



Junos[®] OS

User Access and Authentication Feature Guide



Modified: 2018-12-17

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

Juniper Networks, the Juniper Networks logo, Juniper, and Junos are registered trademarks of Juniper Networks, Inc. in the United States and other countries. All other trademarks, service marks, registered marks, or registered service marks are the property of their respective owners.

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

Junos® OS User Access and Authentication Feature Guide
Copyright © 2018 Juniper Networks, Inc. All rights reserved.

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

YEAR 2000 NOTICE

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

END USER LICENSE AGREEMENT

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

Table of Contents

	About the Documentation	xli
	Documentation and Release Notes	xli
	Using the Examples in This Manual	xli
	Merging a Full Example	xlii
	Merging a Snippet	xlii
	Documentation Conventions	xliii
	Documentation Feedback	xlvi
	Requesting Technical Support	xlvi
	Self-Help Online Tools and Resources	xlvi
	Opening a Case with JTAC	xlvi
Chapter 1	Configuring Junos OS Login Classes	47
	Junos OS Login Classes Overview	47
	Permission Bits	48
	Denying or Allowing Individual Commands	50
	Understanding QFabric System Login Classes	51
	Defining Junos OS Login Classes	52
	Example: Creating Login Classes with Specific Privileges	53
	Configuring the Timeout Value for Idle Login Sessions	54
	Using Junos OS to Configure Logical System Administrators	54
	Configuring Junos OS to Display a System Login Message	55
	Configuring Junos OS to Display a System Login Announcement	57
	Examples: Configuring Time-Based User Access	59
	Configuring System Alarms to Appear Automatically Upon Login	60
	Configuring Login Tips	60
	Configuring System Alarms to Appear Automatically Upon Login	60
	Configuring the Timeout Value for Idle Login Sessions	61
	Troubleshooting Loss of the Root Password	61
Chapter 2	Configuring Junos OS User Accounts	65
	Junos OS User Accounts Overview	65
	Configuring Junos OS User Accounts	67
	Example: Configuring User Accounts	68
	Example: Configuring New Users	69
	Configuring Local User Template Accounts for User Authentication	75
	Configuring Remote Template Accounts for User Authentication	77
	Example: Creating Template Accounts	77
	Junos-FIPS Crypto Officer and User Accounts Overview	80
	Crypto Officer User Configuration	80
	FIPS User Configuration	80

	Configuring Time-Based User Access	80
	Examples: Configuring Time-Based User Access	82
	Configuring a Local Administrator Account	83
	Configuring Junos OS User Accounts by Using a Configuration Group	84
	Limiting the Number of User Login Attempts for SSH and Telnet Sessions	87
	Example: Limiting the Number of Login Attempts for SSH and Telnet Sessions to Prevent Unauthorized Access	88
	Understanding Administrative Roles	89
	Example: Configuring Administrative Roles	91
	Login Retry Options	98
	Example: Configuring Login Retry Options	99
	Managing Users (J-Web Procedure)	103
Chapter 3	Configuring User Access Privileges	107
	Understanding Junos OS Access Privilege Levels	107
	Junos OS Login Class Permission Flags	107
	Allowing or Denying Individual Commands for Junos OS Login Classes	111
	Example: Configuring User Permissions with Access Privilege Levels	113
	Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies	117
	Understanding Regular Expressions	117
	Specifying Regular Expressions	119
	Regular Expressions Operators	121
	Regular Expression Examples	123
	Example: Configuring User Permissions with Access Privileges for Operational Mode Commands	125
	Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies	138
	Examples of Defining Access Privileges Using allow-configuration and deny-configuration Statements	151
	Example: Using Additive Logic With Regular Expressions to Specify Access Privileges	153
	Understanding User and Access Management Features on the QFabric System	156
Chapter 4	Configuring Passwords for User Access	159
	Configuring the Root Password	160
	Configuring the Root Password	162
	Example: Protecting Network Security by Configuring the Root Password	164
	Example: Configuring a Plain-Text Password for Root Logins	164
	Example: Configuring SSH Authentication for Root Logins	166
	Recovering the Root Password	167
	Recovering the Root Password on Junos OS with Upgraded FreeBSD	169
	Recovering the Root Password for Switches	172
	Recovering the Root Password for MX80	174
	Troubleshooting Loss of the Root Password	177
	Changing the Requirements for Junos OS Plain-Text Passwords	180
	Example: Changing the Requirements for Junos OS Plain-Text Passwords	181
	Configuring MS-CHAPv2 for Password-Change Support	183

Chapter 5	Configuring Authentication Order for RADIUS, TACACS+, and Local Password	185
	Junos OS User Authentication Methods	185
	Understanding Remote Authentication Servers	186
	Junos OS Authentication Order for RADIUS, TACACS+, and Password	
	Authentication	187
	Using RADIUS or TACACS+ Authentication	188
	Using Local Password Authentication	188
	Order of Authentication Attempts	189
	Example: Configuring Authentication Order	193
	Configuring the Junos OS Authentication Order for RADIUS, TACACS+, and Local Password Authentication	197
	Example: Configuring System Authentication for RADIUS, TACACS+, and Password Authentication	199
Chapter 6	Configuring Radius Authentication	203
	Configuring RADIUS Server Authentication	203
	Why Use RADIUS	203
	Configuring RADIUS Server Details	204
	Configuring RADIUS To Use the Management Instance	208
	Example: Configuring a RADIUS Server for System Authentication	209
	Example: Configuring RADIUS Authentication	212
	Configuring RADIUS Authentication (QFX Series or OCX Series)	213
	Configuring RADIUS Server Details	213
	Configuring MS-CHAPv2 for Password-Change Support	214
	Specifying a Source Address for the Junos OS to Access External RADIUS Servers	215
	Configuring PEAP for MAC RADIUS Authentication	217
	Example: Configuring RADIUS Authentication on a QFabric System	218
	Juniper Networks Vendor-Specific RADIUS Attributes	219
	Understanding RADIUS Accounting	222
	Configuring RADIUS System Accounting	223
	Configuring Auditing of User Events on a RADIUS Server	223
	Specifying RADIUS Server Accounting and Auditing Events	224
	Configuring RADIUS Server Accounting	224
	Using Regular Expressions on a RADIUS or TACACS+ Server to Allow or Deny Access to Commands	226
Chapter 7	Configuring TACACS+ Authentication	229
	Configuring TACACS+ Authentication	229
	Configuring TACACS+ Server Details	229
	Configuring TACACS+ to Use the Management Instance	231
	Specifying a Source Address for the Junos OS to Access External TACACS+ Servers	231
	Configuring the Same Authentication Service for Multiple TACACS+ Servers	232

	Configuring Juniper Networks Vendor-Specific TACACS+ Attributes	232
	Example: Configuring a TACACS+ Server for System Authentication	233
	Configuring Periodic Refresh of the TACACS+ Authorization Profile	236
	Using Regular Expressions on a RADIUS or TACACS+ Server to Allow or Deny Access to Commands	238
	Juniper Networks Vendor-Specific TACACS+ Attributes	240
	Configuring TACACS+ System Accounting	242
	Specifying TACACS+ Auditing and Accounting Events	242
	Configuring TACACS+ Server Accounting	242
	Configuring TACACS+ To Use the Management Instance	244
	Configuring TACACS+ Accounting on a TX Matrix Router	244
Chapter 8	Configuring Remote Access to a Device	247
	System Services Overview	247
	Configuring Management Access	248
	Configuring Telnet Service for Remote Access to a Router or Switch	248
	Configuring FTP Service for Remote Access to the Router or Switch	249
	Configuring Finger Service for Remote Access to the Router	250
	Configuring SSH Host Keys for Secure Copying of Data	251
	Configuring SSH Known Hosts	251
	Configuring Support for SCP File Transfer	252
	Updating SSH Host Key Information	252
	Retrieving Host Key Information Manually	253
	Importing Host Key Information from a File	253
	Configuring SSH Service for Remote Access to the Router or Switch	253
	Configuring the Root Login Through SSH	254
	Configuring the SSH Protocol Version	255
	Configuring the Client Alive Mechanism	255
	Configuring the SSH Fingerprint Hash Algorithm	255
	Configuring the SSH Service to Support Legacy Cryptography	256
	Configuring Outbound SSH Service	258
	Configuring the Device Identifier for Outbound SSH Connections	259
	Sending the Public SSH Host Key to the Outbound SSH Client	259
	Configuring Keepalive Messages for Outbound SSH Connections	260
	Configuring a New Outbound SSH Connection	260
	Configuring the Outbound SSH Client to Accept NETCONF as an Available Service	261
	Configuring Outbound SSH Clients	261
	Configuring DTCP-over-SSH Service for the Flow-Tap Application	261
	Configuring NETCONF-Over-SSH Connections on a Specified TCP Port	263
	Configuring clear-text or SSL Service for Junos XML Protocol Client Applications	263
	Configuring clear-text Service for Junos XML Protocol Client Applications	264
	Configuring SSL Service for Junos XML Protocol Client Applications	264
	Configuring the Junos OS to Work with SRC Software	265

	Configuring Password Retry Limits for Telnet and SSH Access	266
	Example: Controlling Management Access on SRX Series Devices	267
	Example: Configuring a Filter to Block Telnet and SSH Access	271
	The telnet Command	276
	The ssh Command	278
	Configuration Guidelines for Securing Console Port Access	279
Chapter 9	Configuring Authentication for Routing Protocols	281
	Junos OS Authentication Methods for Routing Protocols	281
	Example: Configuring the Authentication Key for BGP and IS-IS Routing Protocols	282
	Configuring BGP	282
	Configuring IS-IS	283
	Configuring the Authentication Key Update Mechanism for BGP and LDP Routing Protocols	284
	Configuring Authentication Key Updates	284
	Configuring BGP and LDP for Authentication Key Updates	285
Chapter 10	Preventing Unauthorized Access to EX Series Switches Using Unattended Mode for U-Boot	287
	Understanding Unattended Mode for U-Boot on EX Series Switches	287
	Using Unattended Mode for U-Boot to Prevent Unauthorized Access	288
	Configuring the Boot Loader Password	289
	Configuring Unattended Mode for U-Boot	290
	Accessing the U-Boot CLI	290
Chapter 11	Configuring DNS on Security Devices	291
	DNS Overview	291
	DNS Components	291
	DNS Server Caching	292
	Example: Configuring the TTL Value for DNS Server Caching	292
	DNSSEC Overview	293
	Example: Configuring DNSSEC	293
	Example: Configuring Keys for DNSSEC	294
	Example: Configuring Secure Domains and Trusted Keys for DNSSEC	294
	DNS Proxy Overview	296
	DNS Proxy Cache	296
	DNS Proxy with Split DNS	297
	Dynamic Domain Name System Client	299
	Configuring the Device as a DNS Proxy	301
Chapter 12	Encryption for Configuration Secrets	305
	Hardening Shared Secrets in Junos OS	305
	Understanding Hardening Shared Secrets	305
	Chassis Cluster Considerations	306
	Using Trusted Platform Module to Bind Secrets on SRX Series Devices	307
	Limitations	308
	Enabling the TPM	308
	Verifying the Status of the TPM	309
	Changing the Master Encryption Password	309

