support information <brief> <all-lcc lcc <i>number</i> scc>
Syntax (TX Matrix Plus Router)	request support information <brief> <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> >
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Option brief introduced in Junos OS Release 13.2.</p> <p>Option secure-gateway introduced in Junos OS Release 15.1X49-D110 for SRX5400, SRX5600, and SRX5800 devices.</p>
Description	Display all configuration data for the system, including data hidden with the apply-flags omit command. Issue this command before contacting customer support, and then include the command output in your support request. Output from this command varies somewhat, depending on which platform you issue the command from. However, the command always executes a series of show commands, with the appropriate information for your device automatically included.
Options	brief —(Optional) Display brief information for the command output. Without this option, display of the output can take a long time to complete.

all-chassis—(TX Matrix and TX Matrix Plus routers) (Optional) Display system information for all chassis.

all-lcc—(TX Matrix and TX Matrix Plus routers) (Optional) On a TX Matrix router, display system information for all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, display system information for all chassis for all T1600 or T4000 routers (or line-card chassis) connected to the TX Matrix Plus router.

all-members—(EX Series switches and MX Series routers) (Optional) Display system information for all members of the Virtual Chassis configuration.

lcc *number*—(TX Matrix and TX Matrix Plus routers) (Optional) On a TX Matrix router, display system information for a specific T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, display system storage information for a specific router that is connected to the TX Matrix Plus router.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local—(EX Series switches and MX Series routers) (Optional) Display system information for the local Virtual Chassis member.

member *member-id*—(EX Series switches and MX Series routers) (Optional) Display system information for the specified member of the Virtual Chassis configuration. On EX Series switches, replace ***member-id*** with a value appropriate for that Virtual Chassis configuration. On MX Series routers, replace ***member-id*** with a value of 0 or 1.

scc—(TX Matrix routers) (Optional) Display system information for the TX Matrix router (or switch-card chassis).

sfc *number*—(TX Matrix Plus routers) (Optional) Display system information for the TX Matrix Plus router (or switch-fabric chassis). Replace ***number*** with 0.

secure-gateway—(SRX5400, SRX5600, and SRX5800 devices) (Optional) Display system information for secure gateway deployment scenarios.

node—(SRX5400, SRX5600, and SRX5800 devices) (Optional) Display detailed system status report for all nodes or a specific node.

- **node-id**—Display detailed system status report for a specific node. Replace **node-id** with a value of 0 or 1.
- **all**—Display detailed system status report for all nodes.
- **local**—Display detailed system status report for the local node.
- **primary**—Display detailed system status report for the primary node.

Additional Information The **show** commands issued as a result of this command vary depending on which platform you issue the command from. Output is always appropriate for the device. For example, [Table 265 on page 2092](#) lists the **show** commands that are called when you issue **request support information** on an MX Series router.

Table 265: Sample show Commands Called by the request support information command on an MX Series Router

show chassis alarms no-forwarding	show interfaces extensive no-forwarding
show chassis environment no-forwarding	show krt queue
show chassis fabric degradation	show krt state
show chassis fabric destinations	show pfe statistics error
show chassis fabric fpcs	show pfe statistics traffic
show chassis fabric plane	show route summary
show chassis fabric reachability	show system boot-messages no-forwarding
show chassis fabric summary	show system buffer no-forwarding
show chassis fpc	show system commit
show chassis fpc detail	show system core-dumps no-forwarding
show chassis firmware no-forwarding	show system processes extensive no-forwarding
show chassis hardware detail no-forwarding	show system queues no-forwarding
show chassis hardware extensive no-forwarding	show system statistics no-forwarding
show pfe statistics traffic	show system storage no-forwarding
show chassis power	show system uptime no-forwarding
show chassis routing-engine no-forwarding	show system virtual-memory no-forwarding
show configuration except SECRET-DATA	show version detail no-forwarding



NOTE: Show command `show interfaces extensive no-forwarding` is not supported for `request support information brief` command.

The **no-forwarding** option ensures that all mgd processes associated with the **show** command are properly halted if you break into the output (Ctrl+C) while the command is still running.



NOTE: The **no-forwarding** option ensures that all mgd processes associated with the **show** command are properly halted if you break into the output (Ctrl+C) while the command is still running.

Table 266 on page 2093 lists the **show** commands that are called when you issue **request support information** on an EX Series 9200 switch. The table does not include the **no-forwarding** option, which is used for purposes of the **request support information**, itself.

Table 266: Sample show Commands Called by the request support information command on an EX Series 9200 Switch

<code>show chassis alarms</code>	<code>show interfaces extensive</code>
<code>show chassis environment</code>	
<code>show chassis firmware</code>	<code>show pfe statistics traffic</code>
<code>show chassis fpcdetail</code>	<code>show spanning-tree bridge detail</code>
<code>show chassis hardware detail</code>	<code>show spanning-tree interface</code>
<code>show chassis routing-engine</code>	
<code>show configuration except SECRET-DATA display omit</code>	<code>show system boot-messages</code>
<code>show dhcp-security binding</code>	<code>show system queues</code>
<code>show dhcp-security ipv6 binding</code>	<code>show system processes extensive</code>
	<code>show system queues</code>
<code>show ethernet-switching interface detail</code>	<code>show system statistics</code>
<code>show ethernet-switching table</code>	<code>show vlans extensive</code>
	<code>show vrrp summary</code>

Table 267 on page 2094 lists the **show** commands that are called when you issue **request support information** on SRX Series devices.

Table 267: Sample show Commands Called by the request support information command on SRX Series devices

show pfe statistics traffic	show interfaces queue
show chassis environment no-forwarding	show security monitoring fpc 0
show chassis fpc detail	show system license
show system storage no-forwarding	show security policies hit-count no-forwarding
show system virtual-memory no-forwarding	show security policies information no-forwarding
show system buffer no-forwarding	show security dns-cache
show system queues no-forwarding	show security flow statistics
show chassis hardware extensive no-forwarding	show security flow status
show krt queue	show security flow session summary no-forwarding
show route summary	show security utm anti-virus status



NOTE: Starting with Junos OS Release 15.1X49-D110, on SRX5400, SRX5600, and SRX5800 devices, a new option **secure-gateway** is added to the existing **request support information** command. This new option displays all the required information that is relevant for secure gateway deployment scenarios. In Junos OS Release 15.1X49-D100 and earlier, **request support information** displays the information about all features that might not be relevant for secure gateway deployments.

Required Privilege Level maintenance

List of Sample Output [request support information | save on page 2095](#)
[request support information scc \(TX Matrix Router\) on page 2095](#)
[request support information sfc \(TX Matrix Plus Router\) on page 2096](#)
[request support information \(SRX Series device\) on page 2098](#)

Output Fields For information about output fields, see the description for the specific command—listed in the output— in which you are interested.

Sample Output

request support information | save

```
user@host> request support information | save hostA
Wrote 1143 lines of output to 'hostA'

user@host>
```

request support information scc (TX Matrix Router)

```
user@host> request support information scc
```

```
user@host> show system uptime
```

```
scc-re0:
```

```
-----
Current time: 2004-09-15 00:49:06 PDT
System booted: 2004-09-14 12:53:26 PDT (11:55:40 ago)
Protocols started: 2004-09-14 12:54:19 PDT (11:54:47 ago)
Last configured: 2004-09-14 13:07:47 PDT (11:41:19 ago) by user
12:49AM PDT up 11:56, 3 users, load averages: 0.00, 0.02, 0.03
```

```
lcc0-re0:
```

```
-----
Current time: 2004-09-15 00:49:06 PDT
System booted: 2004-09-14 15:36:41 PDT (09:12:25 ago)
Last configured: 2004-09-14 15:38:06 PDT (09:11:00 ago) by root
12:49AM PDT up 9:12, 0 users, load averages: 0.13, 0.05, 0.02
```

```
lcc2-re0:
```

```
-----
Current time: 2004-09-15 00:49:06 PDT
System booted: 2004-09-14 15:36:47 PDT (09:12:19 ago)
Last configured: 2004-09-14 15:38:09 PDT (09:10:57 ago) by root
12:49AM PDT up 9:12, 0 users, load averages: 0.00, 0.00, 0.00
```

```
user@host> show version
```

```
scc-re0:
```

```
-----
Hostname: hostA
Model: TX Matrix
JUNOS Base OS boot [7.0I20040914_1707_mapte]
JUNOS Base OS Software Suite [7.0I20040907_1922_rtuplur]
JUNOS Kernel Software Suite [7.0I20040914_1707_mapte]
JUNOS Packet Forwarding Engine Support (T Series) [7.0I20040914_1707_mapte]
JUNOS Routing Software Suite [7.0I20040914_1707_mapte]
JUNOS Online Documentation [7.0I20040914_1707_mapte]
JUNOS Crypto Software Suite [7.0I20040914_1707_mapte]
JUNOS Support Tools Package [7.0-20040908.0]
```

```
lcc0-re0:
```

```
-----
Hostname: hostB
```

```

Model: t640
JUNOS Base OS boot [7.0I20040914_1707_mapte]
JUNOS Base OS Software Suite [7.0I20040907_1922_rtuplur]
JUNOS Kernel Software Suite [7.0I20040914_1707_mapte]
JUNOS Packet Forwarding Engine Support (T-Series) [7.0I20040914_1707_mapte]
JUNOS Routing Software Suite [7.0I20040914_1707_mapte]
JUNOS Online Documentation [7.0I20040914_1707_mapte]
JUNOS Crypto Software Suite [7.0I20040914_1707_mapte]

lcc2-re0:
-----
Hostname: dewey
Model: t640
JUNOS Base OS boot [7.0I20040914_1707_mapte]
JUNOS Base OS Software Suite [7.0I20040907_1922_rtuplur]
JUNOS Kernel Software Suite [7.0I20040914_1707_mapte]
JUNOS Packet Forwarding Engine Support (T-Series) [7.0I20040914_1707_mapte]
JUNOS Routing Software Suite [7.0I20040914_1707_mapte]
JUNOS Online Documentation [7.0I20040914_1707_mapte]
JUNOS Crypto Software Suite [7.0I20040914_1707_mapte]
...

```

request support information sfc (TX Matrix Plus Router)

```

user@host> request support information sfc 0

sfc0-re0:
-----

root@host> show system uptime no-forwarding

Current time: 2009-05-25 03:43:28 PDT
System booted: 2009-05-25 01:15:04 PDT (02:28:24 ago)
Protocols started: 2009-05-25 01:16:01 PDT (02:27:27 ago)
Last configured: 2009-05-25 03:03:42 PDT (00:39:46 ago) by user
 3:43AM up 2:28, 7 users, load averages: 0.00, 0.00, 0.00

root@host> show version detail no-forwarding

Hostname: aj
Model: txp
JUNOS Base OS boot [9.6-20090519.0]
JUNOS Base OS Software Suite [9.6-20090519.0]
JUNOS Kernel Software Suite [9.6-20090519.0]
...
root@host> show system core-dumps no-forwarding

-rw----- 1 root wheel 152223744 May 25 03:10 /var/crash/vmcore.0
-rw-r--r-- 1 bdeleon field 139417 May 22 10:17
/var/tmp/aj-core-apps-config-n-gres.txt
...
root@host> show chassis alarms no-forwarding

9 alarms currently active
Alarm time          Class Description
2009-05-25 01:27:08 PDT Minor LCC 0 Minor Errors
2009-05-25 01:27:08 PDT Minor Spare SIB F13 6 Fault
...
root@host> show chassis hardware detail no-forwarding

```

Hardware inventory:

Item	Version	Part number	Serial number	Description
Chassis			JN112F007AHB	TXP
Midplane	REV 05	710-022574	TS4027	SFC Midplane
FPM Display	REV 03	710-024027	DX0282	TXP FPM Display

...

root@host> show system processes extensive no-forwarding

last pid: 6639; load averages: 0.00, 0.00, 0.00 up 0+02:28:54 03:43:28
 161 processes: 5 running, 138 sleeping, 18 waiting

Mem: 236M Active, 227M Inact, 104M Wired, 392M Cache, 69M Buf, 2296M Free

Swap: 2048M Total, 2048M Free

PID	USERNAME	THR	PRI	NICE	SIZE	RES	STATE	TIME	WCPU	COMMAND
11	root	1	171	52	OK	12K	RUN	143:00	96.78%	idle
1530	root	1	96	0	38160K	24812K	select	2:54	1.12%	chassisd
1343	root	1	76	0	OK	12K		0:18	0.00%	bcmLINK.0
1345	root	1	76	0	OK	12K		0:15	0.00%	brq17: uhci1

uhci*

...

root@host> show pfe statistics error

Slot 4

SLCHIP Error statistics:

SLCHIP	0	1

Lin XIF :	0	0
Lin SRCTL :	0	0

...

root@host>show pfe statistics traffic

Packet Forwarding Engine traffic statistics:

Input packets:	2590754	0 pps
Output packets:	2640010	0 pps

Packet Forwarding Engine local traffic statistics:

Local packets input	:	2064527
Local packets output	:	2115925
Software input control plane drops	:	0
Software input high drops	:	0
Software input medium drops	:	0
Software input low drops	:	0
Software output drops	:	0
Hardware input drops	:	0

Packet Forwarding Engine local protocol statistics:

HDLC keepalives	:	0
ATM OAM	:	0
Frame Relay LMI	:	0
PPP LCP/NCP	:	0
OSPF hello	:	20048
OSPF3 hello	:	109
RSVP hello	:	3485
LDP hello	:	7191
BFD	:	0
IS-IS IIH	:	11318

```

LACP                :                0
ARP                  :                629
ETHER OAM            :                930
Unknown              :               13212
Packet Forwarding Engine hardware discard statistics:
Timeout              :                0
Truncated key        :                0
Bits to test         :                0
Data error           :                0
Stack underflow      :                0
Stack overflow       :                0
Normal discard       :               18060
Extended discard     :                0
Invalid interface    :                0
Info cell drops      :                0
Fabric drops         :                0
Packet Forwarding Engine Input IPv4 Header Checksum Error and Output MTU Error
statistics:
Input Checksum       :                0
Output MTU           :                0

root@host> show chassis routing-engine no-forwarding

Routing Engine status:
Slot 0:
  Current state      Master
  Election priority  Master (default)
  Temperature        32 degrees C / 89 degrees F
  CPU temperature    46 degrees C / 114 degrees F
  DRAM               3327 MB
...
root@host> show chassis environment no-forwarding

Class Item                Status      Measurement
Temp PEM 0                OK        30 degrees C / 86 degrees F
...
root@host> show chassis firmware no-forwarding

Part                Type      Version
Global FPC 4
Global FPC 6
Global FPC 7
...
root@host> show system boot-messages no-forwarding
...
```

request support information (SRX Series device)

```

user@host> request support information

root@host> show security dns-cache
DNS entry number: 0

root@host> show security utm web-filtering statistics

UTM web-filtering statistics:
Web-filtering sessions in total: 512000
Web-filtering sessions in use: 0
Fallback: log-and-permit block
          Default 0 0
```



```
Timeout                0                0
Connectivity           0                0
Too-many-requests      0                0

root@host> show security utm session

UTM session info:
Maximum sessions:      256000
Total allocated sessions: 0
Total freed sessions:  0
Active sessions:       0

root@host> show system uptime no-forwarding

Current time: 2017-07-09 21:38:01 PDT
Time Source:  LOCAL CLOCK
System booted: 2017-07-09 20:58:06 PDT (00:39:55 ago)
Protocols started: 2017-07-09 20:58:07 PDT (00:39:54 ago)
Last configured: 2017-06-30 08:56:45 PDT (1w2d 12:41 ago) by user
9:38PM up 40 mins, 1 user, load averages: 0.10, 0.07, 0.04
...
```

show chassis alarms

Syntax	show chassis alarms
Release Information	Command introduced in Junos OS Release 11.1 for SRX Series devices.
Description	Display information about the conditions that have been configured to trigger alarms.
Options	This command has no options.
Additional Information	<p>Chassis alarms are preset. You cannot modify them.</p> <p>You cannot clear the alarms for chassis components. Instead, you must remedy the cause of the alarm. When a chassis alarm is lit, it indicates that you are running the device in a manner that we do not recommend.</p> <p>On routers, you can manually silence external devices connected to the alarm relay contacts by pressing the alarm cutoff button, located on the craft interface. Silencing the device does not remove the alarm messages from the display (if present on the router) or extinguish the alarm LEDs. In addition, new alarms that occur after you silence an external device reactivate the external device.</p> <p>In Junos OS Release 11.1 and later, alarms for fans also show the slot number of the fans in the CLI output.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show system alarms on page 2176
List of Sample Output	show chassis alarms on page 2101
Output Fields	<p>Table 268 on page 2100 lists the output fields for the show chassis alarms command. Output fields are listed in the approximate order in which they appear.</p>

Table 268: show chassis alarms Output Fields

Field Name	Field Description
Alarm time	Date and time the alarm was first recorded.
Class	Severity class for this alarm: Minor or Major.
Description	Information about the alarm.