Chapter 13	Setting up USB Modems for Remote Management of Security Devices . .	311
	USB Modem Interface Overview	311
	USB Modem Interfaces	312
	Dialer Interface Rules	312
	How the Device Initializes USB Modems	313
	USB Modem Configuration Overview	314
	Example: Configuring a USB Modem Interface	316
	Example: Configuring a Dialer Interface	319
	Example: Configuring a Dialer Interface for USB Modem Dial-In	323
	Configuring a Dial-Up Modem Connection Remotely	325
	Connecting to the Device Remotely	326
	Modifying USB Modem Initialization Commands	326
	Resetting USB Modems	327
Chapter 14	Configuring Secure Web Access	329
	Secure Web Access Overview	329
	Generating SSL Certificates for Secure Web Access (SRX Series Devices)	330
	Generating SSL Certificates to Be Used for Secure Web Access (EX Series Switch)	331
	Generating a Self-Signed SSL Certificate Automatically	331
	Manually Generating Self-Signed SSL Certificates	332
	Deleting Self-Signed Certificates (CLI Procedure)	333
	Adding, Editing, and Deleting Certificates on the Device	333
	Understanding Self-Signed Certificates on EX Series Switches	334
	Manually Generating Self-Signed Certificates on Switches (CLI Procedure) . . .	335
	Generating a Public-Private Key Pair on Switches	335
	Generating Self-Signed Certificates on Switches	336
	Configuring Device Addresses (IPv4 and Loopback Addresses)	336
	Enabling Remote Access	337
	Example: Configuring Secure Web Access	338
	Understanding Public Key Cryptography on Switches	341
	Public Key Infrastructure (PKI) and Digital Certificates	341
	Enabling HTTPS and XNM-SSL Services on Switches Using Self-Signed Certificates (CLI Procedure)	342
Chapter 15	Configuring 802.1X Authentication to Control Network Access on Switches	345
	Understanding Access Control on Switches	346
	Understanding Authentication on Switches	348
	Sample Authentication Topology	348
	802.1X Authentication	349
	MAC RADIUS Authentication	351
	Captive Portal Authentication	351
	Static MAC Bypass of Authentication	352
	Fallback of Authentication Methods	353
	802.1X for Switches Overview	354
	How 802.1X Authentication Works	354
	802.1X Features Overview	355

802.1X Authentication on Trunk Ports	356
Configuring 802.1X Interface Settings (CLI Procedure)	357
Configuring 802.1X Authentication (J-Web Procedure)	358
Example: Setting Up 802.1X in Conference Rooms to Provide Internet Access to Corporate Visitors on an EX Series Switch	361
Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch	367
Understanding Dynamic Filters Based on RADIUS Attributes	373
Understanding Dynamic VLAN Assignment Using RADIUS Attributes	374
Understanding Guest VLANs for 802.1X on Switches	375
Understanding 802.1X and RADIUS Accounting on Switches	375
RADIUS Accounting Process	375
Supported RADIUS Attributes	376
Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch	378
Understanding RADIUS-Initiated Changes to an Authorized User Session	382
Disconnect Messages	383
Change of Authorization Messages	383
CoA Request Port Bounce	384
Error-Cause Codes	384
Configuring 802.1X RADIUS Accounting (CLI Procedure)	386
Filtering 802.1X Supplicants by Using RADIUS Server Attributes	388
Configuring Firewall Filters on the RADIUS Server	388
Applying a Locally Configured Firewall Filter from the RADIUS Server	391
Example: Applying a Firewall Filter to 802.1X-Authenticated Supplicants by Using RADIUS Server Attributes on an EX Series Switch	392
Example: Applying Firewall Filters to Multiple Supplicants on Interfaces Enabled for 802.1X or MAC RADIUS Authentication	399
Example: Applying Firewall Filters to Multiple Supplicants on Interfaces Enabled for 802.1X or MAC RADIUS Authentication on EX Series Switches with ELS Support	405
Example: Configuring Fallback Options on EX Series Switches for EAP-TTLS Authentication and Odyssey Access Clients	410
Example: Configuring Centralized Access Control to Network Resources, with an EX Series Switch Connected to Junos Pulse Access Control Service	415
Example: Configuring 802.1X Authentication Options When the RADIUS Server Is Unavailable to an EX Series Switch	430
Understanding Server Fail Fallback and Authentication on Switches	436
Configuring RADIUS Server Fail Fallback (CLI Procedure)	437
Monitoring 802.1X Authentication	439
Verifying 802.1X Authentication	440
Troubleshooting Authentication of End Devices on EX Series Switches	442
Juniper-Switching-Filter VSA Match Conditions and Actions	443
Juniper Networks Vendor-Specific RADIUS Attributes	445
Juniper Networks Vendor-Specific TACACS+ Attributes	448

Chapter 16	Configuring 802.1X and VoIP on EX Series Switches	451
	Understanding 802.1X and VoIP on EX Series Switches	451
	Multi Domain 802.1X Authentication	453
	Configuring Multi-Domain Authentication (CLI Procedure)	454
	Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch	455
	Example: Configuring VoIP on an EX Series Switch Without Including LLDP-MED Support	463
	Example: Configuring VoIP on an EX Series Switch Without Including 802.1X Authentication	468
	Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch with ELS Support	475
	Example: Configuring VoIP on an EX Series Switch with ELS Support Without Including 802.1X Authentication	484
	Example: Configuring VoIP on an EX Series Switch Without Including LLDP-MED Support	491
	Configuring EAPoL Block to Maintain an Existing Authentication Session	496
Chapter 17	Configuring MAC RADIUS Authentication to Control Network Access on Switches	499
	Specifying RADIUS Server Connections on Switches (CLI Procedure)	500
	Configuring MAC RADIUS Authentication (CLI Procedure)	501
	Example: Configuring MAC RADIUS Authentication on an EX Series Switch	502
	Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication (CLI Procedure)	508
	Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch	509
	Configuring MS-CHAPv2 to Provide Password-Change Support (CLI Procedure)	513
	Configuring Flexible Authentication Order	514
	Understanding Authentication Session Timeout	516
	Controlling Authentication Session Timeouts (CLI Procedure)	517
	Configuring an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control (CLI Procedure)	519
	Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service (CLI Procedure)	522
Chapter 18	Configuring NetBIOS Snooping EX Series Switches	525
	Understanding NetBIOS Snooping	525
	What Is a NetBIOS Name?	525
	How NetBIOS Snooping Works	525
	Configuring NetBIOS Snooping (CLI Procedure)	526
	Enabling NetBIOS Snooping	526
	Disabling NetBIOS Snooping	526

Chapter 19	Configuring Captive Portal Authentication to Control Network Access on EX Series Switches	527
	Example: Setting Up Captive Portal Authentication on an EX Series Switch . . .	527
	Configuring Captive Portal Authentication (CLI Procedure)	532
	Configuring Secure Access for Captive Portal	533
	Enabling an Interface for Captive Portal	533
	Configuring Bypass of Captive Portal Authentication	534
	Designing a Captive Portal Authentication Login Page on Switches	535
	Configuring Captive Portal Authentication (CLI Procedure) on an EX Series	
	Switches with ELS Support	537
	Configuring Secure Access for Captive Portal	538
	Enabling an Interface for Captive Portal	538
	Configuring Bypass of Captive Portal Authentication	538
	Example: Setting Up Captive Portal Authentication on an EX Series Switch with	
	ELS Support	539
Chapter 20	Configuring Central Web Authentication on EX Series Switches	545
	Understanding Centralized Network Access Control and EX Series Switches . .	545
	NAC Using Any RADIUS Server and Access Policies Defined on the Local	
	Switch	545
	Centralized NAC Using Junos Pulse Access Control Service	546
	Captive Portal Authentication	547
	Understanding Central Web Authentication	547
	Central Web Authentication Process	548
	Dynamic Firewall Filters for Central Web Authentication	549
	Redirect URL for Central Web Authentication	550
	Configuring Central Web Authentication	550
	Configuring Dynamic Firewall Filters for Central Web Authentication	551
	Configuring the Redirect URL for Central Web Authentication	551
	Guidelines for Configuring Central Web Authentication	552
Chapter 21	Configuring Device Discovery Using LLDP and LLDP-MED on Switches . .	555
	Understanding LLDP	555
	Configuring LLDP (CLI Procedure)	556
	Enabling LLDP on Interfaces	556
	Adjusting LLDP Advertisement Settings	557
	Adjusting SNMP Notification Settings of LLDP Changes	558
	Specifying a Management Address for the LLDP Management TLV	559
	Configuring LLDP Power Negotiation	559
	Disabling LLDP TLVs	560
	Configuring LLDP (J-Web Procedure)	561
	Understanding LLDP and LLDP-MED on EX Series Switches	562
	Benefits of LLDP and LLDP-MED	563
	LLDP and LLDP-MED Overview	563
	Supported LLDP TLVs	563
	Supported LLDP-MED TLVs	565

	Disabling TLVs	565
	Configuring LLDP-MED (CLI Procedure)	566
	Enabling LLDP-MED on Interfaces	566
	Configuring Location Information Advertised by the Switch	566
	Configuring a Fast Start for LLDP-MED	567
	Disabling LLDP-MED TLVs	567
Chapter 22	Configuring DHCP Access Service on Routers	569
	DHCP Access Service Overview	570
	Network Address Assignments (Allocating a New Address)	570
	Network Address Assignments (Reusing a Previously Assigned Address) ..	572
	Static and Dynamic Bindings	572
	Compatibility with Autoinstallation	573
	Conflict Detection and Resolution	573
	DHCP Statement Hierarchy and Inheritance	573
	Configuring Address Pools for DHCP Dynamic Bindings	575
	Configuring Manual (Static) DHCP Bindings Between a Fixed IP Address and a Client MAC Address	577
	Specifying DHCP Lease Times for IP Address Assignments	578
	Configuring a DHCP Boot File and DHCP Boot Server	579
	Configuring a Static IP Address as DHCP Server Identifier	580
	Configuring a Domain Name and Domain Search List for a DHCP Server Host ..	580
	Configuring Routers Available to the DHCP Client	581
	Creating User-Defined DHCP Options Not Included in the Default Junos Implementation of the DHCP Server	582
	Example: Complete DHCP Server Configuration	583
	Example: Viewing DHCP Bindings	584
	Example: Viewing DHCP Address Pools	585
	Example: Viewing and Clearing DHCP Conflicts	585
	Configuring Tracing Operations for DHCP Processes	586
	Configuring the DHCP Processes Log Filename	586
	Configuring the Number and Size of DHCP Processes Log Files	587
	Configuring Access to the DHCP Log File	587
	Configuring a Regular Expression for Refining the Output of DHCP Logged Events	587
	Configuring DHCP Trace Operation Events	588
	DHCP Processes Tracing Flags	588
	Configuring the Router as an Extended DHCP Local Server	590
	Interaction Among the DHCP Client, Extended DHCP Local Server, and Address-Assignment Pools	592
	Extended DHCP Local Server and Address-Assignment Pools	592
	Methods Used by the Extended DHCP Local Server to Determine Which Address-Assignment Pool to Use	593
	Matching the Client IP Address to the Address-Assignment Pool	593
	Matching Option 82 Information to Named Address Ranges	593
	Default Options Provided by the Extended DHCP Server for the DHCP Client ..	594
	Using External AAA Authentication Services to Authenticate DHCP Clients ..	594
	Configuring Authentication Support for an Extended DHCP Application ..	595
	Grouping Interfaces with Common DHCP Configurations	596

	Configuring Passwords for Usernames the DHCP Application Presents to the External AAA Authentication Service	597
	Creating Unique Usernames the Extended DHCP Application Passes to the External AAA Authentication Service	597
	Client Configuration Information Exchanged Between the External Authentication Server, DHCP Application, and DHCP Client	599
	Example: Configuring the Minimum Extended DHCP Local Server Configuration	600
	Example: Extended DHCP Local Server Configuration with Optional Pool Matching	600
	Verifying and Managing the DHCP Server Configuration	600
	Tracing Extended DHCP Local Server Operations	601
	Configuring the Filename of the Extended DHCP Local Server Processes Log	602
	Configuring the Number and Size of Extended DHCP Local Server Processes Log Files	602
	Configuring Access to the Log File	602
	Configuring a Regular Expression for Lines to Be Logged	603
	Configuring Trace Option Flags	603
Chapter 23	Configuring DHCP Access Service on Switches	605
	DHCP and BOOTP Relay Overview	608
	DHCP/BOOTP Relay for Switches Overview	608
	Port Number Requirements for DHCP Firewall Filters	609
	Graceful Routing Engine Switchover for DHCP	610
	Extended DHCP Local Server Overview	611
	Interaction Among the DHCP Client, Extended DHCP Local Server, and Address-Assignment Pools	613
	Providing DHCP Client Configuration Information	614
	Minimal Configuration for Clients	615
	DHCP Local Server and Address-Assignment Pools	615
	Configuring DHCP and BOOTP	616
	Example: Minimum Extended DHCP Local Server Configuration	616
	Overriding the Default DHCP Local Server Configuration Settings Overview	617
	Configuring a Token for DHCP Local Server Authentication	620
	Centrally Configured Opaque DHCP Options	621
	Data Flow for RADIUS-Sourced DHCP Options	623
	Multiple VSA 26-55 Instances Configuration	624
	DHCP Options That Cannot Be Centrally Configured	624
	Verifying and Managing DHCP Local Server Configuration	625
	Configuring an Extended DHCP Relay Server on EX Series Switches (CLI Procedure)	626
	DHCPv6 Local Server Overview	628
	Enabling DHCPv6 Rapid Commit Support	629
	Specifying the Delegated Address Pool for IPv6 Prefix Assignment	629
	Preventing Binding of Clients That Do Not Support Reconfigure Messages	630
	Verifying and Managing DHCPv6 Local Server Configuration	631

Extended DHCP Relay Agent Overview	632
Interaction Among the DHCP Relay Agent, DHCP Client, and DHCP Servers	633
DHCP Liveness Detection	634
Understanding the Extended DHCP Relay Agent for EX Series Switches	634
Extended DHCP Relay and Legacy DHCP/BOOTP Relay	634
Interaction Among the DHCP Relay Agent, DHCP Client, and DHCP Servers	635
Example: Minimum DHCP Relay Agent Configuration	635
DHCP Relay Proxy Overview	636
Interaction Among DHCP Relay Proxy, DHCP Client, and DHCP Servers	636
Benefits of Using DHCP Relay Proxy	637
Enabling DHCP Relay Proxy Mode	638
Overriding the Default DHCP Relay Configuration Settings	638
Using Layer 2 Unicast Transmission Instead of Broadcast for DHCP Packets	641
Verifying and Managing DHCP Relay Configuration	641
Verifying and Managing DHCP Relay Configuration for EX Series Switches	642
Changing the Gateway IP Address (giaddr) Field to the giaddr of the DHCP Relay Agent	642
Replacing the DHCP Relay Request and Release Packet Source Address	642
Example: Configuring DHCP Relay Agent Selective Traffic Processing Based on DHCP Option Strings	643
Disabling DHCP Relay Agent for Interfaces, for Groups, or Globally	647
DHCPv6 Relay Agent Overview	648
Inserting DHCPv6 Interface-ID Option (Option 18) In DHCPv6 Packets	649
Verifying and Managing DHCPv6 Relay Configuration	650
DHCP Snooping Support	650
Example: Configuring DHCP Snooping Support for DHCP Relay Agent	652
Preventing Binding of Clients That Do Not Support Reconfigure Messages	654
Configuring DHCP Snooped Packets Forwarding Support for DHCP Relay Agent	655
Using DHCP Relay Agent Option 82 Information	657
Configuring Option 82 Information	658
Overriding Option 82 Information	660
Including a Prefix in DHCP Options	660
Including a Textual Description in DHCP Options	663
How DHCP Relay Agent Uses Option 82 for Auto Logout	665
Enable Processing of Untrusted Packets So Option 82 Information Can Be Used	666
Overriding Option 82 Information	666
Understanding DHCP Services for Switches	667
DHCP Client/Server Model	667
Using DHCP	668
DHCP Relay Servers and DHCP Servers	668
Legacy DHCP and Extended DHCP for Server Versions	669
Configuring DHCP on a Switch	670

How DHCP Works	670
Configuring a DHCP Server on Switches (CLI Procedure)	671
Configuring an Extended DHCP Server on a Switch	671
Configuring a Legacy DHCP Server on a Switch (CLI Procedure)	672
Configuring a Switch as a DHCP Server (CLI Procedure)	674
Configuring the Switch as a Local DHCP Server	675
Configuring a DHCP Client (CLI Procedure)	677
Configuring a DHCP SIP Server (CLI Procedure)	678
Disabling Automatic Binding of Stray DHCP Requests	679
Attaching Dynamic Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces	681
Attaching a Dynamic Profile to All DHCP Subscriber or All DHCP Client Interfaces	681
Attaching a Dynamic Profile to a Group of DHCP Subscriber Interfaces or a Group of DHCP Client Interfaces	682
Using External AAA Authentication Services with DHCP	682
Creating Unique Usernames for DHCP Clients	684
Specifying the Maximum Number of DHCP Clients Per Interface	687
DHCP Local Server Handling of Client Information Request Messages	688
Enabling Processing of Client Information Requests	689
Sending Release Messages When Clients Are Deleted	690
Understanding Dynamic Reconfiguration of Extended DHCP Local Server Clients	690
Default Client/Server Interaction	690
Dynamic Client/Server Interaction for DHCPv4	691
Dynamic Client/Server Interaction for DHCPv6	692
Manually Forcing the Local Server to Initiate the Reconfiguration Process	692
Action Taken for Events That Occur During a Reconfiguration	692
Configuring Dynamic Client Reconfiguration of Extended Local Server Clients Overview	693
Requesting DHCP Local Server to Initiate Reconfiguration of Client Bindings . .	695
Configuring Dynamic Reconfiguration Attempts for DHCP Clients	696
Configuring Deletion of the Client When Dynamic Reconfiguration Fails	697
Configuring Reconfiguration of the Client on Receipt of RADIUS-Initiated Disconnect	697
DHCP Auto Logout Overview	698
Auto Logout Overview	698
How DHCP Identifies and Releases Clients	698
Option 60 and Option 82 Requirements	699
Automatically Logging Out DHCP Clients	699
Configuring Named Server Groups	700
Configuring Active Server Groups to Apply a Common DHCP Relay Agent Configuration to Named Server Groups	701
Grouping Interfaces with Common DHCP Configurations	704
Guidelines for Configuring Interface Ranges for Groups of DHCP Interfaces . .	705
Configuring Group-Specific DHCP Local Server Options	706
Configuring Group-Specific DHCP Relay Options	706
DHCP Liveness Detection Overview	707

	Configuring Detection of DHCP Relay or DHCP Relay Proxy Client Connectivity with BFD	709
	Configuring Detection of DHCP Local Server Client Connectivity with BFD	711
	Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients	714
	DHCP Message Exchange Between DHCP Clients and DHCP Server in Different VRFs	717
	Configuring DHCP Message Exchange Between DHCP Server and Clients in Different Virtual Routing Instances	718
	Client-Side Support	719
	Server-Side Support	720
	DHCP Local Server Support	721
	Address-Assignment Pools Overview	721
	Benefits of Address Assignment Pools	723
	Configuring How the Extended DHCP Local Server Determines Which Address-Assignment Pool to Use	723
	Example: Extended DHCP Local Server Configuration with Optional Pool Matching	725
	Assign a Specific IP Address to a Client Using DHCP Option 50 and DHCPv6 IA_NA Option	725
	Multiple Address Assignment for DHCPv6 Clients	726
	Suppressing DHCP Access, Access-Internal, and Destination Routes	727
	Preventing DHCP from Installing Access, Access-Internal, and Destination Routes by Default	728
	Tracing Extended DHCP Operations	729
	Configuring the Extended DHCP Log Filename	730
	Configuring the Number and Size of Extended DHCP Log Files	731
	Configuring Access to the Extended DHCP Log File	731
	Configuring a Regular Expression for Extended DHCP Messages to Be Logged	732
	Configuring the Extended DHCP Tracing Flags	732
	Configuring the Severity Level to Filter Which Extended DHCP Messages Are Logged	733
	Tracing Extended DHCP Operations for Specific Interfaces	734
	Tracing Extended DHCP Operations for Specific Interfaces	735
Chapter 24	Configuring DHCP Access Service on Security Devices	737
	DHCP Overview	738
	DHCP Local Server	738
	DHCP Client, DHCP Local Server, and Address-Assignment Pool Interaction	739
	DHCP Local Server and Address-Assignment Pools	739
	DHCP Client	739
	DHCP Relay Agent	740
	DHCP Client, DHCP Relay Agent, and DHCP Local Servers	740
	Considerations	741
	DHCP Server, Client, and Relay Agent Overview	742

DHCP Settings and Restrictions Overview	743
Propagation of TCP/IP Settings for DHCP	743
DHCP Conflict Detection and Resolution	743
DHCP Interface Restrictions	743
Understanding Cascaded DHCPv6 Prefix Delegating	744
Example - Configuring DHCPv6 Prefix Delegation (PD) over Point-to-Point Protocol over Ethernet (PPPoE)	745
Understanding DHCP Server Operation	766
DHCP Options	766
Compatibility with Autoinstallation	766
Chassis Cluster Support	767
DHCP Server Configuration Overview	767
Minimum DHCP Local Server Configuration	768
Configuring Address-Assignment Pools	769
Configuring an Address-Assignment Pool Name and Addresses	770
Configuring a Named Address Range for Dynamic Address Assignment	770
Configuring Static Address Assignments	771
Enabling TCP/IP Propagation on a DHCP Local Server	772
Verifying and Managing DHCP Local Server Configuration	772
Example: Configuring the Device as a DHCP Server	773
Understanding DHCP Client Operation	779
Minimum DHCP Client Configuration	780
Configuring DHCP Client-Specific Attributes for Address-Assignment Pools	781
Configuring Optional DHCP Client Attributes	782
Verifying and Managing DHCP Client Configuration	783
Example: Configuring the Device as a DHCP Client	784
Understanding DHCP Relay Agent Operation	789
Minimum DHCP Relay Agent Configuration	789
Verifying and Managing DHCP Relay Configuration	790
Example - Configuring JDHCP Relay Configuration	791
Example: Configuring the Device as a BOOTP or DHCP Relay Agent	802
DHCPv6 Server Overview	806
Creating a Security Policy for DHCPv6	807
Example: Configuring DHCPv6 Server Options	808
Example: Configuring an Address-Assignment Pool	812
Configuring a Named Address Range and DHCPv6 Attributes for Dynamic Address Assignment	814
Configuring Address-Assignment Pool Linking	815
Configuring DHCP Client-Specific Attributes	816
Configuring an Address-Assignment Pool for Router Advertisement	817
Understanding DHCPv6 Client and Server Identification	817
DHCPv6 Client Overview	819
Minimum DHCPv6 Client Configuration	820
Configuring Optional DHCPv6 Client Attributes	821
Configuring Nontemporary Address Assignment	822
Configuring Identity Associations for Nontemporary Addresses and Prefix Delegation	823
Configuring Auto-Prefix Delegation	824
Configuring the DHCPv6 Client Rapid Commit Option	825