Sample Output

show chassis alarms

```
user@host> show chassis alarms
```

```
4 alarms currently active
```

Alarm time	Class	Description
2012-05-29 16:47:18 UTC	Major	/var partition usage crossed critical threshold
2012-05-29 16:47:18 UTC	Minor	/var partition usage crossed high threshold
2012-05-29 16:47:18 UTC	Major	/root partition usage crossed critical threshold
2012-05-29 16:47:18 UTC	Minor	/root partition usage crossed high threshold

show chassis cluster ip-monitoring status redundancy-group

Syntax	<code>show chassis cluster ip-monitoring status <redundancy-group group-number></code>
Release Information	Command introduced in Junos OS Release 9.6. Support for global threshold, current threshold, and weight of each monitored IP address added in Junos OS Release 12.1X47-D10.
Description	Display the status of all monitored IP addresses for a redundancy group.
Options	<ul style="list-style-type: none"> <code>none</code>— Display the status of monitored IP addresses for all redundancy groups on the node. <code>redundancy-group group-number</code>— Display the status of monitored IP addresses under the specified redundancy group.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> clear chassis cluster failover-count
List of Sample Output	show chassis cluster ip-monitoring status on page 2103 show chassis cluster ip-monitoring status redundancy-group on page 2104
Output Fields	Table 269 on page 2102 lists the output fields for the <code>show chassis cluster ip-monitoring status</code> command.

Table 269: show chassis cluster ip-monitoring status Output Fields

Field Name	Field Description
Redundancy-group	ID number (0 - 255) of a redundancy group in the cluster.
Global threshold	Failover value for all IP addresses monitored by the redundancy group.
Current threshold	Value equal to the global threshold minus the total weight of the unreachable IP address.
IP Address	Monitored IP address in the redundancy group.
Status	Current reachability state of the monitored IP address. Values for this field are: reachable , unreachable , and unknown . The status is “unknown” if Packet Forwarding Engines (PFEs) are not yet up and running.
Failure count	Number of attempts to reach an IP address.

Table 269: show chassis cluster ip-monitoring status Output Fields (continued)

Field Name	Field Description
Reason	Explanation for the reported status. See Table 270 on page 2103 .
Weight	Combined weight (0 - 255) assigned to all monitored IP addresses. A higher weight value indicates greater importance.

Expanded reason output fields for unreachable IP addresses added in Junos OS Release 10.1. You might see any of the following reasons displayed.

Table 270: show chassis cluster ip-monitoring status redundancy group Reason Fields

Reason	Reason Description
No route to host	The router could not resolve the ARP, which is needed to send the ICMP packet to the host with the monitored IP address.
No auxiliary IP found	The redundant Ethernet interface does not have an auxiliary IP address configured.
Reth child not up	A child interface of a redundant Ethernet interface is down.
redundancy-group state unknown	Unable to obtain the state (primary, secondary, secondary-hold, disable) of a redundancy-group.
No reth child MAC address	Could not extract the MAC address of the redundant Ethernet child interface.
Secondary link not monitored	The secondary link might be down (the secondary child interface of a redundant Ethernet interface is either down or non-functional).
Unknown	The IP address has just been configured and the router still does not know the status of this IP. or Do not know the exact reason for the failure.

Sample Output

show chassis cluster ip-monitoring status

```
user@host> show chassis cluster ip-monitoring status
```

```
node0:
```

```
-----
Redundancy group: 1
Global threshold: 200
Current threshold: -120
```

IP address	Status	Failure count	Reason	Weight
10.254.5.44	reachable	0	n/a	220
2.2.2.1	reachable	0	n/a	100

```
node1:
```

```
-----
Redundancy group: 1
Global threshold: 200
Current threshold: -120
```

IP address	Status	Failure count	Reason	Weight
10.254.5.44	reachable	0	n/a	220
2.2.2.1	reachable	0	n/a	100

Sample Output

`show chassis cluster ip-monitoring status redundancy-group`

```
user@host> show chassis cluster ip-monitoring status redundancy-group 1
```

```
node0:
```

```
-----
Redundancy group: 1
```

IP address	Status	Failure count	Reason
10.254.5.44	reachable	0	n/a
2.2.2.1	reachable	0	n/a
1.1.1.5	reachable	0	n/a
1.1.1.4	reachable	0	n/a
1.1.1.1	reachable	0	n/a

```
node1:
```

```
-----
Redundancy group: 1
```

IP address	Status	Failure count	Reason
10.254.5.44	reachable	0	n/a
2.2.2.1	reachable	0	n/a
1.1.1.5	reachable	0	n/a
1.1.1.4	reachable	0	n/a
1.1.1.1	reachable	0	n/a

show interfaces snmp-index

Syntax	<code>show interfaces snmp-index <i>snmp-index</i></code>
Release Information	Command introduced before Junos OS Release 7.4.
Description	Display information for the interface with the specified SNMP index.
Options	This command has no options.
Additional Information	Output from both the <code>show interfaces <i>interface-name</i> detail</code> and the <code>show interfaces <i>interface-name</i> extensive</code> command includes all the information displayed in the output from the <code>show interfaces snmp-index</code> command.
Required Privilege Level	view
List of Sample Output	show interfaces snmp-index on page 2105
Output Fields	The output fields from the <code>show interfaces snmp-index <i>snmp-index</i></code> command are identical to those produced by the <code>show interfaces <i>interface-name</i></code> command. For a description of output fields, see the other chapters in this manual.

Sample Output

show interfaces snmp-index

```

user@host> show interfaces snmp-index 33
Physical interface: so-2/1/1, Enabled, Physical link is Down
  Interface index: 149, SNMP ifIndex: 33
  Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode, Speed: 0C48,
  Loopback: None, FCS: 16, Payload scrambler: Enabled
  Device flags   : Present Running Down
  Interface flags: Hardware-Down Point-To-Point SNMP-Traps 16384
  Link flags     : Keepalives
  CoS queues    : 8 supported
  Last flapped  : 2005-06-15 11:45:57 PDT (05:38:43 ago)
  Input rate    : 0 bps (0 pps)
  Output rate   : 0 bps (0 pps)
  SONET alarms  : LOL, PLL, LOS
  SONET defects : LOL, PLL, LOF, LOS, SEF, AIS-L, AIS-P

```

show interfaces summary

Syntax	<code>show interfaces summary</code>
Release Information	Command introduced in Junos OS Release 14.1R2.
Description	Display the status and statistics on logical interfaces configured on the device at the Flexible PIC Concentrator (FPC) level.
Options	This command has no options.
Required Privilege Level	view
List of Sample Output	show interfaces summary on page 2106
Output Fields	Table 271 on page 2106 describes the output fields for the show interfaces summary command. Output fields are listed in the approximate order in which they appear.

Table 271: show interfaces summary Output Fields

Field Name	Field Description
System's maximum logical interfaces	Total number of logical interfaces in the device.
Logical interfaces allocated	Number of allocated logical interfaces.
Logical interfaces available	Number of available logical interfaces.
Logical interface type	<p>The type of logical interfaces.</p> <ul style="list-style-type: none"> • LSI—Number of label-switched logical interfaces and their status. • Ethernet Untagged—Number of untagged logical interfaces and their status. • Ethernet VLAN—Number of tagged logical interfaces and their status. • Others—Number of dynamic and other logical interfaces, and their status.
System	Statistics on the global logical interfaces in the system.
FPC x	Statistics on the logical interfaces in a specific FPC.

Sample Output

show interfaces summary

```
user@host> show interfaces summary
Logical interfaces:
  System's maximum logical interfaces : 262144
```



```
Logical interfaces allocated      :    31
Logical interfaces available    : 262113
```

System:

Logical interface type	Count	UP	DOWN
Total	28	28	0
LSI	0	0	0
Ethernet Untagged	15	15	0
Ethernet VLAN	0	0	0
Others	13	13	0

FPC1:

Logical interface type	Count	UP	DOWN
Total	3	3	0
LSI	0	0	0
Ethernet Untagged	3	3	0
Ethernet VLAN	0	0	0
Others	0	0	0

FPC2:

Logical interface type	Count	UP	DOWN
Total	0	0	0
LSI	0	0	0
Ethernet Untagged	0	0	0
Ethernet VLAN	0	0	0
Others	0	0	0

show ilmi statistics

Syntax	show ilmi statistics
Release Information	Command introduced before Junos OS Release 7.4.
Description	Display input and output Integrated Local Management Interface (ILMI) statistics.
Options	This command has no options.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• clear ilmi statistics on page 2073
List of Sample Output	show ilmi statistics on page 2110
Output Fields	Table 272 on page 2109 lists the output fields for the show ilmi statistics command. Output fields are listed in the approximate order in which they appear.

Table 272: show ilmi statistics Output Fields

Field Name	Field Description
Input	<p>Information about received ILMI packets:</p> <ul style="list-style-type: none"> • Packets—Total number of messages delivered to the ILMI entity from the transport service. • Bad versions—Total number of messages delivered to the ILMI entity that were for an unsupported ILMI version. • Bad community names—Total number of messages delivered to the ILMI entity that did not use an ILMI community name. • Bad community uses—Total number of messages delivered to the ILMI entity that represented an ILMI operation that was not allowed by the ILMI community named in the message. • ASN parse errors—Total number of ASN.1 or BER errors encountered by the ILMI entity when decoding received ILMI messages. • Too bigs—Total number of ILMI packets delivered to the ILMI entity with an error status field of tooBig. • No such names—Total number of ILMI packets delivered to the ILMI entity with an error status field of noSuchName. • Bad values—Total number of ILMI packets delivered to the ILMI entity with an error status field of badValue. • Read onlys—Total number of valid ILMI packets delivered to the ILMI entity with an error status field of readOnly. Only incorrect implementations of ILMI generate this error. • General errors—Total number of ILMI packets delivered to the ILMI entity with an error status field of genErr. • Total request varbinds—Total number of objects retrieved successfully by the ILMI entity as a result of receiving valid ILMI GetRequest and GetNext packets. • Total set varbinds—Total number of objects modified successfully by the ILMI entity as a result of receiving valid ILMI SetRequest packets. • Get requests—Total number of ILMI GetRequest packets that have been accepted and processed by the ILMI entity. • Get nexts—Total number of ILMI GetNext packets that have been accepted and processed by the ILMI entity. • Set requests—Total number of ILMI SetRequest packets that have been accepted and processed by the ILMI entity. • Get responses—Total number of ILMI GetResponse packets that have been accepted and processed by the ILMI entity. • Traps—Total number of ILMI traps received by the ILMI entity. • Silent drops—Total number of GetRequest, GetNextRequest, GetBulkRequest, SetRequest, and InformRequest packets delivered to the ILMI entity that were silently dropped because the size of a reply containing an alternate response packet with an empty variable-bindings field was greater than either a local constraint or the maximum message size associated with the originator of the requests. • Proxy drops—Total number of GetRequest, GetNextRequest, GetBulkRequest, SetRequest, and InformRequest packets delivered to the ILMI entity that were silently dropped because the transmission of the (possibly translated) message to a proxy target failed in such a way (other than a timeout) that no response packet could be returned.
Output	<p>Information about transmitted ILMI packets:</p> <ul style="list-style-type: none"> • Packets—Total number of messages passed from the ILMI entity to the transport service. • Too bigs—Total number of ILMI packets generated by the ILMI entity with an error status field of tooBig. • No such names—Total number of ILMI packets generated by the ILMI entity with an error status field of noSuchName. • Bad values—Total number of ILMI packets generated by the ILMI entity with an error status field of badValue. • General errors—Total number of ILMI packets generated by the ILMI entity with an error status field of genErr. • Get requests—Total number of ILMI GetRequest packets that have been generated by the ILMI entity. • Get nexts—Total number of ILMI GetNext packets that have been generated by the ILMI entity. • Set requests—Total number of ILMI SetRequest packets that have been generated by the ILMI entity. • Get responses—Total number of ILMI GetResponse packets that have been generated by the ILMI entity. • Traps—Total number of ILMI traps generated by the ILMI entity.

Sample Output

show ilmi statistics

```
user@host> show ilmi statistics
```

```
ILMI statistics:
```

```
Input:
```

```
Packets: 0, Bad versions: 0, Bad community names: 0,  
Bad community uses: 0, ASN parse errors: 0,  
Too big: 0, No such names: 0, Bad values: 0,  
Read only: 0, General errors: 0,  
Total request varbinds: 0, Total set varbinds: 0,  
Get requests: 0, Get nexts: 0, Set requests: 0,  
Get responses: 0, Traps: 0,  
Silent drops: 0, Proxy drops 0
```

```
Output:
```

```
Packets: 0, Too big: 0, No such names: 0,  
Bad values: 0, General errors: 0,  
Get requests: 0, Get nexts: 0, Set requests: 0,  
Get responses: 0, Traps: 0
```

show security alarms

Syntax show security alarms
 <detail>
 <alarm-id *id-number*>
 <alarm-type [*types*]>
 <newer-than YYYY-MM-DD.HH:MM:SS>
 <older-than YYYY-MM-DD.HH:MM:SS>
 <process *process*>
 <severity *severity*>

Release Information Command introduced in Junos OS Release 11.2.

Description Display the alarms that are active on the device. Run this command when the CLI prompt indicates that a security alarm has been raised, as shown here:

```
[1 SECURITY ALARM] user@host#
```

Options **none**—Display all active alarms.

detail—(Optional) Display detailed output.

alarm-id *id-number*—(Optional) Display the specified alarm.

alarm-type [*types*]—(Optional) Display the specified alarm type or a set of types.

You can specify one or more of the following alarm types:

- authentication
- cryptographic-self-test
- decryption-failures
- encryption-failures
- ike-phase1-failures
- ike-phase2-failures
- key-generation-self-test
- non-cryptographic-self-test
- policy
- replay-attacks

newer-than YYYY-MM-DD.HH:MM:SS—(Optional) Display active alarms that were raised after the specified date and time.

older-than YYYY-MM-DD.HH:MM:SS—(Optional) Display active alarms that were raised before the specified date and time.

process *process*—(Optional) Display active alarms that were raised by the specified system process.

severity *severity*—(Optional) Display active alarms of the specified severity.

You can specify the following severity levels:

- **alert**
- **crit**
- **debug**
- **emerg**
- **err**
- **info**
- **notice**
- **warning**

Required Privilege Level security—To view this statement in the configuration.

Related Documentation

- [clear security alarms](#)
- [Example: Generating a Security Alarm in Response to Policy Violations](#)

List of Sample Output

[show security alarms on page 2113](#)
[show security alarms detail on page 2113](#)
[show security alarms alarm-id on page 2114](#)
[show security alarms alarm-type authentication on page 2114](#)
[show security alarms newer-than <time> on page 2114](#)
[show security alarms older-than <time> on page 2114](#)
[show security alarms process <process> on page 2114](#)
[show security alarms severity <severity> on page 2114](#)

Output Fields [Table 273 on page 2112](#) lists the output fields for the **show security alarms** command. Output fields are listed in the approximate order in which they appear. Field names might be abbreviated (as shown in parentheses) when no level of output is specified or when the **detail** keyword is used.