	Configuring a DHCPv6 Client in Autoconfig Mode	825
	Configuring TCP/IP Propagation on a DHCPv6 Client	826
	Example: Configuring the Device as a DHCP Server in Chassis Cluster Mode . . .	827
	Example: Configuring the Device as a DHCP Client in Chassis Cluster Mode . . .	833
Chapter 25	Permission Flags for User Access Privileges	841
	access	842
	access-control	846
	admin	847
	admin-control	850
	all-control	851
	clear	851
	configure	922
	control	923
	field	923
	firewall	924
	firewall-control	928
	floppy	928
	flow-tap	929
	flow-tap-control	932
	flow-tap-operation	933
	idp-profiler-operation	933
	interface	933
	interface-control	937
	maintenance	938
	network	947
	pgcp-session-mirroring	949
	pgcp-session-mirroring-control	952
	reset	953
	rollback	953
	routing	954
	routing-control	961
	secret	965
	secret-control	970
	security	971
	security-control	978
	shell	981
	snmp	981
	snmp-control	985
	system	985
	system-control	991
	trace	992
	trace-control	1001
	view	1006
Chapter 26	Configuration Statements	1111
	access	1129
	access (Dynamic Access Routes)	1130
	access-end	1131
	access-internal (Dynamic Access-Internal Routes)	1132

access-start	1133
active-server-group	1134
accounting	1136
accounting (Access Profile)	1137
accounting (Access Profile)	1138
accounting-options	1139
accounting-order	1141
always-write-option-82	1142
authentication-order	1143
accounting-port	1144
accounting-port	1145
accounting-port (RADIUS Server)	1146
accounting-server	1147
accounting-session-id-format	1148
accounting-stop-on-access-deny	1149
accounting-stop-on-failure	1150
address (Access Address Pool)	1151
address (Access Control Service)	1151
address-assignment (Access)	1152
address-assignment (Address-Assignment Pools)	1155
address-pool	1156
address-pool (Access)	1157
address-protection	1158
address-range	1159
advertisement-interval	1160
agent-address	1161
allow-commands	1162
allow-commands-regexps	1163
allow-configuration	1165
allow-configuration	1166
allow-configuration-regexps	1167
allow-configuration-regexps	1168
allow-no-end-option (DHCP Relay Agent)	1169
allow-snooped-clients	1170
allowed-days	1171
always-write-giaddr	1172
always-write-option-82	1173
announcement	1174
archival	1175
archive-sites (Configuration File)	1176
archive-sites	1177
attempts (DHCP Local Server)	1178
attributes (RADIUS Attributes)	1180
authentication (Login)	1181
authentication (DHCP Local Server)	1183
authentication (DHCP Relay Agent)	1184
authentication-server	1185
authentication-key	1186
authentication-key-chains	1187

authentication-order	1188
authentication-order	1189
authentication-order (Access Profile)	1190
authentication-order (Authenticator)	1191
authentication-profile-name	1194
authentication-protocol	1195
authentication-server	1196
authentication-whitelist	1197
authenticator	1198
authorization	1199
authorization-time-interval	1200
authorization-order	1202
authentication-order	1203
backoff-factor	1204
backoff-threshold	1205
bfd	1206
block-interval	1207
boot-file	1208
boot-loader-authentication	1209
boot-server (NTP)	1210
boot-server (DHCP)	1211
broadcast	1212
broadcast-client	1213
ca-name	1213
ca-type	1214
ca-value	1215
cache-size	1216
cache-timeout-negative	1217
captive-portal	1218
certificate-verification	1219
certificates	1220
certification-authority	1221
change-type	1222
civic-based	1223
ciphers	1224
circuit-id (DHCP Relay Agent)	1226
circuit-type	1228
circuit-type (DHCP Local Server)	1229
circuit-type (DHCP Relay Agent)	1230
clear-on-abort (DHCP Local Server)	1231
client-discover-match (DHCP Local Server)	1233
client-id (DHCP Local Server)	1234
client-id (DHCP Relay Agent)	1235
class (Assigning a Class to an Individual User)	1236
class (Defining Login Classes)	1237
class (Defining Login Classes)	1238
class-usage-profile	1239
clients	1240
client-accounting-algorithm	1241

client-alive-count-max	1242
client-alive-interval	1243
client-authentication-algorithm	1244
client-ia-type	1245
client-identifier (dhcp-client)	1246
client-identifier (dhcpv6-client)	1247
client-list-name	1248
client-list-name (SNMP)	1249
client-type	1250
coa-dynamic-variable-validation	1251
commit-delay	1252
community (SNMP)	1253
configuration	1254
connection-limit	1255
connection-limit	1256
contact (SNMP)	1257
counters	1258
country-code	1259
crl (Encryption Interface)	1260
custom-options	1261
delegated-pool (DHCP Local Server)	1263
delimiter (DHCP Local Server)	1264
delimiter (DHCP Relay Agent)	1266
deny-commands	1268
deny-commands-regexps	1269
deny-configuration	1271
deny-configuration	1272
deny-configuration-regexps	1273
deny-configuration-regexps	1274
destination (Accounting)	1275
destination (Accounting)	1276
destination (Accounting)	1277
destination-classes	1278
detection-time	1279
destination-host (Gx-Plus)	1280
destination-realm (Gx-Plus)	1280
dhcp	1281
dhcp (DHCP Client)	1282
dhcp-client	1283
dhcp-local-server	1285
dhcp-relay	1294
dhcpv6 (DHCP Local Server)	1307
dhcpv6 (DHCP Relay Agent)	1312
dhcpv6 (System Services)	1318
dhcpv6-client	1322
dhcp-attributes (Access IPv4 Address Pools)	1324
dhcp-attributes (Access IPv6 Address Pools)	1326
dhcp-local-server (System Services)	1328
disable (802.1X)	1332

disable (802.1X)	1333
disable (LLDP)	1334
disable (LLDP-MED)	1335
disable (LLDP Power Negotiation)	1335
disable-relay	1336
diameter-instance (Diameter Applications)	1337
disable (System Services)	1338
dlv	1338
domain (Domain Map)	1339
domain-name-server (Routing Instances and Access Profiles)	1340
domain-name-server-inet (Routing Instances and Access Profiles)	1341
domain-name-server-inet6 (Routing Instances and Access Profiles)	1342
dot1x	1343
domain-name (DHCP)	1344
domain-name (DHCP Local Server)	1345
domain-name (DHCP Relay Agent)	1347
domain-search	1348
drop (DHCP Relay Agent Option)	1349
dynamic-pool	1350
dynamic-profile (DHCP Local Server)	1351
dynamic-profile (DHCP Relay Agent)	1352
dynamic-profile-options	1353
dynamic-server	1354
group (DHCP Local Server)	1355
group (DHCP Relay Agent)	1359
group (System Services DHCP)	1364
eapol-block	1367
elin	1368
encoding	1369
enhanced-accounting	1370
enhanced-avs-max	1371
enrollment-retry	1372
enrollment-url	1373
ethernet-port-type-virtual	1374
ethernet-switching-options	1375
events	1381
exclude (RADIUS Attributes)	1382
excluded-address	1389
external-authority	1390
failure-action	1391
family (Security Forwarding Options)	1392
falling-threshold (Health Monitor)	1393
fast-start (LLDP-MED)	1394
fields (for Interface Profiles)	1395
file	1396
file (Associating with a Profile)	1397
file (Configuring a Log File)	1398
file (System Logging)	1399
files	1401

filter-duplicates	1402
filter-profile	1403
filter-profile	1404
finger	1405
fingerprint-hash	1406
flow-tap-dtcp	1407
force-discover (dhcp-client)	1408
format	1409
forward-snooped-clients (DHCP Local Server)	1410
forward-snooped-clients (DHCP Relay Agent)	1411
forwarding-class (VoIP)	1412
forwarding-options (Security)	1413
ftp	1414
full-name	1415
global (Gx-Plus)	1416
gx-plus (Gx-Plus)	1417
guest-vlan	1418
health-monitor	1419
hold-multiplier	1420
holddown-interval	1421
host (SSH Known Hosts)	1422
hostkey-algorithm	1423
http	1424
https	1425
icmpv4-rate-limit	1426
icmpv4-rate-limit	1427
idle-timeout (System-Login)	1428
idle-timeout (Access)	1429
idle-timeout	1430
idle-timeout (System)	1431
idle-timeout (System-Login)	1432
ignore (RADIUS Attributes)	1433
ignore (RADIUS Attributes)	1435
ignore-port-bounce	1437
ip-address-first	1438
immediate-update	1439
include-ipv6 (Gx-Plus)	1439
include-irb-and-l2	1440
infranet-controller	1442
interface (802.1X)	1443
interface (802.1X)	1445
interface (Access Control Service)	1446
interface (Captive Portal)	1447
interface (DHCP Local Server)	1448
interface (DHCP Relay Agent)	1450
interface (LLDP)	1452
interface (LLDP-MED)	1454
interface (Static MAC Bypass)	1455
interface (VoIP)	1456

interface (System Services DHCP)	1457
interface-client-limit (DHCP Local Server)	1458
interface-client-limit (DHCP Relay Agent)	1460
interface-delete (Subscriber Management or DHCP Client Management)	1461
interface-description-format	1462
interface-name (DHCP Local Server)	1463
interface-name (DHCP Relay Agent)	1464
interface-profile	1465
interface-traceoptions (System Services DHCP)	1466
interfaces (ARP)	1468
interval	1469
interval (Health Monitor)	1470
interfaces (Security Zones)	1471
interface (Static MAC Bypass)	1472
interface (VoIP)	1473
interface-description-format	1474
internet-options	1476
interval (Access Control Service)	1477
interval (Health Monitor)	1478
juniper-dsl-attributes	1479
kernel-replication (System)	1479
key (Authentication Keychain)	1480
key-chain (Security)	1481
key-exchange	1482
layer2-unicast-replies	1484
ldap-url	1485
lease-time	1486
lease-time (dhcp-client)	1487
liveness-detection	1488
lldp	1490
lldp-configuration-notification-interval	1492
lldp-med (Ethernet Switching)	1493
lldp-med-bypass	1494
lldp-priority	1494
lldp-tx-fast-init	1495
load-key-file	1496
local	1497
local-certificate	1498
local-server-group (DHCP Relay Agent Option)	1499
location	1500
location (SNMP)	1501
location (LLDP-MED)	1502
lockout-period	1503
logical-system-name (DHCP Local Server)	1504
login	1505
login-alarms	1506
login-script (Op Scripts)	1507
login-tip	1507
log-key-changes	1508

mac-radius	1509
macs	1511
mac-address (DHCP Local Server)	1513
mac-address (DHCP Relay Agent)	1514
management-address	1515
master-password	1516
max-outstanding-requests (Diameter Applications)	1517
max-pre-authentication-packets	1518
max-sessions-per-connection	1518
mau-type	1519
maximum-certificates	1520
maximum-hop-count	1521
maximum-lease-time (DHCP)	1522
maximum-lease-time (DHCP)	1522
maximum-length	1523
maximum-lifetime	1524
maximum-requests	1525
maximum-time	1526
method	1527
message	1528
mib-profile	1529
minimum-changes	1530
minimum-character-changes	1531
minimum-interval	1532
minimum-length	1533
minimum-lifetime	1534
minimum-lower-cases	1535
minimum-numeric	1536
minimum-reuse	1537
minimum-punctuations	1538
minimum-receive-interval	1539
minimum-time	1540
minimum-upper-cases	1541
minimum-wait-time	1542
multi-domain	1543
multicast-client	1544
multiplier	1545
name	1546
name-server	1547
name-server (Access)	1547
nas-identifier	1548
nas-ip-address	1549
nas-port-extended-format	1550
nas-port-extended-format	1552
nas-port-id-delimiter (Subscriber Management)	1553
nas-port-id-format (Subscriber Management)	1554
nas-port-type (Subscriber Management)	1556
neighbor-discovery-router-advertisement (Access)	1557
neighbor-port-info-display	1558

netbios-snooping	1559
next-hop (Dynamic Access Routes)	1560
next-server	1561
no-adaptation	1562
no-allow-snooped-clients	1563
no-bind-on-request (DHCP Relay Agent)	1564
no-listen	1565
no-mac-table-binding (802.1X)	1566
no-reauthentication	1566
no-vlan-interface-name	1567
no-passwords	1569
no-public-keys	1569
no-reauthentication	1570
no-tagging	1570
no-tcp-forwarding	1571
non-strict-priority-scheduling	1571
nonvolatile	1572
ntp	1573
object-names	1574
oid	1575
operation	1576
options (Access Profile)	1577
options (Access Profile)	1579
option (DHCP server)	1581
option-60 (DHCP Local Server)	1582
option-60 (DHCP Relay Agent)	1583
option-82 (DHCP Local Server Authentication)	1585
option-82 (DHCP Local Server Pool Matching)	1586
option-82 (DHCP Relay Agent)	1587
option-number (DHCP Relay Agent Option)	1588
order	1589
outbound-ssh	1590
outbound-ssh	1593
overrides (DHCP Local Server)	1595
overrides (DHCP Relay Agent)	1598
overrides (New Relay Options)	1600
overrides (System Services DHCP)	1602
password (Login)	1603
password (Access Control Service)	1604
password (DHCP Local Server)	1605
password (DHCP Relay Agent)	1607
password (DHCP Local Server)	1609
password (Login)	1610
path-length	1611
partition (Gx-Plus)	1612
peer (NTP)	1613
permissions	1614
pool (DHCP Local Server Overrides)	1615
pool (System)	1617

pool-match-order	1618
port	1619
port (Access Control Service)	1620
port (HTTP/HTTPS)	1621
port (NETCONF)	1622
port (RADIUS Server)	1623
port (SRC Server)	1624
port (TACACS+ Server)	1624
power-negotiation	1625
preference (Subscriber Management)	1626
prefix	1627
prefix (DHCP Relay Agent)	1628
preferred-prefix-length	1629
process-inform	1630
profile	1632
profillerd	1633
protocols	1634
protocol-version	1647
provisioning-order (Diameter Applications)	1648
proxy	1649
proxy-mode	1650
ptopo-configuration-maximum-hold-time	1651
ptopo-configuration-trap-interval	1652
quiet-period	1653
quiet-period (Captive Portal)	1654
radius	1655
radius (System)	1656
radius (Access Profile)	1657
radius (System)	1660
radius-disconnect (DHCP Local Server)	1661
radius-options (edit system)	1663
radius-options (Protocols 802.1X)	1664
radius-options	1665
radius-options (Access)	1666
radius-options (edit system)	1667
radius-options (Protocols 802.1X)	1668
radius-server	1669
radius-server	1670
radius-server	1672
radius-server (System)	1673
rapid-commit	1674
rapid-commit (DHCPv6 Local Server)	1675
rate-limit	1676
reauthentication	1677
reconfigure (DHCP Local Server)	1678
reconfigure (System Services DHCP)	1680
req-option	1682
regex-additive-logic	1683
redirect-url	1684

relay-agent-interface-id (DHCP Local Server)	1685
relay-agent-interface-id (DHCPv6 Relay Agent)	1686
relay-agent-remote-id (DHCP Local Server)	1687
relay-agent-remote-id (DHCPv6 Relay Agent Username)	1688
relay-option (DHCP Relay Agent)	1689
relay-option-82	1690
relay-server-group (DHCP Relay Agent Option)	1691
replace-ip-source-with (Before Forwarding Packet)	1692
replace-ip-source-with	1693
remote-debug-permission	1694
restart (Reset)	1695
retransmission-attempt	1699
retransmission-attempt (dhcp-client)	1700
retransmission-attempt (dhcpv6-client)	1701
retransmission-interval	1702
retransmission-interval (dhcp-client)	1703
retry	1704
retry	1705
retry (RADIUS)	1706
retry-options	1707
retries	1708
retries (Captive Portal)	1709
revert-interval	1710
rising-threshold (Health Monitor)	1711
rng	1712
root-authentication	1713
root-authentication	1714
root-login	1716
route-suppression (DHCP Local Server and Relay Agent)	1717
router	1718
routing-engine-profile	1719
routing-instance	1720
routing-instance	1721
routing-instance-name (DHCP Local Server)	1722
routing-instance-name (DHCP Relay Agent)	1724
scp	1725
security	1726
secret	1727
secret	1728
secret	1729
secure-authentication	1730
send-acct-status-on-config-change (Access Profile)	1731
send-release-on-delete (DHCP Relay Agent)	1732
server (NTP)	1733
server (DNS, Port, and TFTP Service)	1734
server (RADIUS Accounting)	1735
server (TACACS+ Accounting)	1736
server-address	1737
server-address (dhcp-client)	1738

server-fail	1739
server-fail-voip	1741
server-group	1743
server-identifier	1744
server-reject-vlan	1745
server-timeout	1746
server-timeout (Captive Portal)	1747
servers	1748
service (Service Accounting)	1749
service-deployment	1750
service-profile (DHCP Local Server)	1751
service-profile (DHCP Relay Agent)	1752
services (System Services)	1754
services (Switches)	1758
services (System Services)	1759
session (Time-out)	1763
session (Time-out)	1764
session-expiry	1765
session-mode	1766
single-connection	1767
single-connection	1767
sip-server	1768
size	1769
snmp	1770
source-address (NTP, RADIUS, System Logging, or TACACS+)	1774
source-address	1775
source-address (NTP, RADIUS, System Logging, or TACACS+)	1776
source-address (SRC Software)	1777
source-address-giaddr	1778
source-classes	1779
source-ip-change (Forwarding Options)	1779
source-port (Port Addresses)	1780
ssh	1781
ssh	1782
ssh-known-hosts	1784
ssh-known-hosts	1785
ssh-dsa	1786
ssh-rsa	1787
ssl-renegotiation	1787
start-time	1788
start-time (Authentication Key Transmission)	1789
static (Protocols 802.1X)	1791
static (Protocols 802.1X)	1792
static-binding	1793
static-subscribers	1794
statistics (Access Profile)	1794
statistics-service	1795
strict (DHCP Local Server)	1796
sub-prefix-length	1797

subscriber-management-helper	1798
supplicant	1799
supplicant-timeout	1800
system	1801
system	1806
system-generated-certificate	1807
tacplus	1808
tacplus	1809
tacplus-options	1810
tacplus-server	1812
tacplus-server	1813
targets	1814
telnet	1815
telnet	1816
tftp	1818
threshold (detection-time)	1819
threshold (transmit-interval)	1820
timeout (System)	1821
timeout (DHCP Local Server)	1822
timeout (Access Control Service)	1823
timeout (RADIUS)	1824
timeout (System)	1825
timeout-action (Access Control Service)	1826
tlv-filter	1827
tlv-select	1829
token (DHCP Local Server)	1831
trace (DHCP Relay Agent)	1832
traceoptions	1833
traceoptions (DNS, Port, and TFTP Packet Forwarding)	1835
traceoptions (802.1X)	1837
traceoptions (Address-Assignment Pool)	1839
traceoptions (DHCP)	1841
traceoptions (DHCP Server)	1844
traceoptions (LLDP)	1847
traceoptions (Outbound SSH)	1849
traceoptions (SBC Configuration Process)	1851
transfer-interval	1853
transfer-interval (Configuration)	1854
transfer-on-commit	1855
transmit-interval	1856
transmit-period	1857
transmit-delay	1858
trap-group	1859
trap-options	1861
trigger (DHCP Local Server)	1863
tries-before-disconnect	1864
trust-option-82	1865
trusted-key	1866
uac-policy	1866

uac-service	1867
uac-service	1868
uid	1869
unattended-boot	1870
unified-access-control	1871
update-interval	1872
update-router-advertisement	1873
update-server	1874
update-server (dhcp-client)	1874
update-server (dhcpv6-client)	1875
use-interface	1875
use-interface-description	1876
use-primary (DHCP Local Server)	1878
use-primary (DHCP Relay Agent)	1879
use-vlan-id	1881
user (Access)	1882
user (Access)	1883
user-defined-option-82	1884
user-id	1885
usb-control	1885
user-keepalive	1886
user-prefix (DHCP Local Server)	1887
username-include (DHCP Local Server)	1889
username-include (DHCP Relay Agent)	1891
vendor-id	1893
vendor-option	1894
vendor-option	1895
version (BFD)	1897
version (SNMP)	1898
view-configuration	1898
vlan (VoIP)	1899
vlan-assignment	1900
vlan-nas-port-stacked-format	1901
vpn (Forwarding Options)	1901
version (SNMP)	1902
versioning	1903
voip	1904
what	1905
wait-for-acct-on-ack (Access Profile)	1906
watchdog	1907
web-management	1908
web-management	1909
web-management (System Services)	1910
wins-server (System)	1914
wins-server (System)	1915
xnm-clear-text	1916
xnm-ssl	1917

Chapter 27	Operational Commands	1919
	clear captive-portal	1923
	clear dhcp client binding	1925
	clear dhcp client statistics	1926
	clear dhcp relay binding	1927
	clear dhcp relay statistics	1928
	clear dhcp server binding	1929
	clear dhcp server statistics	1930
	clear dhcpv6 client binding	1931
	clear dhcpv6 client statistics	1932
	clear dhcpv6 relay binding	1933
	clear dhcpv6 relay statistics	1936
	clear dhcpv6 server binding	1938
	clear dhcpv6 server binding (Local Server)	1941
	clear dhcpv6 server statistics	1942
	clear dhcpv6 server statistics (Local Server)	1943
	clear dot1x	1944
	clear lldp neighbors	1946
	clear lldp statistics	1947
	clear lldp neighbors	1948
	clear lldp statistics	1949
	clear security pki local-certificate	1950
	clear security ssh key-pair-identity	1951
	clear system login logout	1952
	clear system services dhcp binding	1953
	clear system services dhcp conflict	1954
	clear system services dhcp statistics	1955
	request component login	1956
	request dhcp client renew	1958
	request dhcp server reconfigure	1959
	request dhcpv6 server reconfigure	1961
	request dhcpv6 client renew	1963
	request ipsec switch	1964
	request message	1965
	request security certificate enroll (Signed)	1966
	request security certificate enroll (Unsigned)	1968
	request security key-pair	1969
	request security pki generate-key-pair	1970
	request security pki local-certificate generate-self-signed	1971
	request security ssh key-pair-identity generate	1973
	request security tpm master-encryption-password set	1974
	request system autorecovery state	1975
	request system decrypt password	1977
	request system download abort	1978
	request system download clear	1979
	request system download pause	1980
	request system download resume	1981
	request system download start	1982
	request system firmware upgrade	1984

request system license update	1986
request system power-off fpc	1987
request system reboot	1989
request system reboot (SRX Series)	1996
request system services dhcp	1997
request system snapshot (Maintenance)	1998
request system software abort in-service-upgrade (ICU)	2001
request system software add (Maintenance)	2002
request system software rollback (SRX Series)	2003
request system zeroize	2004
Show SNMP	2005
show captive-portal authentication-failed-users	2007
show captive-portal firewall	2009
show captive-portal interface	2011
show ethernet-switching interfaces	2015
show chassis routing-engine (View)	2023
show cli authorization	2026
show cli directory	2028
show dhcp client binding	2029
show dhcp client statistics	2032
show dhcp relay binding	2035
show dhcp relay statistics	2038
show dhcp server binding	2040
show dhcp server statistics	2042
show dhcpv6 client binding	2044
show dhcpv6 client statistics	2046
show dhcpv6 relay binding	2049
show dhcpv6 relay statistics	2058
show dhcpv6 server binding	2062
show dhcpv6 server binding (View)	2069
show dhcpv6 server statistics	2073
show dhcpv6 server statistics (View)	2077
show firewall (View)	2080
show dot1x	2082
show dot1x accounting attribute	2088
show dot1x authentication-failed-users	2090
show dot1x firewall	2092
show dot1x static-mac-address	2094
show dot1x statistics	2096
show ethernet-switching interfaces	2098
show ethernet-switching interface	2106
show lldp	2109
show lldp local-information	2115
show lldp neighbors	2118
show lldp neighbors	2123
show lldp statistics	2130
show lldp statistics	2132
show lldp remote-global-statistics	2134
show network-access aaa statistics accounting	2136

show network-access aaa statistics authentication	2138
show network-access aaa statistics dynamic-requests	2140
show route extensive	2142
show route instance	2161
show route protocol	2165
show security tpm status	2179
show security ssh key-pair-identity	2181
show security pki local-certificate	2183
show services unified-access-control authentication-table	2186
show services unified-access-control policies	2189
show services unified-access-control status	2191
show snmp statistics	2192
show ssl-certificates	2200
show subscribers	2202
show system autorecovery state	2236
show system license (View)	2238
show system login lockout	2241
show system download	2242
show system services dhcp binding	2244
show system services dhcp client	2247
show system services dhcp conflict	2250
show system services dhcp global	2251
show system services dhcp pool	2253
show system services dhcp relay-statistics	2256
show system services dhcp statistics	2258
show system services service-deployment	2261
show system snapshot media	2262
show system storage partitions	2264
show system users	2267
test access profile	2272
test access radius-server	2276