Table 273: show security alarms

Field Name	Field Description	Level of Output
ID	Identification number of the alarm.	All levels
Alarm time	Date and time the alarm was raised..	All levels

Table 273: show security alarms (continued)

Field Name	Field Description	Level of Output
Message	Information about the alarm, including the alarm type, username, IP address, and port number.	All levels
Process	System process (For example, login or sshd) and process identification number associated with the alarm.	detail
Severity	Severity level of the alarm.	detail

Sample Output

show security alarms

```
[3 SECURITY ALARMS] user@router> show security alarms
```

```

ID      Alarm time      Message
1      2010-01-19 13:41:36 PST  SSHD_LOGIN_FAILED_LIMIT: Specified number of login
failures (1) for user 'user' reached from '203.0.113.2'
2      2010-01-19 13:41:52 PST  SSHD_LOGIN_FAILED_LIMIT: Specified number of login
failures (1) for user 'user' reached from '203.0.113.2'
3      2010-01-19 13:42:13 PST  SSHD_LOGIN_FAILED_LIMIT: Specified number of login
failures (1) for user 'user' reached from '203.0.113.2'
```

show security alarms detail

```
[3 SECURITY ALARMS] user@router> show security alarms detail
```

```

Alarm ID   : 1
Alarm Type : authentication
Time      : 2010-01-19 13:41:36 PST
Message    : SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for
user 'user' reached from '203.0.113.2'
Process    : sshd (pid 1414)
Severity   : notice

Alarm ID   : 2
Alarm Type : authentication
Time      : 2010-01-19 13:41:52 PST
Message    : SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for
user 'user' reached from '203.0.113.2'
Process    : sshd (pid 1414)
Severity   : notice

Alarm ID   : 3
Alarm Type : authentication
Time      : 2010-01-19 13:42:13 PST
Message    : SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for
user 'user' reached from '203.0.113.2'
Process    : sshd (pid 1414)
Severity   : notice
```

show security alarms alarm-id

```
[3 SECURITY ALARMS] user@router> show security alarms alarm-id 1
```

ID	Alarm time	Message
1	2010-01-19 13:41:36 PST	SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for user 'user' reached from '203.0.113.2'

show security alarms alarm-type authentication

```
[3 SECURITY ALARMS] user@router> show security alarms alarm-type authentication
```

ID	Alarm time	Message
1	2010-01-19 13:41:36 PST	SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for user 'user' reached from '203.0.113.2'
2	2010-01-19 13:41:52 PST	SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for user 'user' reached from '203.0.113.2'
3	2010-01-19 13:42:13 PST	SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for user 'user' reached from '203.0.113.2'

show security alarms newer-than <time>

```
[3 SECURITY ALARMS] user@router> show security alarms newer-than 2010-01-19.13:41:59
```

3	2010-01-19 13:42:13 PST	SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for user 'user' reached from '203.0.113.2'
---	-------------------------	--

show security alarms older-than <time>

```
[3 SECURITY ALARMS] user@router> show security alarms older-than 2010-01-19.13:41:59
```

ID	Alarm time	Message
1	2010-01-19 13:41:36 PST	SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for user 'user' reached from '203.0.113.2'
2	2010-01-19 13:41:52 PST	SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for user 'user' reached from '203.0.113.2'

show security alarms process <process>

```
[3 SECURITY ALARMS] user@router> show security alarms process sshd
```

ID	Alarm time	Message
1	2010-01-19 13:41:36 PST	SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for user 'user' reached from '203.0.113.2'
2	2010-01-19 13:41:52 PST	SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for user 'user' reached from '203.0.113.2'
3	2010-01-19 13:42:13 PST	SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for user 'user' reached from '203.0.113.2'

show security alarms severity <severity>

```
[3 SECURITY ALARMS] user@router> show security alarms severity notice
```


ID	Alarm time	Message
1	2010-01-19 13:41:36 PST	SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for user 'user' reached from '203.0.113.2'
2	2010-01-19 13:41:52 PST	SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for user 'user' reached from '203.0.113.2'
3	2010-01-19 13:42:13 PST	SSHD_LOGIN_FAILED_LIMIT: Specified number of login failures (1) for user 'user' reached from '203.0.113.2'

show security datapath-debug capture

Syntax	show security datapath-debug capture
Release Information	Command introduced in Junos OS Release 10.0.
Description	Display details of the data path debugging capture file.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show security datapath-debug counter on page 2117 • <i>Understanding Data Path Debugging for Logical Systems</i>
List of Sample Output	show security datapath—debug capture on page 2116
Output Fields	Output fields are listed in the approximate order in which they appear.

Sample Output

show security datapath—debug capture

```

user@host> show security datapath-debug capture

Packet 1, len 120: (C0/F0/P0/SEQ:71:1bt)
91 00 00 47 11 00 10 00 9a 14 00 19 03 00 00 00
00 00 00 00 00 01 00 47 10 00 00 00 00 00 00 00
00 1f 12 f8 dd 29 00 21 59 84 f4 01 81 00 02 1e
08 00 45 60 01 f4 00 00 00 00 3f 06 73 9f 01 01
01 02 03 01 01 02 d4 31 d4 31 00 00 00 00 00 00
00 00 50 02 00 00 ff ad 00 00 00 00
Packet 2, len 120: (C0/F0/P0/SEQ:71:1bt)
90 00 00 47 04 00 00 00 00 00 00 00 02 02 00 47
10 00 00 00 00 00 00 00 50 00 a6 1c 00 00 00 00
00 00 00 0a 00 00 00 00 00 00 09 d9 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 1f 12 f8
dd 29 00 21 59 84 f4 01 81 00 02 1e

```

show security datapath-debug counter

Syntax	show security datapath-debug counter
Release Information	Command introduced in Junos OS Release 10.0.
Description	Display details of the data path debugging counter.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show security datapath-debug capture on page 2116 • <i>Understanding Data Path Debugging for Logical Systems</i>
List of Sample Output	show security datapath-debug counter on page 2117
Output Fields	Output fields are listed in the approximate order in which they appear.

Sample Output

show security datapath-debug counter

```

user@host> show security datapath-debug counter
Datapath debug counters
Packet Filter 1:
np-ingress
Chassis 0 FPC 4 : 1
np-ingress
Chassis 0 FPC 3 : 0
np-egress
Chassis 0 FPC 4 : 1
np-egress
Chassis 0 FPC 3 : 0
jexec
Chassis 0 FPC 0 PIC 1: 0
jexec
Chassis 0 FPC 0 PIC 0: 1
lbt
Chassis 0 FPC 0 PIC 1: 0
lbt
Chassis 0 FPC 0 PIC 0: 2
pot
Chassis 0 FPC 0 PIC 1: 0
pot

```

show security monitoring

Syntax show security monitoring

Release Information Command introduced in Junos OS Release 10.2.

Description Displays a count of security flow and central point (CP) sessions, CPU utilization (as a percentage of maximum), and memory in use (also as a percentage of maximum) at the moment the command is run. This command is supported on SRX1400, SRX1500, SRX5400, SRX5600, and SRX5800 devices and vSRX.

Required Privilege Level View

Related Documentation

- [show security monitoring fpc fpc-number on page 2120](#)
- [show security monitoring performance session on page 2123](#)
- [show security monitoring performance spu on page 2124](#)

show security monitoring

user@host>show security monitoring

```
user@host> show security monitoring
```

FPC	PIC	CPU	Mem	Flow session current	Flow session maximum	CP session current	CP session maximum
1	0	0	11	0	0	0	0
1	1	0	5	3	6291456	1	7549747
1	2	0	5	2	6291456	0	7549747
1	3	0	5	3	6291456	1	7549747
8	0	0	65	4	6963	2	8355
8	1	0	65	2	6963	0	8355
Total Sessions:				14	18888294	4	22665951

show security monitoring (SRX1400)

user@host>show security monitoring

```
user@host> show security monitoring
```

FPC	PIC	CPU	Mem	Flow session current	Flow session maximum	CP session current	CP session maximum
1	0	0	75	0	1048576	0	1048576

show security monitoring (vSRX)**user@host>show security monitoring****user@host> show security monitoring**

FPC	PIC	CPU	Mem	Flow session current	Flow session maximum	CP session current	CP session maximum
0	0	0	68	2	524288	N/A	N/A

show security monitoring (vSRX in a Chassis Cluster)**user@host>show security monitoring****node0:**

FPC	PIC	CPU	Mem	Flow session current	Flow session maximum	CP session current	CP session maximum
0	0	0	67	0	524288	N/A	N/A

node1:

FPC	PIC	CPU	Mem	Flow session current	Flow session maximum	CP session current	CP session maximum
0	0	0	67	0	524288	N/A	N/A

show security monitoring fpc fpc-number

Syntax	show security monitoring fpc <i>fpc-number</i> <node (<i>node-id</i> all local primary)>
Release Information	Command introduced in Junos OS Release 9.2.
Description	Display security monitoring information about the FPC slot.
Options	<ul style="list-style-type: none"> • <i>fpc-number</i>—Display security monitoring information for the specified FPC slot. It can be in the range from 0 to 11. • node—(Optional) For chassis cluster configurations, display security monitoring information for the specified FPC on a specific node (device) in the cluster. <ul style="list-style-type: none"> • <i>node-id</i>—Identification number of the node. It can be 0 or 1. • all—Display information about all nodes. • local—Display information about the local node. • primary—Display information about the primary node.
Additional Information	For complete list of slot numbering, physical port, and logical interface numbering for SRX Series devices in chassis cluster, see <i>Chassis Cluster Feature Guide for SRX Series Devices</i> .
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show services ip-monitoring status on page 2126
List of Sample Output	show security monitoring fpc 0 on page 2121 show security monitoring fpc 1 on page 2121 show security monitoring fpc 8 on page 2122
Output Fields	Table 274 on page 2120 lists the output fields for the show security monitoring fpc <i>fpc-number</i> command. Output fields are listed in the approximate order in which they appear.

Table 274: show security monitoring fpc fpc-number Output Fields

Field Name	Field Description
FPC	Slot number in which the FPC is installed.
PIC	Slot number in which the PIC is installed.
CPU Utilization (%)	Total percentage of CPU being used by the PIC's processors.

Table 274: show security monitoring fpc fpc-number Output Fields (continued)

Field Name	Field Description
Memory Utilization (%)	Percentage of heap space (dynamic memory) being used by the PIC's processor. If this number exceeds 80 percent, there might be a software problem (memory leak).
Current flow session	The current number of flow sessions. When SRX Series devices operate in packet mode, flow sessions will not be created and this field will remain zero.
Max flow session	The maximum number of flow sessions allowed. This number will differ from one device to another.
SPU current cp session	The current number of cp sessions for the SPU (on SRX5600, and SRX5800 devices only).
SPU max cp session	The maximum number of cp sessions allowed for the SPU (on SRX5600, and SRX5800 devices only).

Sample Output

show security monitoring fpc 0

```

user@host> show security monitoring fpc 0
FPC 0
  PIC 0
    CPU utilization      :    0 %
    Memory utilization   :   82 %
    Current flow session :    0
    Max flow session     :    0
    Current CP session   :    0
    Max CP session       : 12000000
  Session Creation Per Second (for last 96 seconds on average):    0
  PIC 1
    CPU utilization      :    0 %
    Memory utilization   :   54 %
    Current flow session :    0
    Max flow session     : 819200
    Current CP session   :    0
    Max CP session       :    0
  Session Creation Per Second (for last 96 seconds on average):    0

```

Sample Output

show security monitoring fpc 1

```

user@host> show security monitoring fpc 1
FPC 1
  PIC 0
    CPU utilization      :    0 %
    Memory utilization   :   21 %
    Current flow session :    0
    Max flow session     : 524288
    Current CP session   :    0

```

```
Max CP session      : 1048576
Session Creation Per Second (for last 96 seconds on average): 0
```

Sample Output

show security monitoring fpc 8

```
user@host> show security monitoring fpc 5
FPC 5
  PIC 0
    CPU utilization      : 0 %
    Memory utilization   : 64 %
    Current flow session : 0
    Max flow session     : 524288
    Current CP session   : 0
    Max CP session       : 2359296
  Session Creation Per Second (for last 96 seconds on average): 0
  PIC 1
    CPU utilization      : 0 %
    Memory utilization   : 65 %
    Current flow session : 0
    Max flow session     : 1048576
    Current CP session   : 0
    Max CP session       : 0
  Session Creation Per Second (for last 96 seconds on average): 0
```


show security monitoring performance session

Syntax show security monitoring performance session

<fpc slot-number>

<pic slot-number>

Release Information Command introduced in Junos OS Release of 10.2.

Description Display the current session (total number of sessions at that time) for the last 60 seconds.

- Options**
- **fpc slot-number** — Display information about the FPC slot. Use this option to filter the output based on the slot number.
 - **pic slot-number** — Display information about existing PIMs or Mini-PIMs in a particular PIC slot. Use this option to filter the output based on PIC slot.



NOTE: The `fpc slot-number` and `pic slot-number` options are not available on SRX300, SRX320, and SRX340 devices.

Required Privilege Level View

Related Documentation

- [show services ip-monitoring status on page 2126](#)

show security monitoring performance session

user@host> show security monitoring performance session

```
fpc 0 pic 0
Last 60 seconds:
0:      8  1:      8  2:      8  3:      8  4:      8  5:      7
6:      7  7:      7  8:      7  9:      7 10:      7 11:      8
12:     8 13:     8 14:     7 15:     7 16:     7 17:     7
18:     7 19:     7 20:     7 21:     5 22:     5 23:     5
24:     5 25:     5 26:     5 27:     5 28:     5 29:     4
30:     4 31:     4 32:     3 33:     3 34:     3 35:     3
36:     5 37:     5 38:     6 39:     6 40:     5 41:     5
42:     5 43:     5 44:     5 45:     5 46:     5 47:     5
48:     7 49:     7 50:     6 51:     8 52:     8 53:     6
54:     5 55:     7 56:     7 57:     5 58:     5 59:     8
```

show security monitoring performance spu

Syntax show security monitoring performance spu

<fpc slot-number>

<pic slot-number>

Release Information Command introduced in Junos OS Release 10.2.

Description Display the services processing unit (SPU) percent utilization for all FPC slots over the last 60 seconds. Use this command to track the percent utilization statistics per second for the past 60 seconds for each FPC slot and PIC.

- Options**
- **fpc slot-number** — Display information about the FPC slot. Use this option to filter the output based on the slot number.
 - **pic slot-number** — Display information about existing PIMs or Mini-PIMs in a particular PIC slot. Use this option to filter the output based on PIC slot.



NOTE: The fpc slot-number and pic slot-number options are not available on SRX300, SRX320, or SRX340 devices or on vSRX instances.

Required Privilege Level View

Related Documentation

- [show services ip-monitoring status on page 2126](#)

show security monitoring performance spu

This sample shows 46% utilization of the SPU for second 42 in the past 60 seconds for FPC 0 and PIC 0.

user@host>show security monitoring performance spu

```
fpc 0 pic 0
Last 60 seconds:
0: 48 1: 48 2: 48 3: 48 4: 48 5: 48
6: 48 7: 48 8: 49 9: 48 10: 48 11: 48
12: 48 13: 48 14: 48 15: 48 16: 48 17: 48
18: 48 19: 48 20: 48 21: 48 22: 49 23: 48
24: 49 25: 49 26: 48 27: 48 28: 48 29: 48
30: 48 31: 48 32: 48 33: 48 34: 48 35: 48
36: 46 37: 47 38: 46 39: 46 40: 46 41: 46
```

```
42: 46 43: 46 44: 46 45: 46 46: 46 47: 46
48: 46 49: 46 50: 46 51: 46 52: 46 53: 46
54: 46 55: 46 56: 46 57: 46 58: 46 59: 46
```

show services ip-monitoring status

Syntax	<code>show services ip-monitoring status</code>
Release Information	Command modified in Junos OS Release 11.4 R2. Next-hop functionality added in Junos OS Release 12.1X46-D15.
Description	Display a brief summary of IP monitoring status along with the current state for a given policy.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show security monitoring on page 2118
List of Sample Output	show services ip-monitoring status on page 2127 show services ip-monitoring status on page 2127 show services ip-monitoring status on page 2128 show services ip-monitoring status on page 2128 show services ip-monitoring status on page 2129
Output Fields	Table 275 on page 2126 lists the output fields for the show services ip-monitoring status command. Output fields are listed in the approximate order in which they appear.