List of Figures

Chapter 1	Configuring Junos OS Login Classes	47
	Figure 1: Connecting to the Console Port on the EX Series Switch	62
Chapter 3	Configuring User Access Privileges	107
	Figure 2: Configuring TACACS+ Server Authentication	129
	Figure 3: Configuring TACACS+ Server Authentication	144
Chapter 4	Configuring Passwords for User Access	159
	Figure 4: Connecting to the Console Port on the EX Series Switch	178
Chapter 11	Configuring DNS on Security Devices	291
	Figure 5: DNS Proxy with Split DNS	298
	Figure 6: Dynamic DNS	300
Chapter 12	Encryption for Configuration Secrets	305
	Figure 7: Master Password Encryption	306
Chapter 15	Configuring 802.1X Authentication to Control Network Access on Switches	345
	Figure 8: Authentication Process Flow for Switches	347
	Figure 9: Example Authentication Topology	349
	Figure 10: Topology for Guest VLAN Example	363
	Figure 11: Topology for Configuring Supplicant Modes	369
	Figure 12: Topology for Configuration	380
	Figure 13: Topology for Firewall Filter and RADIUS Server Attributes Configuration	395
	Figure 14: Conceptual Model: Dynamic Filter Updated for Each New User	401
	Figure 15: Multiple Supplicants on an 802.1X-Enabled Interface Connecting to a File Server	402
	Figure 16: Conceptual Model: Dynamic Filter Updated for Each New User	407
	Figure 17: Multiple Supplicants on an 802.1X-Enabled Interface Connecting to a File Server	408
	Figure 18: EX Series Switch Connecting OAC to RADIUS Server Using EAP-TTLS Authentication	413
	Figure 19: Centralized Access Control to Network Resources with an EX Series Switch Connected to Junos Pulse Access Control Service	419
	Figure 20: Topology for Configuring 802.1X Options	432
Chapter 16	Configuring 802.1X and VoIP on EX Series Switches	451
	Figure 21: VoIP Multiple Supplicant Topology	452
	Figure 22: VoIP Single Supplicant Topology	453
	Figure 23: VoIP Topology	457
	Figure 24: VoIP Topology	478

Chapter 17	Configuring MAC RADIUS Authentication to Control Network Access on Switches	499
	Figure 25: Topology for MAC RADIUS Authentication Configuration	504
	Figure 26: Topology for Static MAC Bypass of Authentication Configuration . . .	510
Chapter 19	Configuring Captive Portal Authentication to Control Network Access on EX Series Switches	527
	Figure 27: Example of a Captive Portal Login Page	535
Chapter 20	Configuring Central Web Authentication on EX Series Switches	545
	Figure 28: Central Web Authentication Process	549
Chapter 22	Configuring DHCP Access Service on Routers	569
	Figure 29: DHCP Discover	571
	Figure 30: DHCP Offer	571
	Figure 31: DHCP Request	571
	Figure 32: DHCP ACK	572
	Figure 33: DHCP Release	572
Chapter 23	Configuring DHCP Access Service on Switches	605
	Figure 34: DHCP Options Data Flow	623
	Figure 35: DHCP Client/Server Model	668
	Figure 36: DHCP Four-Step Transfer	670
Chapter 24	Configuring DHCP Access Service on Security Devices	737
	Figure 37: IPv6 Prefix Delegation	744
	Figure 38: Sub-prefix Delegation	745
	Figure 39: Configuring SRX Series Devices for DHCPv6 PD over PPPoE	746
	Figure 40: Understanding DHCP Services in a Routing Instance	792

List of Tables

	About the Documentation	xli
	Table 1: Notice Icons	xlili
	Table 2: Text and Syntax Conventions	xliv
Chapter 1	Configuring Junos OS Login Classes	47
	Table 3: Predefined System Login Classes	48
	Table 4: Permission Bits for Login Classes	48
Chapter 2	Configuring Junos OS User Accounts	65
	Table 5: User Management Configuration Page Summary	104
	Table 6: Add an Authentication Server	105
Chapter 3	Configuring User Access Privileges	107
	Table 7: Login Class Permission Flags	108
	Table 8: Sample Local and Remote Authorization Configuration Using Regular Expressions	118
	Table 9: Specifying Regular Expressions	120
	Table 10: Common Regular Expression Operators	121
	Table 11: Regular Expressions Examples	124
	Table 12: Restricting Configuration Access Using deny-configuration and deny-configuration-regexps Statements	141
Chapter 5	Configuring Authentication Order for RADIUS, TACACS+, and Local Password	185
	Table 13: Order of Authentication Attempts	189
Chapter 6	Configuring Radius Authentication	203
	Table 14: Juniper Networks Vendor-Specific RADIUS Attributes	219
Chapter 7	Configuring TACACS+ Authentication	229
	Table 15: Juniper Networks Vendor-Specific TACACS+ Attributes	240
Chapter 8	Configuring Remote Access to a Device	247
	Table 16: CLI telnet Command Options	277
	Table 17: CLI ssh Command Options	278
Chapter 10	Preventing Unauthorized Access to EX Series Switches Using Unattended Mode for U-Boot	287
	Table 18: Unattended Mode Behavior	288
Chapter 12	Encryption for Configuration Secrets	305
	Table 19: \$8\$-encrypted Password Format	306
Chapter 13	Setting up USB Modems for Remote Management of Security Devices . .	311

	Table 20: Default Modem Initialization Commands	313
	Table 21: Configuring Branch Office and Head Office Routers for USB Modem Backup Connectivity	315
	Table 22: Incoming Map Options	316
Chapter 15	Configuring 802.1X Authentication to Control Network Access on Switches	345
	Table 23: RADIUS Server Settings	359
	Table 24: 802.1X Exclusion List	360
	Table 25: 802.1X Port Settings	360
	Table 26: Components of the Guest VLAN Topology	363
	Table 27: Components of the Supplicant Mode Configuration Topology	369
	Table 28: RADIUS Accounting Request Attributes	377
	Table 29: Components of the Topology	380
	Table 30: Error-Cause Codes (RADIUS Attribute 101)	385
	Table 31: Components of the Firewall Filter and RADIUS Server Attributes Topology	395
	Table 32: Components of the OAC Deployment	413
	Table 33: Components of the Topology for Access Control Service and the EX Series Switch	418
	Table 34: Components of the Topology	432
	Table 35: Match Conditions	444
	Table 36: Actions for VSAs	445
	Table 37: Juniper Networks Vendor-Specific RADIUS Attributes	446
	Table 38: Juniper Networks Vendor-Specific TACACS+ Attributes	448
Chapter 16	Configuring 802.1X and VoIP on EX Series Switches	451
	Table 39: Components of the VoIP Configuration Topology	458
	Table 40: Components of the VoIP Configuration Topology	478
Chapter 17	Configuring MAC RADIUS Authentication to Control Network Access on Switches	499
	Table 41: Components of the MAC RADIUS Authentication Configuration Topology	504
	Table 42: Components of the Static MAC Bypass of Authentication Configuration Topology	511
Chapter 19	Configuring Captive Portal Authentication to Control Network Access on EX Series Switches	527
	Table 43: Configurable Elements of a Captive Portal Login Page	535
Chapter 21	Configuring Device Discovery Using LLDP and LLDP-MED on Switches . .	555
	Table 44: Global Settings	562
	Table 45: Edit Port Settings	562
Chapter 22	Configuring DHCP Access Service on Routers	569
	Table 46: Pool and Binding Statements	574
	Table 47: Common Configuration Statements	575
	Table 48: DHCP Processes Tracing Flags	588
Chapter 23	Configuring DHCP Access Service on Switches	605

	Table 49: Comparing the Extended DHCP Local Server to the Traditional DHCP Local Server	612
	Table 50: Information in Authentication Grant	614
	Table 51: Unsupported Opaque DHCP Options	625
	Table 52: RADIUS Attributes and VSAs for DHCPv6 Local Server	628
	Table 53: Actions for DHCP Relay Agent Snooped Packets When DHCP Snooping Is Enabled	655
	Table 54: Actions for DHCP Relay Agent Snooped Packets When DHCP Snooping Is Disabled	656
	Table 55: Actions for Snooped BOOTREPLY Packets	656
	Table 56: DHCP Relay Agent Option 82 Value for Auto Logout	665
	Table 57: Legacy DHCP and Extended DHCP Server Hierarchy Levels	669
	Table 58: DHCP Client Settings	678
	Table 59: Action Taken for Events That Occur During a Reconfiguration	692
Chapter 24	Configuring DHCP Access Service on Security Devices	737
	Table 60: Sample DHCP Server Configuration Settings	767
	Table 61: DHCPv6 Attributes	816
Chapter 26	Configuration Statements	1111
	Table 62: Supportability of Diffie-Hellman key exchange methods on FIPS mode	1483
Chapter 27	Operational Commands	1919
	Table 63: clear captive-portal interface Output Fields	1923
	Table 64: show captive-portal authentication-failed-users Output Fields	2007
	Table 65: show captive-portal interface Output Fields	2012
	Table 66: show ethernet-switching interfaces Output Fields	2016
	Table 67: show ethernet-switching interfaces Output Fields	2017
	Table 68: show chassis routing-engine Output Fields	2023
	Table 69: show dhcp client binding Output Fields	2030
	Table 70: show dhcp client statistics	2032
	Table 71: show dhcp relay binding Output Fields	2035
	Table 72: show dhcp relay statistics	2038
	Table 73: show dhcp server binding Output Fields	2040
	Table 74: show dhcp server statistics	2042
	Table 75: show dhcpv6 client binding Output Fields	2044
	Table 76: show dhcpv6 client statistics Output Fields	2046
	Table 77: show dhcpv6 relay binding Output Fields	2050
	Table 78: show dhcpv6 relay statistics Output Fields	2059
	Table 79: show dhcpv6 server binding Output Fields	2063
	Table 80: show dhc6p server binding Output Fields	2069
	Table 81: show dhcpv6 server statistics Output Fields	2074
	Table 82: show dhcpv6 server statistics Output Fields	2078
	Table 83: show firewall Output Fields	2080
	Table 84: show dot1x Output Fields	2083
	Table 85: show dot1x accounting attribute Output Fields	2089
	Table 86: show dot1x authentication-failed-users Output Fields	2090
	Table 87: show dot1x static-mac-address Output Fields	2094
	Table 88: show dot1x statistics Output Fields	2096