Table 275: show services ip-monitoring status Output Fields

Field Name	Field Description
Policy	Name of the policy configured.
Probe Name	Name of the probe configured.
Address	Displays the configured target address.
Status	Displays the status of the probe on the target address. If the status is PASS, then the target address is reached.
Route-Action	Displays route injection information configured for the policy and its failover status.
Route-Instance	Displays the routing instance of the route to be injected during failover.
Route	Routing address of the route to be injected during failover.
Next-Hop	Specifies the next-hop address of the route to be injected during failover. P2P interfaces only.

Table 275: show services ip-monitoring status Output Fields (continued)

Field Name	Field Description
State	Display the state of the route injection action. If the state is APPLIED, then the ip-monitoring policy is in failover state.
Interface Action	Displays the interface action type as enable or disable.
Policy Action	Displays the policy action type as enable or disable.
Admin State	Displays the current admin state of the interface.
Action Status	Displays the current action status of the interface.

Sample Output

show services ip-monitoring status

```
user@host> show services ip-monitoring status
```

```
Policy - policy1 (Non-preemptive. Status: FAIL)
```

```
RPM Probes:
```

Probe name	Test Name	Address	Status
probe_a	a1	15.1.1.10	FAIL
probe_a	a2	200.1.1.1	FAIL

```
Route-Action:
```

route-instance	route	next-hop	State
inet.0	200.1.1.0	150.1.1.1	APPLIED

```
Interface-Action:
```

interface	policy action	admin state	action status
fe-0/0/5.2	Enable	UP	FAILOVER
fe-0/0/5.4	Disable	DOWN	FAILOVER
t1-1/0/0	Enable	UP	FAILOVER
d10	Enable	UP	FAILOVER
ge-0/0/1	Enable	UP	FAILOVER

Sample Output

show services ip-monitoring status

In this example, the policy is in the failback state, and the no-preempt option is not configured.

```
user@host> show services ip-monitoring status
```

```
Policy - policy1 (Status: PASS)
```

```
RPM Probes:
```

Probe name	Test Name	Address	Status
------------	-----------	---------	--------

```

-----
probe1                a1                99.1.1.2                PASS
Route-Action:
route-instance        route                next-hop                state
-----
inet.0                99.1.1.0                12.12.12.2                NOT-APPLIED
Interface-Action:
interface              policy action        admin state action status
-----
at-2/0/0                Enable                DOWN                MARKED-DOWN
ge-0/0/2.2                Enable                DOWN                MARKED-DOWN
ge-0/0/2.3                Enable                DOWN                MARKED-DOWN

```

Sample Output

show services ip-monitoring status

In this example, the policy is in the failover state, and the primary is restored. The no-preempt option is configured.

```
user@host> show services ip-monitoring status
```

```

Policy - policy1 (Non-preemptive. Status: FAILOVER-NO-PREEMPT)
RPM Probes:
  Probe name          Test Name          Address          Status
  -----
  probe1              a1                99.1.1.2                PASS
Route-Action:
route-instance        route                next-hop                state
-----
inet.0                99.1.1.0                12.12.12.2                APPLIED
Interface-Action:
interface              policy action        admin state action status
-----
at-2/0/0                Enable                UP                FAILOVER
ge-0/0/2.2                Enable                UP                FAILOVER
ge-0/0/2.3                Enable                UP                FAILOVER

```

Sample Output

show services ip-monitoring status

When the probe succeeds and the policy is not applied, the output is as follows:

```
user@host> show services ip-monitoring status
```

```

Policy payment (Status: PASS)
RPM Probes:
  Probe name          Test Name          Address          Status
  -----
  Probe-Payment-Server  paysvr            9.9.9.2                PASS
Route-Action:
route-instance        route                next-hop                state
-----
inet.0                9.9.9.0/24                e1-6/0/0.0                NOT-APPLIED

```

Sample Output

show services ip-monitoring status

When the probe fails and the policy is applied, the output is as follows:

```
user@host> show services ip-monitoring status
```

Policy payment (Status: FAIL)

RPM Probes:

Probe name	Test Name	Address	Status
------------	-----------	---------	--------

Probe-Payment-Server	paysvr	9.9.9.2	FAIL
----------------------	--------	---------	------

Route-Action:

route-instance	route	next-hop	state
----------------	-------	----------	-------

inet.0	9.9.9.0/24	e1-6/0/0.0	APPLIED
--------	------------	------------	---------

show services rpm twamp client connection

Syntax `show services rpm twamp client connection
<connection-name>`

Release Information Command introduced in Junos OS Release 15.1X49-D110 for SRX Series devices.

Description Display information about the connections established between the real-time performance monitoring (RPM) Two-Way Active Measurement Protocol (TWAMP) server and control clients. By default, all established sessions are displayed, unless you specify a control connection name when you issue the command.

Options *connection-name*—(Optional) Display information about the specified control connection or TWAMP control client.

Required Privilege Level view

List of Sample Output [show services rpm twamp client connection on page 2131](#)

Output Fields [Table 276 on page 2130](#) lists the output fields for the **show services rpm twamp client connection** command. Output fields are listed in the approximate order in which they appear.

Table 276: show services rpm twamp client connection Output Fields

Field Name	Field Description
Connection Name	Connection name that uniquely identifies the connection between the TWAMP server and a particular client.
Client address	Client IP address.
Client port	Client port number.
Server address	Server IP address.
Server port	Server port number.
Session count	Session count.
Auth mode	Authentication mode.

Sample Output

show services rpm twamp client connection

```
user@host> show services rpm twamp client connection
```

Connection Name	Client address	Client port	Server address	Server port	Session count	Auth mode
c1	123.0.0.2	60530	123.0.0.1	1862	1	
Unauthenticated						

show services rpm twamp client history-results

Syntax `show services rpm history-results`
`<brief | detail>`
`<control-connection control-connection-name>`
`<since time>`
`<test-session test-session-name>`

Release Information Command introduced in Junos OS Release 15.1X49-D110 for SRX Series devices.

Description Display standard information about the results of the last 50 probes for each real-time performance monitoring (RPM) Two-Way Active Measurement Protocol (TWAMP) instance. You can also view the historical results of the probes or test packets sent from a TWAMP client to a TWAMP server for a particular control connection, or a test session associated with a control connection.

Options **brief | detail**—(Optional) Display the specified level of output.

control-connection *control-connection-name*—(Optional) Display information for the specified control connection between a TWAMP client and a TWAMP server.

since *time*—(Optional) Display information from the specified time. Specify time as *yyyy-mm-dd.hh:mm:ss*.

test-session *test-session-name*—(Optional) Display information for the specified test session associated with a control connection between a TWAMP client and a TWAMP server.

Required Privilege Level view

List of Sample Output [show services rpm twamp client history-results on page 2133](#)

Output Fields [Table 227 on page 1890](#) lists the output fields for the **show services rpm twamp client history-results** command. Output fields are listed in the approximate order in which they appear.

Table 277: show services rpm twamp client history-results Output Fields

Field Name	Field Description
Owner	Probe owner or the TWAMP client.
Test	Name of a test for a TWAMP probe instance.
Probe received	Timestamp when the probe result was received.
Round trip time	Average ping round-trip time (RTT), in microseconds.

Table 277: show services rpm twamp client history-results Output Fields (continued)

Field Name	Field Description
Probes sent	Timestamp when the probe result was sent.
Round trip time	Average ping RTT, in microseconds.

Sample Output

show services rpm twamp client history-results

```
user@host> show services rpm twamp client history-results
```

Owner, Test	Probe Sent	Probe received
Round trip time		
c2, t2	Fri Jul 21 05:11:06 2017	Fri Jul 21 05:11:06 2017
241 usec		
c2, t2	Fri Jul 21 05:11:07 2017	Fri Jul 21 05:11:07 2017
254 usec		
c2, t2	Fri Jul 21 05:11:08 2017	Fri Jul 21 05:11:08 2017
248 usec		
c2, t2	Fri Jul 21 05:11:09 2017	Fri Jul 21 05:11:09 2017
241 usec		
c2, t2	Fri Jul 21 05:11:10 2017	Fri Jul 21 05:11:10 2017
245 usec		
c2, t2	Fri Jul 21 05:11:11 2017	Fri Jul 21 05:11:11 2017
231 usec		
c2, t2	Fri Jul 21 05:11:12 2017	Fri Jul 21 05:11:12 2017
258 usec		
c2, t2	Fri Jul 21 05:11:13 2017	Fri Jul 21 05:11:13 2017
232 usec		
c2, t2	Fri Jul 21 05:11:14 2017	Fri Jul 21 05:11:14 2017
236 usec		
c2, t2	Fri Jul 21 05:11:15 2017	Fri Jul 21 05:11:15 2017
236 usec		
c2, t2	Fri Jul 21 05:11:16 2017	Fri Jul 21 05:11:16 2017
213 usec		

show services rpm twamp client probe-results

Syntax `show services rpm twamp client probe-results
<control-connection control-connection-name>
<test-session test-session-name>`

Release Information Command introduced in Junos OS Release 15.1X49-D110 for SRX Series devices.

Description Display the results of the most recent real-time performance monitoring (RPM) Two-Way Active Measurement Protocol (TWAMP) probes sent from the TWAMP client to the TWAMP server. You can also view the results of the probes or test packets sent from a TWAMP client to a TWAMP server for a particular control connection, or a test session associated with a control connection.

Options **control-connection control-connection-name**—(Optional) Display information for the specified control connection between a TWAMP client and a TWAMP server.

test-session test-session-name—(Optional) Display information for the specified test session associated with a control connection between a TWAMP client and a TWAMP server.

Required Privilege Level view

List of Sample Output [show services rpm twamp client probe-results on page 2137](#)

Output Fields [Table 278 on page 2134](#) lists the output fields for the **show services twamp client probe-results** command. Output fields are listed in the approximate order in which they appear.

Table 278: show services twamp client probe-results Output Fields

Field Name	Field Description
Owner	Name of the session-sender or the control client, which is the TWAMP client. When you configure the control-client-name option at the [edit services twamp client control-connection] hierarchy level, this field displays the configured owner name or the client name.
Test	Name of a test representing a collection of probes. When you configure the test-session test-name statement at the [edit services owner] hierarchy level, the field displays the configured test name.
server-address	Destination address used for the probes.
server-port	Destination port used for the probes.
Client address	Source or TWAMP client address used for the probes.
Client port	Source or TWAMP client port used for the probes.

Table 278: show services twamp client probe-results Output Fields (continued)

Field Name	Field Description
Reflector address	Session reflector or TWAMP server address used for the probes.
Reflector port	Session reflector or TWAMP server port used for the probes.
Test size	Number of probes within a test.
Probe results	<p>Raw measurement of a particular probe sample done by a remote host. This data is provided separately from the calculated results. The following information is contained in the raw measurement:</p> <ul style="list-style-type: none"> • Response received—Timestamp when the probe result was determined. • Client and server hardware timestamps—If timestamps are configured, an entry appears at this point. • Rtt—Average ping round-trip time (RTT), in microseconds. • Egress jitter—Egress jitter, in microseconds. • Ingress jitter—Ingress jitter, in microseconds. • Round trip jitter—Round-trip jitter, in microseconds. • Egress interarrival jitter—Egress interarrival jitter, in microseconds. • Ingress interarrival jitter—Ingress interarrival jitter, in microseconds. • Round trip interarrival jitter—Round-trip interarrival jitter, in microseconds.
Results over current test	<p>Probes are grouped into tests, and the statistics are calculated for each test. If a test contains 10 probes, the average, minimum, and maximum results are calculated from the results of those 10 probes. If the command is issued while the test is in progress, the statistics use information from the completed probes.</p> <ul style="list-style-type: none"> • Probes sent—Number of probes sent within the current test. • Probes received—Number of probe responses received within the current test. • Loss percentage—Percentage of lost probes for the current test. • Measurement—Measurement type. Possible values are round-trip time, positive round-trip jitter, negative round-trip jitter, egress time, positive egress jitter, negative egress jitter, ingress time, positive ingress jitter, negative ingress jitter, and, for the probe type icmp-ping-timestamp, the egress delay and ingress delay. <p>For each measurement type, the following individual calculated results are provided:</p> <ul style="list-style-type: none"> • Samples—Number of probes. • Minimum—Minimum RTT, ingress delay, or egress delay measured over the course of the current test. • Maximum—Maximum RTT, ingress delay, or egress delay measured over the course of the current test. • Average—Average RTT, ingress delay, or egress delay measured over the course of the current test. • Peak to peak—Peak-to-peak difference, in microseconds. • Stddev—Standard deviation, in microseconds. • Sum—Statistical sum.

Table 278: *show services twamp client probe-results Output Fields (continued)*

Field Name	Field Description
Results over last test	<p>Results for the most recently completed test. If the command is issued while the first test is in progress, this information is not displayed:</p> <ul style="list-style-type: none"> • Probes sent—Number of probes sent for the most recently completed test. • Probes received—Number of probe responses received for the most recently completed test. • Loss percentage—Percentage of lost probes for the most recently completed test. • Test completed—Time the most recent test was completed. • Measurement—Measurement type. Possible values are round-trip time, positive round-trip jitter, negative round-trip jitter, egress time, positive egress jitter, negative egress jitter, ingress time, positive ingress jitter, negative ingress jitter, and, for the probe type icmp-ping-timestamp, the egress delay and ingress delay. <p>For each measurement type, the following individually calculated results are provided:</p> <ul style="list-style-type: none"> • Samples—Number of probes. • Minimum—Minimum RTT, ingress delay, or egress delay measured for the most recently completed test. • Maximum—Maximum RTT, ingress delay, or egress delay measured for the most recently completed test. • Average—Average RTT, ingress delay, or egress delay measured for the most recently completed test. • Peak to peak—Peak-to-peak difference, in microseconds. • Stddev—Standard deviation, in microseconds. • Sum—Statistical sum.
Results over all tests	<p>Displays statistics made for all the probes, independently of the grouping into tests, as well as statistics for the current test.</p> <ul style="list-style-type: none"> • Probes sent—Number of probes sent in all tests. • Probes received—Number of probe responses received in all tests. • Loss percentage—Percentage of lost probes in all tests. • Measurement—Measurement type. Possible values are round-trip time, positive round-trip jitter, negative round-trip jitter, egress time, positive egress jitter, negative egress jitter, ingress time, positive ingress jitter, negative ingress jitter, and, for the probe types icmp-ping-timestamp and udp-ping-timestamp, the egress delay and ingress delay. <p>For each measurement type, the following individually calculated results are provided:</p> <ul style="list-style-type: none"> • Samples—Number of probes. • Minimum—Minimum RTT, ingress delay, or egress delay measured over the course of the current test. • Maximum—Maximum RTT, ingress delay, or egress delay measured over the course of the current test. • Average—Average RTT, ingress delay, or egress delay measured over the course of the current test. • Peak to peak—Peak-to-peak difference, in microseconds. • Stddev—Standard deviation, in microseconds. • Sum—Statistical sum.