Table 89: show ethernet-switching interfaces Output Fields	2099
Table 90: show ethernet-switching interfaces Output Fields	2100
Table 91: show ethernet-switching interface Output Fields	2106
Table 92: show lldp Output Fields	2110
Table 93: show lldp local-information Output Fields	2115
Table 94: show lldp neighbors Output Fields	2118
Table 95: show lldp neighbors Output Fields	2123
Table 96: show lldp statistics Output Fields	2130
Table 97: show lldp statistics Output Fields	2132
Table 98: show lldp remote-global-statistics Output Fields	2134
Table 99: show network-access aaa statistics accounting Output Fields	2136
Table 100: show network-access aaa statistics authentication Output Fields . .	2138
Table 101: show network-access aaa statistics dynamic-requests Output Fields	2140
Table 102: show route extensive Output Fields	2142
Table 103: show route instance Output Fields	2161
Table 104: show security tpm status Output Fields	2179
Table 105: show security pki local-certificate Output Fields	2183
Table 106: show snmp statistics Output Fields	2193
Table 107: show snmp statistics subagents Output Fields	2196
Table 108: show ssl-certificates Output Fields	2200
Table 109: show subscribers Output Fields	2207
Table 110: show system autorecovery state Output Fields	2236
Table 111: show system license Output Fields	2238
Table 112: show system login lockout	2241
Table 113: show system download Output Fields	2242
Table 114: show system services dhcp binding Output Fields	2244
Table 115: show system services dhcp client Output Fields	2247
Table 116: show system services dhcp conflict Output Fields	2250
Table 117: show system services dhcp global Output Fields	2251
Table 118: show system services dhcp pool Output Fields	2253
Table 119: show system services dhcp relay-statistics Output Fields	2256
Table 120: show system services dhcp statistics Output Fields	2258
Table 121: show system services service-deployment Output Fields	2261
Table 122: show system snapshot media Output Fields	2262
Table 123: show system storage partitions Output Fields	2265
Table 124: show system users Output Fields	2269
Table 125: test access profile Output Fields	2272
Table 126: test access radius-server Output Fields	2276

About the Documentation

- Documentation and Release Notes on page xli
- Using the Examples in This Manual on page xli
- Documentation Conventions on page xliii
- Documentation Feedback on page xlv
- Requesting Technical Support on page xlv

Documentation and Release Notes

To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at <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 xliii defines notice icons used in this guide.

Table 1: Notice Icons

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

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

Table 2: Text and Syntax Conventions

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

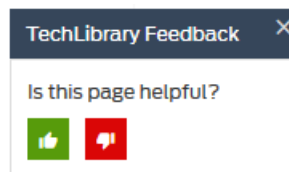
Table 2: Text and Syntax Conventions (continued)

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>.

CHAPTER 1

Configuring Junos OS Login Classes

- [Junos OS Login Classes Overview on page 47](#)
- [Understanding QFabric System Login Classes on page 51](#)
- [Defining Junos OS Login Classes on page 52](#)
- [Example: Creating Login Classes with Specific Privileges on page 53](#)
- [Configuring the Timeout Value for Idle Login Sessions on page 54](#)
- [Using Junos OS to Configure Logical System Administrators on page 54](#)
- [Configuring Junos OS to Display a System Login Message on page 55](#)
- [Configuring Junos OS to Display a System Login Announcement on page 57](#)
- [Examples: Configuring Time-Based User Access on page 59](#)
- [Configuring System Alarms to Appear Automatically Upon Login on page 60](#)
- [Configuring Login Tips on page 60](#)
- [Configuring System Alarms to Appear Automatically Upon Login on page 60](#)
- [Configuring the Timeout Value for Idle Login Sessions on page 61](#)
- [Troubleshooting Loss of the Root Password on page 61](#)

Junos OS Login Classes Overview

All users who can log in to the router or switch must be in a login class. With login classes, you define the following:

- Access privileges that users have when they are logged in to the router or switch
- Commands and statements that users can and cannot specify
- How long a login session can be idle before it times out and the user is logged out

You can define any number of login classes and then apply one login class to an individual user account.

The Junos operating system (Junos OS) contains a few predefined login classes, which are listed in [Table 3 on page 48](#). The predefined login classes cannot be modified.

Table 3: Predefined System Login Classes

Login Class	Permission Flag Set
operator	clear, network, reset, trace, and view
read-only	view
superuser or super-user	all
unauthorized	None



NOTE:

- You cannot modify a predefined login class name. If you issue the `set` command on a predefined class name, the Junos OS appends `-local` to the login class name. The following message also appears:

```
warning: '<class-name>' is a predefined class name; changing to
'<class-name>-local'
```

- You cannot issue the `rename` or `copy` command on a predefined login class. Doing so results in the following error message:

```
error: target '<class-name>' is a predefined class
```

Permission Bits

Each top-level CLI command and each configuration statement has an access privilege level associated with it. Users can execute only those commands and configure and view only those statements for which they have access privileges. The access privileges for each login class are defined by one or more permission bits (see [Table 4 on page 48](#)).

Two forms for the permissions control the individual parts of the configuration:

- "Plain" form—Provides read-only capability for that permission type. An example is **interface**.
- Form that ends in **-control**—Provides read and write capability for that permission type. An example is **interface-control**.

Table 4: Permission Bits for Login Classes

Permission Bit	Access
admin	Can view user account information in configuration mode and with the show configuration command.
admin-control	Can view user accounts and configure them (at the [edit system login] hierarchy level).

Table 4: Permission Bits for Login Classes (continued)

Permission Bit	Access
access	Can view the access configuration in configuration mode and with the show configuration operational mode command.
access-control	Can view and configure access information (at the [edit access] hierarchy level).
all	Has all permissions.
clear	Can clear (delete) information learned from the network that is stored in various network databases (using the clear commands).
configure	Can enter configuration mode (using the configure command) and commit configurations (using the commit command).
control	Can perform all control-level operations (all operations configured with the -control permission bits).
field	Reserved for field (debugging) support.
firewall	Can view the firewall filter configuration in configuration mode.
firewall-control	Can view and configure firewall filter information (at the [edit firewall] hierarchy level).
floppy	Can read from and write to the removable media.
interface	Can view the interface configuration in configuration mode and with the show configuration operational mode command.
interface-control	Can view chassis, class of service, groups, forwarding options, and interfaces configuration information. Can configure chassis, class of service, groups, forwarding options, and interfaces (at the [edit] hierarchy).
maintenance	Can perform system maintenance, including starting a local shell on the device and becoming the superuser in the shell (by issuing the su root command), and can halt and reboot the device (using the request system commands).
network	Can access the network by entering the ping , ssh , telnet , and traceroute commands.
reset	Can restart software processes using the restart command and can configure whether software processes are enabled or disabled (at the [edit system processes] hierarchy level).
rollback	Can use the rollback command to return to a previously committed configuration other than the most recently committed one.
routing	Can view general routing, routing protocol, and routing policy configuration information in configuration and operational modes.

Table 4: Permission Bits for Login Classes (continued)

Permission Bit	Access
routing-control	Can view general routing, routing protocol, and routing policy configuration information and configure general routing (at the [edit routing-options] hierarchy level), routing protocols (at the [edit protocols] hierarchy level), and routing policy (at the [edit policy-options] hierarchy level).
secret	Can view passwords and other authentication keys in the configuration.
secret-control	Can view passwords and other authentication keys in the configuration and can modify them in configuration mode.
security	Can view security configuration in configuration mode and with the show configuration operational mode command.
security-control	Can view and configure security information (at the [edit security] hierarchy level).
shell	Can start a local shell on the device by entering the start shell command.
snmp	Can view SNMP configuration information in configuration and operational modes.
snmp-control	Can view SNMP configuration information and configure SNMP (at the [edit snmp] hierarchy level).
system	Can view system-level information in configuration and operational modes.
system-control	Can view system-level configuration information and configure it (at the [edit system] hierarchy level).
trace	Can view trace file settings in configuration and operational modes.
trace-control	Can view trace file settings and configure trace file properties.
view	Can use various commands to display current system-wide, routing table, and protocol-specific values and statistics.

Denying or Allowing Individual Commands

By default, all top-level CLI commands have associated access privilege levels. Users can execute only those commands and view only those statements for which they have access privileges. For each login class, you can explicitly deny or allow the use of operational and configuration mode commands that are otherwise permitted or not allowed by a permission bit.

Related Documentation

- [Defining Junos OS Login Classes on page 52](#)

Understanding QFabric System Login Classes

In some cases (such as device-level troubleshooting), it is useful to log in to individual QFabric system components so you can view and manage issues on a per-device basis. This topic explains the login classes that provide individual component access within a QFabric system.



NOTE: Under normal operating conditions, you should manage the QFabric system as a single entity by using the QFabric system default partition command-line interface (CLI). The default partition CLI provides you with the ability to configure and monitor your entire QFabric system from a central location and should be used as the primary way to manage the system.

The QFabric system offers three special preset login classes that provide different levels of access to individual components within a QFabric system:

- **qfabric-admin**—Provides the ability to log in to individual QFabric system components and manage them. This class is equivalent to setting the following permissions: **access, admin, clear, firewall, interface, maintenance, network, reset, routing, secret, security, snmp, system, trace, and view**. The *qfabric-admin* class also enables you issue all operational mode commands except **configure**. To provide QFabric system component-level login and management privileges, include the **qfabric-admin** statement at the **[edit system login user *username* authentication remote-debug-permission]** hierarchy level.
- **qfabric-operator**—Provides the privilege to log in to individual QFabric system components and view component operations and configurations. This class is equivalent to setting the following permissions: **trace and view**. The *qfabric-operator* class also enables you issue the **monitor** and **show log messages** operational mode commands. To provide limited QFabric system component-level access, include the **qfabric-operator** statement at the **[edit system login user *username* authentication remote-debug-permission]** hierarchy level.
- **qfabric-user**—Prevents access to individual QFabric system components. This class is the default setting for all QFabric system users and is equivalent to the preset Junos OS class of **unauthorized**. To prevent a user from accessing individual QFabric system components, include the **qfabric-user** statement at the **[edit system login user *username* authentication remote-debug-permission]** hierarchy level.

When you perform the initial setup for the Director group, you must specify a username and password for QFabric components. Once configured, this information is stored in the QFabric system and mapped to the QFabric system login classes. Such mapping allows users with the proper login class (**qfabric-admin** or **qfabric-operator**) to log in automatically to a component without being prompted for the username and password.

After you assign the **qfabric-admin** or **qfabric-operator** class to a user, the user can log in to an individual QFabric system component by issuing the **request component login *component-name*** command. You can access Node devices, Interconnect devices, and

virtual Junos Routing Engines (diagnostics, fabric control, and fabric manager) one at a time when you issue this command. To leave the CLI prompt of a component and return to the QFabric system default partition CLI, issue the **exit** command from the component's operational mode CLI prompt.

Related Documentation

- [Junos OS Login Classes Overview on page 47](#)

Defining Junos OS Login Classes

Login classes allow you to define the following:

- Access privileges that users have when they are logged in to the router or switch
- Commands and statements that users can and cannot specify
- How long a login session can be idle before it times out and the user is logged out

All users who can log in to the router or switch must be in a login class. Therefore, you must define a Junos OS login class for each user or class of users. You can define any number of login classes depending on the types of permissions the users need.

To define a login class and its access privileges, include the **class** statement at the **[edit system login]** hierarchy level:

```
[edit system login]
class class-name {
  access-end;
  access-start;
  allow-commands "regular-expression";
  ( allow-configuration | allow-configuration-regexps ) "regular expression 1" "regular
  expression 2";
  allowed-days;
  configuration-breadcrumbs;
  deny-commands "regular-expression";
  ( deny-configuration | deny-configuration-regexps ) "regular expression 1" "regular
  expression 2 ";
  idle-timeout minutes;
  login-script filename;
  login-tip;
  permissions [ permissions ];
}
```

Related Documentation

- [Junos OS User Accounts Overview on page 65](#)
- [Example: Creating Login Classes with Specific Privileges on page 53](#)
- [Using Junos OS to Configure Logical System Administrators on page 54](#)

Example: Creating Login Classes with Specific Privileges

Login classes are used to assign certain permissions or restrictions to groups of users, ensuring that sensitive commands are only accessible to the appropriate users. By default, Juniper Networks devices have four types of login classes with preset permissions: operator, read-only, superuser or super-user, and unauthorized.