Sample Output

show services rpm twamp client probe-results

```
user@host> show services rpm twamp client probe-results
```

```
Owner: c2, Test: t2
server-address: 23.0.0.1, server-port: 862, Client address: 23.0.0.1,
Client port: 63223
Reflector address: 23.0.0.1, Reflector port: 10000,
Sender address: 23.0.0.1, sender-port: 10000
Test size: 400000 probes
Probe results:
  Response received
  Fri Jul 21 05:12:12 2017
  Fri Jul 21 05:12:12 2017
  Rtt: 242 usec, Egress jitter: -9 usec, Ingress jitter: 24 usec,
  Round trip jitter: 15 usec, Egress interarrival jitter: 14 usec,
  Ingress interarrival jitter: 18 usec,
  Round trip interarrival jitter: 16 usec
Results over current test:
  Probes sent: 67, Probes received: 67, Loss percentage: 0.000000
  Measurement: Round trip time
Samples: 67, Minimum: 206 usec, Maximum: 266 usec, Average: 243 usec,
  Peak to peak: 60 usec, Stddev: 11 usec, Sum: 16283 usec
  Measurement: Negative egress jitter
  Samples: 66, Minimum: 4 usec, Maximum: 25 usec, Average: 14 usec,
  Peak to peak: 21 usec, Stddev: 4 usec, Sum: 935 usec
  Measurement: Positive ingress jitter
  Samples: 55, Minimum: 0 usec, Maximum: 62 usec, Average: 19 usec,
  Peak to peak: 62 usec, Stddev: 13 usec, Sum: 1023 usec
  Measurement: Negative ingress jitter
  Samples: 11, Minimum: 1 usec, Maximum: 23 usec, Average: 8 usec,
  Peak to peak: 22 usec, Stddev: 6 usec, Sum: 87 usec
  Measurement: Positive round trip jitter
  Samples: 33, Minimum: 0 usec, Maximum: 49 usec, Average: 14 usec,
  Peak to peak: 49 usec, Stddev: 11 usec, Sum: 463 usec
  Measurement: Negative round trip jitter
  Samples: 33, Minimum: 1 usec, Maximum: 34 usec, Average: 14 usec,
  Peak to peak: 33 usec, Stddev: 8 usec, Sum: 462 usec
Results over all tests:
  Probes sent: 67, Probes received: 67, Loss percentage: 0.000000
  Measurement: Round trip time
  Samples: 67, Minimum: 206 usec, Maximum: 266 usec, Average: 243 usec,
  Peak to peak: 60 usec, Stddev: 11 usec, Sum: 16283 usec
  Measurement: Negative egress jitter
  Samples: 66, Minimum: 4 usec, Maximum: 25 usec, Average: 14 usec,
  Peak to peak: 21 usec, Stddev: 4 usec, Sum: 935 usec
  Measurement: Positive ingress jitter
  Samples: 55, Minimum: 0 usec, Maximum: 62 usec, Average: 19 usec,
  Peak to peak: 62 usec, Stddev: 13 usec, Sum: 1023 usec
  Measurement: Negative ingress jitter
  Samples: 11, Minimum: 1 usec, Maximum: 23 usec, Average: 8 usec,
  Peak to peak: 22 usec, Stddev: 6 usec, Sum: 87 usec
  Measurement: Positive round trip jitter
  Samples: 33, Minimum: 0 usec, Maximum: 49 usec, Average: 14 usec,
  Peak to peak: 49 usec, Stddev: 11 usec, Sum: 463 usec
  Measurement: Negative round trip jitter
  Samples: 33, Minimum: 1 usec, Maximum: 34 usec, Average: 14 usec,
  Peak to peak: 33 usec, Stddev: 8 usec, Sum: 462 usec
```


show services rpm twamp client session

Syntax `show services rpm twamp client session`
`<control-connection control-connection-name>`
`<test-session test-session-name>`

Release Information Command introduced in Junos OS Release 15.1X49-D110 for SRX Series devices.

Description Display information about the sessions established between the real-time performance monitoring (RPM) Two-Way Active Measurement Protocol (TWAMP) server and control clients for control packets and data packets. By default, all established control connection and data connection or test sessions are displayed, unless you specify a control connection name or a test session name when you issue the command.

Options **control-connection control-connection-name**—(Optional) Display information about the specified control connection, which is established for control packets exchanged between a TWAMP client and a TWAMP server.

test-session test-session-name—(Optional) Display information about the specified test session, which is established for data packets transmitted between a TWAMP client and a TWAMP server, associated with a control connection.

Required Privilege Level view

List of Sample Output [show services rpm twamp client session on page 2140](#)

Output Fields [Table 279 on page 2139](#) lists the output fields for the `show services rpm twamp client session` command. Output fields are listed in the approximate order in which they appear.

Table 279: show services rpm twamp client session Output Fields

Field Name	Field Description
Connection Name	Name of the control connection that uniquely identifies the connection between the TWAMP server and the TWAMP client.
Session Name	Name of the test session that uniquely identifies the data session between the TWAMP server and the TWAMP client.
Sender address	Sender IP address.
Sender port	Sender port number.
Reflector address	Reflector IP address.
Reflector port	Reflector port number.

Sample Output

show services rpm twamp client session

```
user@host> show services rpm twamp client session
```

```
root> show services rpm twamp client session
Connection      Session      Sender      Sender Reflector      Reflector
Name            Name          address     port  address      port
c1              t1            123.0.0.2   10001 123.0.0.1    10001
```

show services rpm twamp server connection

Syntax `show services rpm twamp server connection
<connection-id>`

Release Information Command introduced in Junos OS Release 15.1X49-D110 for SRX Series devices.

Description Display information about the connections established between the real-time performance monitoring (RPM) Two-Way Active Measurement Protocol (TWAMP) server and control clients. By default, all established sessions are displayed, unless you specify a session ID when you issue the command.

Options *connection-id*—(Optional) Identifier of the connection that you want to display information about.

Required Privilege Level view

List of Sample Output [show services rpm twamp server connection on page 2142](#)

Output Fields [Table 276 on page 2130](#) lists the output fields for the **show services rpm twamp server connection** command. Output fields are listed in the approximate order in which they appear.

Table 280: show services rpm twamp server connection Output Fields

Field Name	Field Description
Connection ID	Connection ID that uniquely identifies the connection between the TWAMP server and a particular client.
Client address	Client IP address.
Client port	Client port number.
Server address	Server IP address.
Server port	Server port number.
Session count	Session count.
Auth mode	Authentication mode.

Sample Output

show services rpm twamp server connection

```
user@host> show services rpm twamp server connection
```

Connection ID	Client address	Client port	Server address	Server port	Session count	Auth mode
5	123.0.0.1	50821	123.0.0.2	862	1	Unauthenticated

show services rpm twamp server session

Syntax `show services rpm twamp server session
<session-id>`

Release Information Command introduced in Junos OS Release 15.1X49-D110 for SRX Series devices.

Description Display information about the sessions established between the real-time performance monitoring (RPM) Two-Way Active Measurement Protocol (TWAMP) server and control clients. By default, all established sessions are displayed, unless you specify a session ID when you issue the command.

Options *session-id*—(Optional) Identifier of the session that you want to display information about.

Required Privilege Level view

List of Sample Output [show services rpm twamp server session on page 2143](#)

Output Fields [Table 281 on page 2143](#) lists the output fields for the `show services rpm twamp server session` command. Output fields are listed in the approximate order in which they appear.

Table 281: show services rpm twamp server session Output Fields

Field Name	Field Description
Session ID	Session ID that uniquely identifies the session between the TWAMP server and a particular client.
Connection ID	Connection ID that uniquely identifies the connection between the TWAMP server and a particular client.
Sender address	Sender IP address.
Sender port	Sender port number.
Reflector address	Reflector IP address.
Reflector port	Reflector port number.

Sample Output

`show services rpm twamp server session`

```
user@host> show services rpm twamp server session
```

Session ID	Connection ID	Sender address	Sender port	Reflector address	Reflector port
3	6	123.0.0.1	40000	123.0.0.2	40000

show snmp health-monitor

Syntax	<code>show snmp health-monitor <alarms <detail>> <logs></code>
Release Information	Command introduced in Junos OS Release 8.0. Command introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Display information about Simple Network Management Protocol (SNMP) health monitor alarms and logs.
Options	none —Display information about all health monitor alarms and logs. alarms <detail> —(Optional) Display detailed information about health monitor alarms. logs —(Optional) Display information about health monitor logs.
Required Privilege Level	view
List of Sample Output	show snmp health-monitor on page 2147 show snmp health-monitor alarms detail on page 2149
Output Fields	Table 250 on page 2004 describes the output fields for the show snmp health-monitor command. Output fields are listed in the approximate order in which they appear.

Table 282: show snmp health-monitor Output Fields

Field Name	Field Description	Level of Output
Alarm Index	Alarm identifier.	All levels
Variable description	Description of the health monitor object instance being monitored.	All levels
Variable name	Name of the health monitor object instance being monitored.	All levels
Value	Current value of the monitored variable in the most recent sample interval.	All levels

Table 282: *show snmp health-monitor Output Fields (continued)*

Field Name	Field Description	Level of Output
State	<p>State of the alarm or event entry:</p> <ul style="list-style-type: none"> Alarms: <ul style="list-style-type: none"> active—Entry is fully configured and activated. falling threshold crossed—Value of the variable has crossed the lower threshold limit. rising threshold crossed—Value of the variable has crossed the upper threshold limit. under creation—Entry is being configured and is not yet activated. startup—Alarm is waiting for the first sample of the monitored variable. object not available—Monitored variable of that type is not available to the health monitor agent. instance not available—Monitored variable's instance is not available to the health monitor agent. object type invalid—Monitored variable is not a numeric value. object processing errored—An error occurred when the monitored variable was processed. unknown—State is not one of the above. 	All levels
Variable OID	Object ID to which the variable name is resolved. The format is x.x.x.x.	detail
Sample type	Method of sampling the monitored variable and calculating the value to compare against the upper and lower thresholds. It can have the value of absolute value or delta value .	detail
Startup alarm	<p>Alarm that might be sent when this entry is first activated, depending on the following criteria:</p> <ul style="list-style-type: none"> Alarm is sent when one of the following situations exists: <ul style="list-style-type: none"> Value of the alarm is above or equal to the rising threshold and the startup type is either rising alarm or rising or falling alarm. Value of the alarm is below or equal to the falling threshold and the startup type is either falling alarm or rising or falling alarm. Alarm is <i>not</i> sent when one of the following situations exists: <ul style="list-style-type: none"> Value of the alarm is above or equal to the rising threshold and the startup type is falling alarm. Value of the alarm is below or equal to the falling threshold and the startup type is rising alarm. Value of the alarm is between the thresholds. 	detail
Owner	Name of the entry configured by the user. If the entry was created through the CLI, the owner has monitor prepended to it.	detail
Creator	Mechanism by which the entry was configured (Health Monitor).	detail
Sample interval	Time period between samples (in seconds).	detail
Rising threshold	Upper limit threshold value as a percentage of the maximum possible value.	detail

Table 282: *show snmp health-monitor Output Fields (continued)*

Field Name	Field Description	Level of Output
Falling threshold	Lower limit threshold value as a percentage of the maximum possible value.	detail
Rising event index	Event triggered when the rising threshold is crossed.	detail
Falling event index	Event triggered when the falling threshold is crossed.	detail

Sample Output

show snmp health-monitor

```
user@host> show snmp health-monitor
```

```
Alarm
Index  Variable description                               Value State
-----
32768  Health Monitor: root file system utilization
      jnxHrStoragePercentUsed.1                      58 active
32769  Health Monitor: /config file system utilization
      jnxHrStoragePercentUsed.2                      0 active
32770  Health Monitor: RE 0 CPU utilization
      jnxOperatingCPU.9.1.0.0                        0 active
32773  Health Monitor: RE 0 Memory utilization
      jnxOperatingBuffer.9.1.0.0                    35 active
32775  Health Monitor: jkernel daemon CPU utilization
      Init daemon                                    0 active
      Chassis daemon                                50 active
      Firewall daemon                                0 active
      Interface daemon                               5 active
      SNMP daemon                                    11 active
      MIB2 daemon                                    42 active
      Sonet APS daemon                               0 active
      VRRP daemon                                    0 active
      Alarm daemon                                   3 active
      PFE daemon                                     0 active
      CRAFT daemon                                   0 active
      Traffic sampling control daemon                 0 active
      Ilmi daemon                                    0 active
      Remote operations daemon                       0 active
      CoS daemon                                     0 active
      Pic Services Logging daemon                    0 active
      Internal Routing Service Daemon                 3 active
      Network Access Service daemon                  0 active
      Forwarding UDP daemon                           0 active
      Routing socket proxy daemon                    0 active
      Disk Monitoring daemon                          1 active
      Inet daemon                                    0 active
      Syslog daemon                                  0 active
      Adaptive Services PIC daemon                   0 active
      ECC parity errors logging Daemon                0 active
```

	Layer 2 Tunneling Protocol daemon	0 active
	PPPoE daemon	3 active
	Redundancy device daemon	0 active
	PPP daemon	0 active
	Dynamic Flow Capture Daemon	0 active
32776	Health Monitor: jroute daemon CPU utilization	
	Routing protocol daemon	1 active
	Management daemon	0 active
	Management daemon	0 active
	Command line interface	4 active
	Periodic Packet Management daemon	0 active
	Link Management daemon	0 active
	Pragmatic General Multicast daemon	0 active
	Bidirectional Forwarding Detection daemon	0 active
	SRC daemon	0 active
	audit daemon	0 active
	Event daemon	0 active
32777	Health Monitor: jcrypto daemon CPU utilization	
	IPSec Key Management daemon	0 active
32779	Health Monitor: jkernel daemon Memory utilization	
	Init daemon	47384 active
	Chassis daemon	20204 active
	Firewall daemon	1956 active
	Interface daemon	3340 active
	SNMP daemon	4540 active
	MIB2 daemon	3880 active
	Sonet APS daemon	2632 active
	VRRP daemon	2672 active
	Alarm daemon	1856 active
	PFE daemon	2600 active
	CRAFT daemon	2000 active
	Traffic sampling control daemon	3164 active
	Ilmi daemon	2132 active
	Remote operations daemon	2964 active
	CoS daemon	3044 active
	Pic Services Logging daemon	1944 active
	Internal Routing Service Daemon	1392 active
	Network Access Service daemon	1992 active
	Forwarding UDP daemon	1876 active
	Routing socket proxy daemon	1296 active
	Disk Monitoring daemon	1180 active
	Inet daemon	1296 active
	Syslog daemon	1180 active
	Adaptive Services PIC daemon	3220 active
	ECC parity errors logging Daemon	1100 active
	Layer 2 Tunneling Protocol daemon	3372 active
	PPPoE daemon	1424 active
	Redundancy device daemon	1820 active
	PPP daemon	2060 active
	Dynamic Flow Capture Daemon	10740 active
32780	Health Monitor: jroute daemon Memory utilization	
	Routing protocol daemon	8104 active
	Management daemon	13360 active
	Management daemon	19252 active
	Command line interface	9912 active
	Periodic Packet Management daemon	1484 active
	Link Management daemon	2016 active

Pragmatic General Multicast daemon	1968 active
Bidirectional Forwarding Detection daemon	1956 active
SRC daemon	1772 active
audit daemon	1772 active
Event daemon	1808 active
32781 Health Monitor: jcrypto daemon Memory utilization	
IPSec Key Management daemon	5600 active

show snmp health-monitor alarms detail

```
user@host> show snmp health-monitor alarms detail
```

```
Alarm Index 32768:
  Variable name      jnxHrStoragePercentUsed.1
  Variable OID       1.3.6.1.4.1.2636.3.31.1.1.1.1.1
  Sample type        absolute value
  Startup alarm       rising alarm
  Owner               Health Monitor: root file system
                     utilization
  Creator             Health Monitor
  State               active
  Sample interval     300 seconds
  Rising threshold    80
  Falling threshold   70
  Rising event index  32768
  Falling event index 32768
  Instance Value: 58
  Instance State: active

Alarm Index 32769:
  Variable name      jnxHrStoragePercentUsed.2
  Variable OID       1.3.6.1.4.1.2636.3.31.1.1.1.1.2
  Sample type        absolute value
  Startup alarm       rising alarm
  Owner               Health Monitor: /config file system
                     utilization
  Creator             Health Monitor
  State               active
  Sample interval     300 seconds
  Rising threshold    80
  Falling threshold   70
  Rising event index  32768
  Falling event index 32768
  Instance Value: 0
  Instance State: active

Alarm Index 32770:
  Variable name      jnxOperatingCPU.9.1.0.0
  Variable OID       1.3.6.1.4.1.2636.3.1.13.1.8.9.1.0.0
  Sample type        absolute value
  Startup alarm       rising alarm
  Owner               Health Monitor: RE 0 CPU utilization

  Creator             Health Monitor
  State               active
  Sample interval     300 seconds
  Rising threshold    80
```

```

Falling threshold          70
Rising event index        32768
Falling event index       32768
  Instance Value: 0
  Instance State: active

Alarm Index 32773:
  Variable name            jnxOperatingBuffer.9.1.0.0
  Variable OID             1.3.6.1.4.1.2636.3.1.13.1.11.9.1.0.0
  Sample type              absolute value
  Startup alarm            rising alarm
  Owner                   Health Monitor: RE 0 Memory utilization

  Creator                 Health Monitor
  State                   active
  Sample interval         300 seconds
  Rising threshold         80
  Falling threshold       70
  Rising event index      32768
  Falling event index     32768
    Instance Value: 35
    Instance State: active

Alarm Index 32775:
  Variable name            sysAppElmtRunCPU.3
  Variable OID             1.3.6.1.2.1.54.1.2.3.1.9.3
  Sample type              delta value
  Startup alarm            rising alarm
  Owner                   Health Monitor: jkernel daemon CPU
                          utilization

  Creator                 Health Monitor
  State                   active
  Sample interval         300 seconds
  Rising threshold         24000
  Falling threshold       21000
  Rising event index      32768
  Falling event index     32768
    Instance Name: sysAppElmtRunCPU.3.1.1
    Instance Description: Init daemon
    Instance Value: 0
    Instance State: active

    Instance Name: sysAppElmtRunCPU.3.2.2786
    Instance Description: Chassis daemon
    Instance Value: 50
    Instance State: active

    Instance Name: sysAppElmtRunCPU.3.3.2938
    Instance Description: Firewall daemon
    Instance Value: 0
    Instance State: active

    Instance Name: sysAppElmtRunCPU.3.4.2942
    Instance Description: Interface daemon
    Instance Value: 5
    Instance State: active

    Instance Name: sysAppElmtRunCPU.3.7.7332
    Instance Description: SNMP daemon

```

```
Instance Value: 11
Instance State: active

Instance Name: sysAppElemRunCPU.3.9.2914
Instance Description: MIB2 daemon
Instance Value: 42
Instance State: active

Instance Name: sysAppElemRunCPU.3.12.2916
Instance Description: Sonet APS daemon
Instance Value: 0
Instance State: active

Instance Name: sysAppElemRunCPU.3.13.2917
Instance Description: VRRP daemon
Instance Value: 0
Instance State: active

Instance Name: sysAppElemRunCPU.3.14.2787
Instance Description: Alarm daemon
Instance Value: 3
Instance State: active

Instance Name: sysAppElemRunCPU.3.15.2940
Instance Description: PFE daemon
Instance Value: 0
Instance State: active

Instance Name: sysAppElemRunCPU.3.16.2788
Instance Description: CRAFT daemon
Instance Value: 0
Instance State: active

Instance Name: sysAppElemRunCPU.3.17.2918
Instance Description: Traffic sampling control daemon
---(more 23%)---
```

show snmp inform-statistics

Syntax	<code>show snmp inform-statistics</code>
Release Information	<p>Command introduced in Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
Description	Display information about Simple Network Management Protocol (SNMP) inform requests.
Options	This command has no options.
Required Privilege Level	view
List of Sample Output	show snmp inform-statistics on page 2152
Output Fields	Table 251 on page 2011 describes the output fields for the show snmp inform-statistics command. Output fields are listed in the approximate order in which they appear.

Table 283: show snmp inform-statistics Output Fields

Field Name	Field Description
Target Name	Name of the device configured to receive and respond to SNMP informs.
Address	IP address of the target device.
Sent	Number of informs sent to the target device and acknowledged by the target device.
Pending	Number of informs held in memory pending a response from the target device.
Discarded	Number of informs discarded after the specified number of retransmissions to the target device were attempted.
Timeouts	Number of informs that did not receive an acknowledgement from the target device within the timeout specified.
Probe Failures	Connection failures that occurred (for example, when the target server returned invalid content or you incorrectly configured the target address).

Sample Output

show snmp inform-statistics

```
user@host> show snmp inform-statistics
```

Inform Request Statistics:

Target Name: TA1_v3_md5_none Address: 172.17.20.184

Sent: 176, Pending: 0

Discarded: 0, Timeouts: 0, Probe Failures: 0

Target Name: TA2_v3_sha_none Address: 192.168.110.59

Sent: 0, Pending: 4

Discarded: 84, Timeouts: 0, Probe Failures: 258

Target Name: TA5_v2_none Address: 172.17.20.184

Sent: 0, Pending: 0

Discarded: 2, Timeouts: 10, Probe Failures: 0

show snmp mib

Syntax `show snmp mib (get | get-next | walk) (ascii | decimal) object-id`

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 for EX Series switches.
ascii and **decimal** options introduced in Junos OS Release 9.6.
ascii and **decimal** options introduced in Junos OS Release 9.6 for EX Series switches.
 Command introduced in Junos OS Release 11.1 for the QFX Series.
 Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

Description Display local Simple Network Management Protocol (SNMP) Management Information Base (MIB) object values.



NOTE: Starting in Junos OS Release 18.3R1, SNMP queue statistics reporting for static interface-sets configured over Aggregate Ethernet (AE) interfaces is supported.

Options **get**—Retrieve and display one or more SNMP object values.
get-next—Retrieve and display the next SNMP object values.
walk—Retrieve and display the SNMP object values that are associated with the requested object identifier (OID). When you use this option, the Junos OS displays the objects below the subtree that you specify.
ascii—Display the SNMP object's string indices as an ASCII-key representation.
decimal—Display the SNMP object values in the decimal (default) format. The **decimal** option is the default option for this command. Therefore, issuing the **show snmp mib (get | get-next | walk) decimal object-id** and the **show snmp mib (get | get-next | walk) object-id** commands display the same output.
object-id—The object can be represented by a sequence of dotted integers (such as 1.3.6.1.2.1.2) or by its subtree name (such as **interfaces**). When entering multiple objects, enclose the objects in quotation marks.

Required Privilege Level **snmp**—To view this statement in the configuration.

List of Sample Output [show snmp mib get on page 2155](#)
[show snmp mib get \(Multiple Objects\) on page 2155](#)
[show snmp mib get \(Layer 2 Policer\) on page 2155](#)
[show snmp mib get-next on page 2155](#)
[show snmp mib get-next \(Specify an OID\) on page 2155](#)

[show snmp mib walk on page 2156](#)
[show snmp mib walk \(QFX Series\) on page 2156](#)
[show snmp mib walk decimal on page 2156](#)
[show snmp mib walk \(ASCII\) on page 2156](#)
[show snmp mib walk \(Multiple Indices\) on page 2156](#)
[show snmp mib walk decimal \(Multiple Indices\) on page 2156](#)
[show snmp mib walk \(Queue Statistics\) on page 2157](#)

Output Fields [Table 252 on page 2014](#) describes the output fields for the **show snmp mib** command. Output fields are listed in the approximate order in which they appear.

Table 284: show snmp mib Output Fields

Field Name	Field Description
<i>name</i>	Object name and numeric instance value.
<i>object value</i>	Object value. The Junos OS translates OIDs into the corresponding object names.

Sample Output

show snmp mib get

```
user@host> show snmp mib get sysObjectID.0
sysObjectID.0 = jnxProductNameM20
```

show snmp mib get (Multiple Objects)

```
user@host> show snmp mib get "sysObjectID.0 sysUpTime.0"
sysObjectID.0 = jnxProductNameM20
sysUpTime.0 = 1640992
```

show snmp mib get (Layer 2 Policer)

```
user@host> show snmp mib get ifInOctets.25970
ifInOctets.25970 = 7545720
```

show snmp mib get-next

```
user@host> show snmp mib get-next jnxMibs
jnxBoxClass.0 = jnxProductLineM20.0
```

show snmp mib get-next (Specify an OID)

```
user@host> show snmp mib get-next 1.3.6.1
sysDescr.0 = Juniper Networks, Inc. m20 internet router, kernel
Junos OS Release: 2004-1 Build date: build date UTC Copyright (c) 1996-2004 Juniper
Networks, Inc.
```

show snmp mib walk

```
user@host> show snmp mib walk system
sysDescr.0    = Juniper Networks, Inc. m20 internet router, kernel
Junos OS Release #0: 2004-1 Build date: build date UTC Copyright (c) 1996-2004
Juniper Networks, Inc.
sysObjectID.0 = jnxProductNameM20
sysUpTime.0   = 1640992
sysContact.0  = Your contact
sysName.0     = my router
sysLocation.0 = building 1
sysServices.0 = 4
```

show snmp mib walk (QFX Series)

```
user@switch> show snmp mib walk system
sysDescr.0    = Juniper Networks, Inc. qfx3500s internet router, kernel JUNOS
11.1-20100926.0 #0: 2010-09-26 06:17:38 UTC Build date: 2010-09-26 06:00:10
sysObjectID.0 = jnxProductQFX3500
sysUpTime.0   = 138980301
sysContact.0  = System Contact
sysName.0     = LabQFX3500
sysLocation.0 = Lab
sysServices.0 = 4
```

show snmp mib walk decimal

```
user@host> show snmp mib walk decimal jnxUtilData
jnxUtilCounter32Value.102.114.101.100 = 100
```

show snmp mib walk (ASCII)

```
show snmp mib walk ascii jnxUtilData
jnxUtilCounter32Value."fred" = 100
```

show snmp mib walk (Multiple Indices)

```
show snmp mib walk ascii jnxFWCounterByteCount
jnxFWCounterByteCount."fe-1/3/0.0-i"."CLASS_BE-fe-1/3/0.0-i".2 = 0
jnxFWCounterByteCount."fe-1/3/0.0-i"."CLASS_CC-fe-1/3/0.0-i".2 = 0
jnxFWCounterByteCount."fe-1/3/0.0-i"."CLASS_RT-fe-1/3/0.0-i".2 = 0
.....
```

show snmp mib walk decimal (Multiple Indices)

```
show snmp mib walk ascii jnxFWCounterByteCount
jnxFWCounterByteCount."fe-1/3/0.0-i"."CLASS_BE-fe-1/3/0.0-i".2 = 0
jnxFWCounterByteCount."fe-1/3/0.0-i"."CLASS_CC-fe-1/3/0.0-i".2 = 0
jnxFWCounterByteCount."fe-1/3/0.0-i"."CLASS_RT-fe-1/3/0.0-i".2 = 0
.....
```

show snmp mib walk (Queue Statistics)

To get interface-set queue statistics from jnxCosQstatQedPkts MIB with using interface-set SNMP index, use the following command:

```
show snmp mib walk jnxCosQstatQedPkts.interface-set snmp index
```

For example, if the interface-set SNMP index is 67108866

```
show snmp mib walk jnxCosQstatQedPkts.67108866
```

```
jnxCosQstatQedPkts.67108866.0 = 10
jnxCosQstatQedPkts.67108866.1 = 0
jnxCosQstatQedPkts.67108866.2 = 0
jnxCosQstatQedPkts.67108866.3 = 0
jnxCosQstatQedPkts.67108866.4 = 0
jnxCosQstatQedPkts.67108866.5 = 0
jnxCosQstatQedPkts.67108866.6 = 0
jnxCosQstatQedPkts.67108866.7 = 0
```

To get interface-set queue statistics from jnxCosIfsetQstatQedPkts MIB with using interface-set SNMP index, use the following command:

```
show snmp mib walk jnxCosIfsetQstatQedPkts.interface-set snmp index
```

For example, if the interface-set snmp index is 67108866

```
show snmp mib walk jnxCosIfsetQstatQedPkts.67108866
```

```
jnxCosIfsetQstatQedPkts.67108866.0 = 10
jnxCosIfsetQstatQedPkts.67108866.1 = 0
jnxCosIfsetQstatQedPkts.67108866.2 = 0
jnxCosIfsetQstatQedPkts.67108866.3 = 0
jnxCosIfsetQstatQedPkts.67108866.4 = 0
jnxCosIfsetQstatQedPkts.67108866.5 = 0
jnxCosIfsetQstatQedPkts.67108866.6 = 0
jnxCosIfsetQstatQedPkts.67108866.7 = 0
```

To get Interface-set queue statistics from jnxCosIfsetQstatQedPkts MIB using interface-set member IFL SNMP index, use the following command:

```
show snmp mib walk jnxCosIfsetQstatQedPkts.interface-set member IFL SNMP index
```

For example, if the interface-set member IFL SNMP is 519

```
show snmp mib walk jnxCosIfsetQstatQedPkts.519
```

```
jnxCosIfsetQstatQedPkts.519.0 = 10
jnxCosIfsetQstatQedPkts.519.1 = 0
jnxCosIfsetQstatQedPkts.519.2 = 0
jnxCosIfsetQstatQedPkts.519.3 = 0
jnxCosIfsetQstatQedPkts.519.4 = 0
jnxCosIfsetQstatQedPkts.519.5 = 0
jnxCosIfsetQstatQedPkts.519.6 = 0
jnxCosIfsetQstatQedPkts.519.7 = 0
```

show snmp rmon

Syntax	<code>show snmp rmon</code> <code><alarms <brief detail> events <brief detail> logs></code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Display information about Simple Network Management Protocol (SNMP) Remote Monitoring (RMON) alarms, events, and logs.
Options	none —Display information about all RMON alarms and events. alarms —(Optional) Display information about RMON alarms. brief detail —(Optional) Display brief or detailed information about RMON alarms or events. events —(Optional) Display information about RMON events. logs —(Optional) Display information about RMON monitoring logs.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• RMON MIB Event, Alarm, Log, and History Control Tables on page 382• Monitoring RMON MIB Tables on page 264• Configuring RMON Alarms and Events on page 276• Understanding RMON on page 377• clear snmp statistics on page 1996• clear snmp history on page 2076• show snmp rmon history on page 2022
List of Sample Output	show snmp rmon on page 2160 show snmp rmon (QFX Series) on page 2161 show snmp rmon alarms detail on page 2161 show snmp rmon events detail on page 2161 show snmp rmon logs (QFX Series) on page 2161
Output Fields	Table 253 on page 2018 describes the output fields for the show snmp rmon command. Output fields are listed in the approximate order in which they appear.

Table 285: *show snmp rmon Output Fields*

Field Name	Field Description	Level of Output
Alarm Index	Alarm identifier.	All levels
State	<p>State of the alarm or event entry:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • active—Entry is fully configured and activated. • falling threshold crossed—Value of the variable has crossed the lower threshold limit. • rising threshold crossed—Value of the variable has crossed the upper threshold limit. • under creation—Entry is being configured and is not yet activated. • startup—Alarm is waiting for the first sample of the monitored variable. • object not available—Monitored variable of that type is not available to the SNMP agent. • instance not available—Monitored variable's instance is not available to the SNMP agent. • object type invalid—Monitored variable is not a numeric value. • object processing errored—An error occurred when the monitored variable was processed. • unknown—State is not one of the above. <p>Events:</p> <ul style="list-style-type: none"> • active—Entry has been fully configured and activated. • under creation—Entry is being configured and is not yet activated. • unknown—State is not one of the above. 	All levels
Variable name	Name of the SNMP object instance being monitored.	All levels
Event Index	Event identifier.	All levels
Type	<p>Type of notification made when an event is triggered. It can be one of the following:</p> <ul style="list-style-type: none"> • log—A system log message is generated and an entry is made to the log table. • snmptrap—An SNMP trap is sent to the configured destination. • log and trap—A system log message is generated, an entry is made to the log table, and an SNMP trap is sent to the configured destination. • none—Neither log nor trap will be sent. 	detail
Last Event	Date and time of the last event. It has the format <i>yyyy-mm-dd hh:mm:ss timezone</i> .	brief
Community	Trap group used for sending the SNMP trap.	detail
Variable OID	Object ID to which the variable name is resolved. The format is <i>x.x.x.x</i> .	detail
Sample type	Method of sampling the monitored variable and calculating the value to compare against the upper and lower thresholds. It can have the value of absolute value or delta value .	detail

Table 285: *show snmp rmon Output Fields (continued)*

Field Name	Field Description	Level of Output
Startup alarm	Alarm that might be sent when this entry is first activated, depending on the following criteria: <ul style="list-style-type: none"> Alarm is sent when one of the following situations exists: <ul style="list-style-type: none"> Value of the alarm is above or equal to the rising threshold and the startup type is either rising alarm or rising or falling alarm. Value of the alarm is below or equal to the falling threshold and the startup type is either falling alarm or rising or falling alarm. Alarm is <i>not</i> sent when one of the following situations exists: <ul style="list-style-type: none"> Value of the alarm is above or equal to the rising threshold and the startup type is falling alarm. Value of the alarm is below or equal to the falling threshold and the startup type is rising alarm. Value of the alarm is between the thresholds. 	detail
Owner	Name of the entry configured by the user. If the entry was created through the CLI, the owner has monitor prepended to it.	detail
Creator	Mechanism by which the entry was configured (CLI or SNMP).	detail
Sample interval	Time period between samples (in seconds).	detail
Rising threshold	Upper limit threshold value configured by the user.	detail
Falling threshold	Lower limit threshold value configured by the user.	detail
Rising event index	Event triggered when the rising threshold is crossed.	detail
Falling event index	Event triggered when the falling threshold is crossed.	detail
Current value	Current value of the monitored variable in the most recent sample interval.	detail

Sample Output

show snmp rmon

```
user@host> show snmp rmon
```

```
Alarm
Index  State                      Variable name
   1   falling threshold crossed  ifInOctets.1

Event
Index  Type                        Last Event
   1   log and trap              2002-01-30 01:13:01 PST
```

show snmp rmon (QFX Series)

```
user@host> show snmp rmon
```

Alarm		Value	State
Index	Variable description		
5	monitor jnxOperatingCPU.9.1.0.0	5	falling threshold

Event		Last Event
Index	Type	
1	log and trap	2009-07-10 11:34:17 PDT

Event Index: 1

Description: Event 1 triggered by Alarm 5, rising threshold (90) crossed, (variable: jnxOperatingCPU.9.1.0.0, value: 100)

Time: 2009-07-10 11:34:07 PDT

Description: Event 1 triggered by Alarm 5, falling threshold (75) crossed, (variable: jnxOperatingCPU.9.1.0.0, value: 5)

Time: 2009-07-10 11:34:17 PDT

show snmp rmon alarms detail

```
user@host> show snmp rmon alarms detail
```

Alarm Index 1:	
Variable name	ifInOctets.1
Variable OID	1.3.6.1.2.1.2.2.1.10.1
Sample type	delta value
Startup alarm	rising or falling alarm
Owner	monitor
Creator	CLI
State	falling threshold crossed
Sample interval	60 seconds
Rising threshold	100000
Falling threshold	80000
Rising event index	1
Falling event index	1
Current value	0

show snmp rmon events detail

```
user@host> show snmp rmon events detail
```

Event Index 1:	
Description	rmon event
Type	log and trap
Community	rmon-trap-group
Last event	2009-07-10 11:34:17 PDT
Creator	CLI
State	active

show snmp rmon logs (QFX Series)

```
user@host> show snmp rmon logs
```

Event Index: 1

Description: Event 1 triggered by Alarm 5, rising threshold (90) crossed, (variable: jnxOperatingCPU.9.1.0.0, value: 100)

Time: 2009-07-10 11:34:07 PDT
Description: Event 1 triggered by Alarm 5, falling threshold (75) crossed,
(variable: jnxOperatingCPU.9.1.0.0, value: 5)
Time: 2009-07-10 11:34:17 PDT

show snmp statistics

Syntax	<code>show snmp statistics</code> <code><subagents></code>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p> <p>Option subagents introduced in Junos OS Release 14.2.</p>
Description	Display statistics about Simple Network Management Protocol (SNMP) packets sent and received by the router or switch.
Options	subagents —(Optional) Display the statistics of the protocol data unit (PDU), the number of SNMP requests and responses per subagent, and the SNMP statistics received from each subagent per logical system.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear snmp statistics on page 1996
List of Sample Output	<p>show snmp statistics on page 2168</p> <p>show snmp statistics subagents on page 2168</p>
Output Fields	<p>Table 255 on page 2027 describes the output fields for the show snmp statistics command.</p> <p>Output fields are listed in the approximate order in which they appear.</p>

Table 286: *show snmp statistics Output Fields*

Field Name	Field Description
Input	<p>Information about received packets:</p> <ul style="list-style-type: none"> • Packets(snmplnPkts)—Total number of messages delivered to the SNMP entity from the transport service. • Bad versions—(snmplnBadVersions) Total number of messages delivered to the SNMP entity that were for an unsupported SNMP version. • Bad community names—(snmplnBadCommunityNames) Total number of messages delivered to the SNMP entity that used an SNMP community name not known to the entity. • Bad community uses—(snmplnBadCommunityUses) Total number of messages delivered to the SNMP entity that represented an SNMP operation that was not allowed by the SNMP community named in the message. • ASN parse errors—(snmplnASNParseErrs) Total number of ASN.1 or BER errors encountered by the SNMP entity when decoding received SNMP messages. • Too big—(snmplnTooBigs) Total number of SNMP PDUs delivered to the SNMP entity with an error status field of tooBig. • No such names—(snmplnNoSuchNames) Total number of SNMP PDUs delivered to the SNMP entity with an error status field of noSuchName. • Bad values—(snmplnBadValues) Total number of SNMP PDUs delivered to the SNMP entity with an error status field of badValue. • Read only—(snmplnReadOnly) Total number of valid SNMP PDUs delivered to the SNMP entity with an error status field of readOnly. Only incorrect implementations of SNMP generate this error.

Table 286: *show snmp statistics Output Fields (continued)*

Field Name	Field Description
Input (continued)	<ul style="list-style-type: none"> • General errors—(snmpInGenErrs) Total number of SNMP PDUs delivered to the SNMP entity with an error status field of genErr. • Total requests varbinds—(snmpInTotalReqVars) Total number of MIB objects retrieved successfully by the SNMP entity as a result of receiving valid SNMP GetRequest and GetNext PDUs. • Total set varbinds—(snmpInSetVars) Total number of MIB objects modified successfully by the SNMP entity as a result of receiving valid SNMP SetRequest PDUs. • Get requests—(snmpInGetRequests) Total number of SNMP GetRequest PDUs that have been accepted and processed by the SNMP entity. • Get nexts—(snmpInGetNexts) Total number of SNMP GetNext PDUs that have been accepted and processed by the SNMP entity. • Set requests—(snmpInSetRequests) Total number of SNMP SetRequest PDUs that have been accepted and processed by the SNMP entity. • Get responses—(snmpInGetResponses) Total number of SNMP GetResponse PDUs that have been accepted and processed by the SNMP entity. • Traps—(snmpInTraps) Total number of SNMP traps generated by the SNMP entity. • Silent drops—(snmpSilentDrops) Total number of GetRequest, GetNextRequest, GetBulkRequest, SetRequests, and InformRequest PDUs delivered to the SNMP entity that were silently dropped because the size of a reply containing an alternate response PDU with an empty variable-bindings field was greater than either a local constraint or the maximum message size associated with the originator of the requests. • Proxy drops—(snmpProxyDrops) Total number of GetRequest, GetNextRequest, GetBulkRequest, SetRequests, and InformRequest PDUs delivered to the SNMP entity that were silently dropped because the transmission of the message to a proxy target failed in such a way (other than a timeout) that no response PDU could be returned. • Commit pending drops—Number of SNMP packets for Set requests dropped because of a previous pending SNMP Set request on the committed configuration. • Throttle drops—Number of SNMP packets for any requests dropped reaching the throttle limit.

Table 286: *show snmp statistics Output Fields (continued)*

Field Name	Field Description
V3 Input	<p>Information about SNMP version 3 packets:</p> <ul style="list-style-type: none"> • Unknown security models—(snmpUnknownSecurityModels) Total number of packets received by the SNMP engine that were dropped because they referenced a security model that was not known to or supported by the SNMP engine. • Invalid messages—(snmpInvalidMsgs) Number of packets received by the SNMP engine that were dropped because there were invalid or inconsistent components in the SNMP message. • Unknown pdu handlers—(snmpUnknownPDUHandlers) Number of packets received by the SNMP engine that were dropped because the PDU contained in the packet could not be passed to an application responsible for handling the PDU type. • Unavailable contexts—(snmpUnavailableContexts) Number of requests received for a context that is known to the SNMP engine, but is currently unavailable. • Unknown contexts—(snmpUnknownContexts) Total number of requests received for a context that is unknown to the SNMP engine. • Unsupported security levels—(usmStatsUnsupportedSecLevels) Total number of packets received by the SNMP engine that were dropped because they requested a security level unknown to the SNMP engine (or otherwise unavailable). • Not in time windows—(usmStatsNotInTimeWindows) Total number of packets received by the SNMP engine that were dropped because they appeared outside the authoritative SNMP engine's window. • Unknown user names—(usmStatsUnknownUserNames) Total number of packets received by the SNMP engine that were dropped because they referenced a user that was not known to the SNMP engine. • Unknown engine ids—(usmStatsUnknownEngineIDs) Total number of packets received by the SNMP engine that were dropped because they referenced an SNMP engine ID that was not known to the SNMP engine. • Wrong digests—(usmStatsWrongDigests) Total number of packets received by the SNMP engine that were dropped because they did not contain the expected digest value. • Decryption errors—(usmStatsDecryptionErrors) Total number of packets received by the SNMP engine that were dropped because they could not be decrypted.

Table 286: *show snmp statistics Output Fields (continued)*

Field Name	Field Description
Output	<p>Information about transmitted packets:</p> <ul style="list-style-type: none"> • Packets—(snmpOutPkts) Total number of messages passed from the SNMP entity to the transport service. • Too big—(snmpOutTooBigs) Total number of SNMP PDUs generated by the SNMP entity with an error status field of tooBig. • No such names—(snmpOutNoSuchNames) Total number of SNMP PDUs delivered to the SNMP entity with an error status field of noSuchName. • Bad values—(snmpOutBadValues) Total number of SNMP PDUs generated by the SNMP entity with an error status field of badValue. • General errors—(snmpOutGenErrs) Total number of SNMP PDUs generated by the SNMP entity with an error status field of genErr. • Get requests—(snmpOutGetRequests) Total number of SNMP GetRequest PDUs generated by the SNMP entity. • Get nexts—(snmpOutGetNexts) Total number of SNMP GetNext PDUs generated by the SNMP entity. • Set requests—(snmpOutSetRequests) Total number of SNMP SetRequest PDUs generated by the SNMP entity. • Get responses—(snmpOutGetResponses) Total number of SNMP GetResponse PDUs generated by the SNMP entity. • Traps—(snmpOutTraps) Total number of SNMP traps generated by the SNMP entity.

Table 256 on page 2030 describes the output fields for the **show snmp statistics subagents** command. Output fields are listed in the approximate order in which they appear.

Table 287: *show snmp statistics subagents Output Fields*

Field Name	Field Description
Subagent	Location of the SNMP subagent.
Request PDUs	Number of PDUs requested by the SNMP manager.
Response PDUs	Number of response PDUs sent by the SNMP subagent.
Request Variables	Number of variable bindings on the PDUs requested by the SNMP manager.
Response Variables	Number of variable bindings on the PDUs sent by the SNMP subagent.
Average Response Time	Average time taken by the SNMP subagent to send statistics response.
Maximum Response Time	Maximum time taken by the SNMP subagent to send the statistics response.

Sample Output

show snmp statistics

```
user@host> show snmp statistics
```

```
SNMP statistics:
Input:
  Packets: 246213, Bad versions: 12, Bad community names: 12,
  Bad community uses: 0, ASN parse errors: 96,
  Too bigs: 0, No such names: 0, Bad values: 0,
  Read onlys: 0, General errors: 0,
  Total request varbinds: 227084, Total set varbinds: 67,
  Get requests: 44942, Get nexts: 190371, Set requests: 10712,
  Get responses: 0, Traps: 0,
  Silent drops: 0, Proxy drops: 0, Commit pending drops: 0,
  Throttle drops: 0,
V3 Input:
  Unknown security models: 0, Invalid messages: 0
  Unknown pdu handlers: 0, Unavailable contexts: 0
  Unknown contexts: 0, Unsupported security levels: 1
  Not in time windows: 0, Unknown user names: 0
  Unknown engine ids: 44, Wrong digests: 23, Decryption errors: 0
Output:
  Packets: 246093, Too bigs: 0, No such names: 31561,
  Bad values: 0, General errors: 2,
  Get requests: 0, Get nexts: 0, Set requests: 0,
  Get responses: 246025, Traps: 0
```

show snmp statistics subagents

```
user@host> show snmp statistics subagents
```

```
Subagent: /var/run/cosd-20
  Request PDUs: 0, Response PDUs: 0,
  Request Variables: 0, Response Variables: 0,
  Average Response Time(ms): 0.00,
  Maximum Response Time(ms): 0.00

Subagent: /var/run/pfed-30
  Request PDUs: 0, Response PDUs: 0,
  Request Variables: 0, Response Variables: 0,
  Average Response Time(ms): 0.00,
  Maximum Response Time(ms): 0.00

Subagent: /var/run/rmopd-15
  Request PDUs: 0, Response PDUs: 0,
  Request Variables: 0, Response Variables: 0,
  Average Response Time(ms): 0.00,
  Maximum Response Time(ms): 0.00

Subagent: /var/run/chassisd-30
  Request PDUs: 33116, Response PDUs: 33116,
  Request Variables: 33116, Response Variables: 33116,
  Average Response Time(ms): 1.83,
  Maximum Response Time(ms): 203.48

Subagent: /var/run/pkid-13
  Request PDUs: 0, Response PDUs: 0,
```

```
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00  
  
Subagent: /var/run/apspd-13  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00  
  
Subagent: /var/run/dfcd-32  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00  
  
Subagent: /var/run/mib2d-33  
Request PDUs: 74211, Response PDUs: 74211,  
Request Variables: 74211, Response Variables: 74211,  
Average Response Time(ms): 2.30,  
Maximum Response Time(ms): 51.04  
  
Subagent: /var/run/license-check-16  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00  
  
Subagent: /var/run/craftd-14  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00  
  
Subagent: /var/run/bfdd-19  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00  
  
Subagent: /var/run/smihelperd-24  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00  
  
Subagent: /var/run/cfmd-18  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00  
  
Subagent: /var/run/rpd_snmp  
Request PDUs: 0, Response PDUs: 0,  
Request Variables: 0, Response Variables: 0,  
Average Response Time(ms): 0.00,  
Maximum Response Time(ms): 0.00  
  
Subagent: /var/run/l2tpd-18  
Request PDUs: 0, Response PDUs: 0,
```

Request Variables: 0, Response Variables: 0,
Average Response Time(ms): 0.00,
Maximum Response Time(ms): 0.00

show snmp stats-response-statistics

Syntax	show snmp stats-response-statistics
Release Information	Command introduced in Junos OS Release 14.2.
Description	Display statistics of SNMP statistics responses sent from the Packet Forwarding Engine during the MIB II process (mib2d).
Options	This command has no options.
Required Privilege Level	view
List of Sample Output	show snmp stats-response-statistics on page 2172
Output Fields	Table 288 on page 2171 describes the output fields for the show snmp stats-response-statistics command. Output fields are listed in the approximate order in which they appear.

Table 288: show snmp stats-response-statistics Output Fields

Field Name	Field Description
Average response time statistics	<p>Display the average response time in milliseconds per protocol data unit (PDU) by snmpd. It includes the following information:</p> <ul style="list-style-type: none"> • Stats Type—Type of SNMP statistics. • Stats Responses—Number of SNMP statistics responses received from the Packet Forwarding Engine. • Average Response Time—Average time taken to receive the statistics response from the Packet Forwarding Engine in milliseconds.
Bucket statistics	<p>Information about SNMP statistics responses:</p> <ul style="list-style-type: none"> • Bucket Type—Category of time intervals in which SNMP statistics responses are received from the Packet Forwarding Engine. • Stats Responses—Number of SNMP statistics responses received from the Packet Forwarding Engine.
Bad responses	<p>Information about top 20 bad responses from a subagent:</p> <ul style="list-style-type: none"> • Response—Time taken to receive the SNMP statistics response from the Packet Forwarding Engine in milliseconds. • Request Time—Date and time of SNMP request. • Key—Display the attribute of SNMP Stats Type. For example, in the case of SNMP statistics responses for interfaces, the Key value is SNMP ifIndex, and for firewalls, the Key value is the filter name.

Sample Output

show snmp stats-response-statistics

```
user@host> show snmp stats-response-statistics
```

Average response time statistics:

Stats Type	Stats Responses	Average Response Time (ms)
ifd(non ae)	34182	175.48
ifd(ae)	0	0.00
ifl(non ae)	5472	5.40
ifl(ae)	0	0.00
firewall	15	1141.73

Bucket statistics:

Bucket Type(ms)	Stats Responses
0 - 10	39078
11 - 50	588
51 - 100	0
101 - 200	0
201 - 500	1
501 - 1000	2
1001 - 2000	0
2001 - 5000	0
More than 5001	0

Bad responses:

Response (ms)	Request Time (UTC)	Stats Type	Key
927.80	2014-03-26 05:44:16	firewall	__default_arp_policer__
908.68	2014-03-26 05:44:16	firewall	__default_bpdu_filter__
421.00	2014-03-26 05:46:25	ifd(non ae)	504
49.76	2014-04-13 04:15:18	ifd(non ae)	503
49.62	2014-04-13 04:30:18	ifd(non ae)	504
48.52	2014-04-05 10:06:55	ifd(non ae)	504
47.61	2014-04-11 04:06:27	ifd(non ae)	505
47.38	2014-04-13 03:30:18	ifd(non ae)	501
47.22	2014-03-27 20:08:07	ifd(non ae)	502
46.26	2014-03-31 13:08:58	ifd(non ae)	506
46.00	2014-04-13 04:00:18	ifd(non ae)	503
45.95	2014-04-05 17:15:17	ifd(non ae)	503
45.75	2014-04-15 13:06:10	ifd(non ae)	507
45.60	2014-04-01 03:07:28	ifd(non ae)	517
45.56	2014-04-08 13:09:15	ifd(non ae)	502
45.23	2014-04-13 03:15:18	ifd(non ae)	501
45.15	2014-04-05 16:45:17	ifd(non ae)	501
44.74	2014-04-08 22:08:47	ifd(non ae)	505
44.10	2014-04-05 16:30:17	ifd(non ae)	501
44.00	2014-04-08 09:09:23	ifd(non ae)	524

show snmp v3

Syntax	<code>show snmp v3</code> <code><access <brief detail> community general groups notify <filter> target <address parameters> users></code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Display the Simple Network Management Protocol version 3 (SNMPv3) operating configuration.
Options	<p>none—Display all of the SNMPv3 operating configuration.</p> <p>access—(Optional) Display SNMPv3 access information.</p> <p>brief detail—(Optional) Display brief or detailed information about SNMPv3 access information.</p> <p>community—(Optional) Display SNMPv3 community information.</p> <p>general—(Optional) Display SNMPv3 general information.</p> <p>groups—(Optional) Display SNMPv3 security-to-group information.</p> <p>notify <filter>—(Optional) Display SNMPv3 notify and, optionally, notify filter information.</p> <p>target <address parameters>—(Optional) Display SNMPv3 target and, optionally, either target address or target parameter information.</p> <p>users—(Optional) Display SNMPv3 user information.</p>
Additional Information	To edit the default display of the show snmp v3 command, specify options in the show statement at the [edit snmp v3] hierarchy level.
Required Privilege Level	view
List of Sample Output	show snmp v3 on page 2175
Output Fields	Table 257 on page 2035 describes the output fields for the show snmp v3 command. Output fields are listed in the approximate order in which they appear.

Table 289: *show snmp v3 Output Fields*

Field Name	Field Description
Access control	<p>Information about access control:</p> <ul style="list-style-type: none"> • Group—Group name for which the configured access privileges apply. The group, together with the context prefix and the security model and security level, forms the index for this table. • Context prefix—SNMPv3 context for which the configured access privileges apply. • Security model/level—Security model and security level for which the configuration access privileges apply. • Read view—Identifies the MIB view applied to SNMPv3 read operations. • Write view—Identifies the MIB view applied to SNMPv3 write operations. • Notify view—Identifies the MIB view applied to outbound SNMP notifications.
Engine	<p>Information about local engine configuration:</p> <ul style="list-style-type: none"> • Local engine ID—Identifier that uniquely and unambiguously identifies the local SNMPv3 engine. • Engine boots—Number of times the local SNMPv3 engine has rebooted or reinitialized since the engine ID was last changed. • Engine time—Number of seconds since the local SNMPv3 engine was last rebooted or reinitialized. • Max msg size—Maximum message size the sender can accommodate.
Engine ID	<p>Information about engine ID:</p> <ul style="list-style-type: none"> • Local engine ID—Identifier that uniquely and unambiguously identifies the local SNMPv3 engine. • Engine boots—Number of times the local SNMPv3 engine has rebooted or reinitialized since the engine ID was last changed. • Engine time—Number of seconds since the local SNMPv3 engine was last rebooted or reinitialized. • Max msg size—Maximum message size the sender can accommodate. • Engine ID—SNMPv3 engine ID associated with each user. • User—SNMPv3 user. • Auth/Priv—Authentication and encryption algorithm available for use by each user. • Storage—Indicates whether a user is saved to the configuration file (nonvolatile) or not (volatile). Applies only to users with active status. • Status—Status of the conceptual row. Only rows with an active status are used by the SNMPv3 engine.
Group name	Name of the group to which this entry belongs.
Security model	Identifies the security model context for the security name.
Security name	Used with the security model; identifies a specific security name instance. Each security model/security name combination can be assigned to a specific group.
Storage type	Indicates whether a user is saved to the configuration file (nonvolatile) or not (volatile). Applies only to users with active status.
Status	Status of the conceptual row. Only rows with active status are used by the SNMPv3 engine.

Sample Output

show snmp v3

```
user@host> show snmp v3
```

```
Local engine ID: 80 00 0a 4c e04 31 32 33 34
```

```
Engine boots: 38
```

```
Engine time: 64583 seconds
```

```
Max msg size: 2048 bytes
```

```
Engine ID: local
```

User	Auth/Priv	Storage	Status
user1	md5/des	nonvolatile	active
user2	sha/none	nonvolatile	active
user3	none/none	nonvolatile	active

```
Engine ID: 81 00 0a 4c 04 64 64 64 64
```

User	Auth/Priv	Storage	Status
UNEW	md5/none	nonvolatile	active

Group name	Security model	Security name	Storage type	Status
g1	usm	user1	nonvolatile	active
g2	usm	user2	nonvolatile	active
g3	usm	user3	nonvolatile	active

```
Access control:
```

Group	Context prefix	Security model/level	Read view	Write view	Notify view
g1		usm/privacy	v1	v1	
g2		usm/authent	v1	v1	
g3		usm/none	v1	v1	

show system alarms

Syntax	show system alarms
Release Information	Command introduced in Junos OS Release 11.1 for SRX Series devices.
Description	Display active system alarms.
Options	This command has no options.
Additional Information	System alarms are preset. You cannot modify them, although you can configure them to appear automatically in the J-Web user interface or CLI. They include a configuration alarm that appears when no rescue configuration alarm is set and a license alarm that appears when a software feature is configured but no valid license is configured for the feature.
Required Privilege Level	admin
List of Sample Output	show system alarms on page 2176

Sample Output

show system alarms

```
user@host> show system alarms

5 alarms currently active
Alarm time           Class  Description
2012-05-29 16:47:18 UTC Major  /var partition usage crossed critical threshold
2012-05-29 16:47:18 UTC Minor  /var partition usage crossed high threshold
2012-05-29 16:47:18 UTC Major  /root partition usage crossed critical threshold
2012-05-29 16:47:18 UTC Minor  /root partition usage crossed high threshold
2012-05-29 16:47:18 UTC Minor  Rescue configuration is not set
```

show system alarms

Syntax	show system alarms
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
Description	Display active system alarms.
Options	This command has no options.
Additional Information	<p>System alarms are preset. You cannot modify them, although you can configure them to appear automatically in the J-Web user interface or CLI. They include a <i>configuration</i> alarm that appears when no rescue configuration alarm is set and a <i>license</i> alarm that appears when a software feature is configured and no valid license is configured for the feature. You can also determine when a license will expire from syslog messages that appear starting from four weeks before expiry of the license. On EX6200 switches, an alarm can be triggered by an internal link error.</p> <p>The logic for multiple feature licenses is based on the highest validity among the licenses. Also, for capacity non-cumulative, exclusive type licenses (such as for scale), the logic is based on the highest validity of the license.</p>



NOTE: As of Junos OS Release 17.3R1, the logic for multiple capacity type licenses and when their expiry raises alarms was changed. Before, the behavior had alarms and syslog messages for expiring licenses raised based on the highest validity, which would mislead users in the case of a license expiring earlier than the highest validity license. The newer behavior has the about-to-expire logic based on the first expiring license.

For more information about system alarms, see the *Junos OS Administration Library*.

In Junos OS release 11.1 and later, alarms for fans also show the slot number of the malfunctioning fans in the CLI output.

Starting with Junos OS Release 13.2, you can view degraded fabric alarms on a routing matrix based on TX Matrix Plus router with 3D SiBs. The alarm indicates that the source FPC is running with a degraded fabric condition. This alarm is an early warning of a possible fabric black-hole condition. When the degraded fabric alarm is raised on the source FPC, you can take remedial action to avoid a fabric black-hole condition. The degraded fabric alarm is raised on the source FPC if both the following conditions are met:

- The active Packet Forwarding Engine destinations are reachable on one or no active switching planes.
- At least one of the inactive switching planes has a fault that causes the destination Packet Forwarding Engine to become unreachable.

Required Privilege Level view

Related Documentation

- *show chassis alarms*

List of Sample Output [show system alarms on page 2178](#)
[show system alarms \(Fan Tray\) on page 2178](#)
[show system alarms \(QFX Series and OCX Series\) on page 2179](#)
[show system alarms \(EX6200\) on page 2179](#)
[show system alarms \(TX Matrix Plus router with 3D SIBs\) on page 2179](#)

Output Fields [Table 290 on page 2178](#) lists the output fields for the **show system alarms** command. Output fields are listed in the approximate order in which they appear.

Table 290: show system alarms Output Fields

Field Name	Field Description
Alarm time	Date and time the alarm was first recorded.
Class	Severity class for this alarm: Minor or Major .
Description	Information about the alarm.

Sample Output

[show system alarms](#)

```
user@host> show system alarms
```

```
2 alarms currently active
```

Alarm time	Class	Description
2005-02-24 17:29:34 UTC	Minor	IPsec VPN tunneling usage requires a license
2005-02-24 17:29:34 UTC	Minor	Rescue configuration is not sent

[show system alarms \(Fan Tray\)](#)

```
user@host> show system alarms
```

```
4 alarms currently active
```

Alarm time	Class	Description
2010-11-11 20:27:38 UTC	Major	Side Fan Tray 7 Failure
2010-11-11 20:27:13 UTC	Minor	Side Fan Tray 7 Overspeed
2010-11-11 20:27:13 UTC	Major	Side Fan Tray 5 Failure
2010-11-11 20:27:13 UTC	Major	Side Fan Tray 0 Failure

show system alarms (QFX Series and OCX Series)

```
user@switch> show system alarms

2 alarms currently active
Alarm time Class Description
2005-02-24 17:29:34 UTC Minor Rescue configuration is not sent
```

show system alarms (EX6200)

```
user@switch> show system alarms

2 alarms currently active
Alarm time      Class  Description
2013-04-05 16:51:41 PDT  Major  FPC 8 internal link errors detected
2013-04-04 18:05:35 PDT  Minor  Rescue configuration is not set
```

show system alarms (TX Matrix Plus router with 3D SIBs)

```
user@router> show system alarms

sfc0-re0:
-----
2 alarms currently active
Alarm time      Class  Description
2013-05-08 18:13:58 UTC  Major  LCC 0 Major Errors
2013-05-08 17:48:46 UTC  Major  LCC 7 Major Errors

lcc0-re1:
-----
1 alarm currently active
Alarm time      Class  Description
2013-05-08 18:19:24 UTC  Major  FPC 1 degraded fabric condition detected

lcc7-re0:
-----
1 alarm currently active
Alarm time      Class  Description
2013-05-08 18:19:24 UTC  Major  FPC 7 degraded fabric condition detected
```

show system resource-monitor fpc

Syntax	<code>show system resource-monitor fpc slot-number</code>
Release Information	<p>Command introduced in Junos OS Release 15.1 for MX80, MX104, MX240, MX480, MX960, MX2010, and MX2020 routers.</p> <p>Command introduced in Junos OS Release 16.1 for EX9200 switches.</p>
Description	<p>Display the utilization of memory resources on the Packet Forwarding Engines of an FPC. The filter memory denotes the filter counter memory used for firewall filter counters. The asterisk (*) displayed next to each of the memory regions denotes the ones for which the configured threshold is being currently exceeded.</p>
Options	<p>fpc slot-number—Display the Junos OS utilization information of memory resources for the specified slot number in which the FPC is installed.</p> <ul style="list-style-type: none"> MX80 router—Replace fpc-slot with a value from 1. This command is not supported on FPC slot 0. MX104 router—Replace fpc-slot with a value from 0 through 2. MX240 router—Replace fpc-slot with a value from 0 through 2. MX480 router—Replace fpc-slot with a value from 0 through 5. MX-960 router—Replace fpc-slot with a value from 0 through 11. MX2010 router—Replace fpc-slot-number with a value from 0 through 9. MX2020 router—Replace fpc-slot-number with a value from 0 through 19. EX9204 switches—Replace fpc-slot-number with a value from 0 through 2. EX9208 switches—Replace fpc-slot-number with a value from 0 through 5. EX9214 switches—Replace fpc-slot-number with a value from 0 through 11.
Additional Information	<p>The filter memory denotes the filter counter memory used for firewall filter counters. From the Ukern perspective, MPC5E contains only one Packet Forwarding Engine instance. The show chassis fabric plane command output displays the state of fabric plane connections to the Packet Forwarding Engine. Because two Packet Forwarding Engines exist, you notice PFE-0 and PFE-1 in the output.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> <code>show system resource-monitor ifd-cos-queue-mapping fpc</code> <code>show system resource-monitor subscribers-limit</code>

List of Sample Output [show system resource-monitor fpc on page 2181](#)

Output Fields [Table 291 on page 2181](#) lists the output fields for the **show system resource-monitor fpc** command. Output fields are listed in the approximate order in which they appear.

Table 291: show system resource-monitor fpc Output Fields

Field Name	Field Description
Free Heap Memory Watermark	Configured watermark value for the percentage of free memory space used for ukernel or heap memory to be monitored
Free FW Memory Watermark	Configured watermark value for the percentage of free memory space used for firewall or filter memory to be monitored
Free NH Memory Watermark	Configured watermark value for the percentage of free memory space used for next-hop memory to be monitored
* - watermark reached	An asterix (*) displayed beside any of the memory regions denotes the memory types for which the configured threshold is being currently exceeded.
Slot #	Slot number in which the line card is installed
PFE #	Number or identifier of the Packet Forwarding Engine in the specified line card slot
Heap % free	Percentage of free space associated with heap or ukernel memory
Encap mem % free	Percentage of free space associated with encapsulation memory
NH mem % free	Percentage of free space associated with next-hop memory
Filter / FW mem % free	Percentage of free space associated with firewall or filter memory

Sample Output

[show system resource-monitor fpc](#)

```

user@host> show system resource-monitor fpc

FPC Resource Usage Summary

Throttle           : Enabled
Heap Mem Threshold : 80 %
Round Trip Delay Threshold :120 ms
IFL Counter Threshold : 80 %

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Filter Counter Threshold : 80 %
Expansion Threshold      : 95 %
MFS threshold           : 80 %      Used : 1
Slot # 1
  Client allowed         : Yes
  Service allowed        : Yes
  Client denied          : 0         Performance Denial Client : 0
  Service denied         : 0         Performance Denial Service : 0
  Heap memory used       : 183985808 In % : 9
  Average Round-trip Delay : 127 ms
  Round Trip Delay : 130 ms *      MAX session rate allowed(%) : 80
    Filter memory      IFL memory      Expansion memory
    PFE #      used | %      used | %      used | %
    0      29696      0      5056      0      0      0
    1      29536      0      4896      0      0      0
Slot # 2
  Client allowed         : Yes
  Service allowed        : Yes
  Client denied          : 0         Performance Denial Client : 0
  Service denied         : 0         Performance Denial Service : 0
  Heap memory used       : 183982960 In % : 9
  Average Round-trip Delay : 98 ms
  Round Trip Delay : 100 ms      MAX session rate allowed(%) : 100
    Filter memory      IFL memory      Expansion memory
    PFE #      used | %      used | %      used | %
    0      29856      0      5216      0      0      0
    1      29376      0      4736      0      0      0

```