You can create new custom login classes to make different combinations of permissions that are not found in the default login classes. The following example shows how to create three custom login classes, each with specific privileges and timers to disconnect the class members after a period of inactivity. Inactivity timers help protect network security by disconnecting a user from the network if the user is away from his computer for too long, preventing potential security risks created by leaving an unattended account logged in to a switch or router. The permissions and inactivity timers shown here are only examples and should be customized to your organization.

The first class of users is called **observation** and they can only view statistics and configuration. They are not allowed to modify any configuration. The second class of users is called **operation** and they can view and modify the configuration. The third class of users is called **engineering** and they have unlimited access and control. All three login classes use the same inactivity timer of 5 minutes.

```
[edit]
system {
  login {
    class observation {
      idle-timeout 5;
      permissions [ view ];
    }
    class operation {
      idle-timeout 5;
      permissions [ admin clear configure interface interface-control network
        reset routing routing-control snmp snmp-control trace-control
        firewall-control rollback ];
    }
    class engineering {
      idle-timeout 5;
      permissions all;
    }
  }
}
```

Related Documentation

- [Junos OS Login Classes Overview on page 47](#)
- [Defining Junos OS Login Classes on page 52](#)
- [Configuring a Local Administrator Account on page 83](#)

Configuring the Timeout Value for Idle Login Sessions

An idle login session is one in which the CLI operational mode prompt is displayed but there is no input from the keyboard. By default, a login session remains established until a user logs out of the router or switch, even if that session is idle. To close idle sessions automatically, you must configure a time limit for each login class. If a session established by a user in that class remains idle for the configured time limit, the session automatically closes.

To define the timeout value for idle login sessions, include the **idle-timeout** statement at the **[edit system login class *class-name*]** hierarchy level:

```
[edit system login class class-name]  
idle-timeout minutes;
```

Specify the number of minutes that a session can be idle before it is automatically closed.

If you have configured a timeout value, the CLI displays messages similar to the following when timing out an idle user. It starts displaying these messages 5 minutes before timing out the user.

```
user@host# Session will be closed in 5 minutes if there is no activity.  
Warning: session will be closed in 1 minute if there is no activity  
Warning: session will be closed in 10 seconds if there is no activity  
Idle timeout exceeded: closing session
```

If you configure a timeout value, the session closes after the specified time has elapsed, unless the user is running telnet or monitoring interfaces using the **monitor interface** or **monitor traffic** command.

- Related Documentation**
- [Defining Junos OS Login Classes on page 52](#)
 - [idle-timeout \(System-Login\) on page 1428](#)

Using Junos OS to Configure Logical System Administrators

Using Junos OS, you can partition a single router or switch into multiple logical devices that perform independent routing or switching tasks. When creating logical systems, you must configure logical system administrators and interfaces, assign logical interfaces to logical systems, and configure various other logical system statements.

The master administrator can assign one or more logical system administrators to each logical system. Once assigned to a logical system, administrators are restricted to viewing only configurations of the logical system to which they are assigned and accessing only the operational commands that apply to that particular logical system. This restriction means that these administrators cannot access global configuration statements, and all command output is restricted to the logical system to which the administrators are assigned.

To configure logical system administrators, include the **logical-system** *logical-system-name* statement at the **[edit system login class class-name]** hierarchy level and apply the class to the user. For example:

```
[edit]
system {
  login {
    class admin1 {
      permissions all;
      logical-system logical-system-LS1;
    }
    class admin2 {
      permissions view; # Gives users assigned to class admin2 the ability to view
                        # but not to change the configuration.
      logical-system logical-system-LS2;
    }
    user user1 {
      class admin1;
    }
    user user2 {
      class admin2;
    }
  }
}
```

Fully implementing logical systems requires that you also configure any protocols, routing statements, switching statements, and policy statements for the logical system.

Related Documentation

- [Defining Junos OS Login Classes on page 52](#)

Configuring Junos OS to Display a System Login Message

You can create login banners for those who post messages and announcements to those who access the device. You might want to configure an initial login message now, before you create any user accounts.

A login message displays a banner to users when they access the device, before they log in. To display a message only after the user logs in, use a system login announcement instead of a system login message.

You can format the login message using the following special characters:

- \n—New line
- \t—Horizontal tab
- \'—Single quotation mark
- \"—Double quotation mark
- \\—Backslash

If the message text contains any spaces, enclose it in quotation marks.

To configure a login banner:

1. Include the **message** statement in the **[edit system login]** configuration.

```
[edit system login]
message text;
```

For example:

```
system {
  login {
    message "\n\n\n\tUNAUTHORIZED USE OF THIS SYSTEM\n
\tIS STRICTLY PROHIBITED!\n\n\tPlease contact
\t'company-noc@company.com\t' to gain\authorization
to this equipment if you need access.\n\n\n";
  }
}
```

2. Commit the configuration.

```
[edit system login]
user@host# commit
```

3. Connect to the device in a new session to verify the presence of the new banner.

The preceding login message configuration example produces a login message similar to the following:

```
server% telnet router1
Trying 1.1.1.1...
Connected to router1.
Escape character is '^['.

      UNAUTHORIZED USE OF THIS SYSTEM
      IS STRICTLY PROHIBITED!

      Please contact 'company-noc@company.com' to gain
      authorization to this equipment if you need access.

router1 (tty0)
login:
```



NOTE: On some platforms, when you log in from the console, the login banner message is not seen unless you press Ctrl-D at the login prompt.

- Related Documentation**
- [Configuring Junos OS to Display a System Login Announcement on page 57](#)
 - [Defining Junos OS Login Classes on page 52](#)
 - [Configuring Junos OS to Display a System Login Announcement on page 57](#)

Configuring Junos OS to Display a System Login Announcement

Sometimes you want to make announcements only to authorized users after they have logged in. For example, you might want to announce an upcoming maintenance event.

You can format the announcement using the following special characters:

- \n—New line
- \t—Horizontal tab
- \'—Single quotation mark
- \"—Double quotation mark
- \\—Backslash

If the message text contains any spaces, enclose it in quotation marks.

By default, no login announcement is displayed.

To configure an announcement that can be seen only by authorized users:

1. Include the **announcement** statement in the **[edit system login]** configuration.

```
[edit system login]
user@host# set announcement text
```

For example:

```
system {
  login {
    announcement "\tJuly 27th 1:00 AM to 8:00\n\nPlanned Network
Maintenance\n\nAFFECTED LOCATIONS: Sunnyvale\n\nPLANNED ACTIVITY:
Upgrade all 6200 switch firmware to the Enterprise TAC recommended firmware
version\n\nPURPOSE: This activity will help to minimize the impact of unplanned
power outages as well as address known issues within our currently installed
firmware version(s)\n\nWHAT TO EXPECT: During the maintenance window for
your site, the office network will not be available.\n\n";
    message "\n\n\tTPO - M7i - iX Router Lab\n\n\tUNAUTHORIZED USE OF THIS
ROUTER\n\tIS STRICTLY PROHIBITED!\n\n\tPlease contact
\'astatti@juniper.net\' to gain\n\taccess to this equipment if you need
authorization.\n\n\n"
  }
}
```

2. Commit the configuration.

```
[edit system login]
user@host# commit
```

3. Connect to the device in a new session to verify the presence of the new banner.

The preceding login message configuration example produces a login message similar to the following:

```
server% telnet host
Trying 203.0.113.0
Connected to host.example.net
Escape character is '^['.

      TPO - M7i - iX Router Lab

      UNAUTHORIZED USE OF THIS ROUTER
      IS STRICTLY PROHIBITED!

      Please contact 'astatti@juniper.net' to gain
      access to this equipment if you need authorization

Login: user
Password:

      July 27th 1:00 AM to 8:00

Planned Network Maintenance

AFFECTED LOCATIONS: Sunnyvale

PLANNED ACTIVITY: Upgrade all 6200 switch firmware to the Enterprise TAC
recommended firmware version

PURPOSE: This activity will help to minimize the impact of unplanned power
outages as well as address known issues within our currently installed firmware
version(s)

WHAT TO EXPECT: During the maintenance window for your site, the office network
will not be available.
```

If the announcement text contains any spaces, enclose the text in quotation marks.

A system login *announcement* appears after the user logs in. A system login *message* appears before the user logs in.



TIP: You can use the same special characters described to format your system login announcement.

Related Documentation

- [Configuring Junos OS to Display a System Login Message on page 55](#)

Examples: Configuring Time-Based User Access

The following example shows how to configure user access for the **operator-round-the-clock-access** login class from Monday through Friday without any restriction on access time or duration of login:

```
[edit system]
login {
  class operator-round-the-clock-access {
    allowed-days [ monday tuesday wednesday thursday friday ];
  }
}
```

The following example shows how to configure user access for the **operator-day-shift** login class on Monday, Wednesday, and Friday from 8:30 AM to 4:30 PM:

```
[edit system]
login {
  class operator-day-shift {
    allowed-days [ monday wednesday friday ];
    access-start 0830;
    access-end 1630;
  }
}
```

Alternatively, you can also specify the login start time and end time for the **operator-day-shift** login class to be from 8:30 AM to 4:30 PM in the following format:

```
[edit system]
login {
  class operator-day-shift {
    allowed-days [ monday wednesday friday ];
    access-start 08:30am;
    access-end 04:30pm;
  }
}
```

The following example shows how to configure user access for the **operator-day-shift-all-days-of-the-week** login class to be on all days of the week from 8:30 AM to 4:30 PM:

```
[edit system]
login {
  class operator-day-shift-all-days-of-the-week {
    access-start 0830;
    access-end 1630;
  }
}
```

- Related Documentation**
- [Configuring Time-Based User Access on page 80](#)

Configuring System Alarms to Appear Automatically Upon Login

You can configure Juniper Networks routers and switches to run the **show system alarms** command whenever a user with the login class **admin** logs in to the router or switch. To do so, include the **login-alarms** statement at the **[edit system login class admin]** hierarchy level.

```
[edit system login class admin]
login-alarms;
```

For more information on the **show system alarms** command, see the [CLI Explorer](#).

- Related Documentation**
- [show system alarms](#)

Configuring Login Tips

The Junos OS CLI provides the option of configuring login tips for the user. By default, the **tip** command is not enabled when a user logs in.

- To enable tips, include the **login-tip** statement at the **[edit system login class class-name]** hierarchy level:

```
[edit system login class class-name]
login-tip;
```

Adding this statement enables the **tip** command for the class specified, provided the user logs in using the CLI.

- Related Documentation**
- [Defining Junos OS Login Classes on page 52](#)

Configuring System Alarms to Appear Automatically Upon Login

You can configure Juniper Networks routers and switches to run the **show system alarms** command whenever a user with the login class **admin** logs in to the router or switch. To do so, include the **login-alarms** statement at the **[edit system login class admin]** hierarchy level.

```
[edit system login class admin]
login-alarms;
```

For more information on the **show system alarms** command, see the [CLI Explorer](#).

- Related Documentation**
- [show system alarms](#)

Configuring the Timeout Value for Idle Login Sessions

An idle login session is one in which the CLI operational mode prompt is displayed but there is no input from the keyboard. By default, a login session remains established until a user logs out of the router or switch, even if that session is idle. To close idle sessions automatically, you must configure a time limit for each login class. If a session established by a user in that class remains idle for the configured time limit, the session automatically closes.

To define the timeout value for idle login sessions, include the **idle-timeout** statement at the **[edit system login class *class-name*]** hierarchy level:

```
[edit system login class class-name]  
idle-timeout minutes;
```

Specify the number of minutes that a session can be idle before it is automatically closed.

If you have configured a timeout value, the CLI displays messages similar to the following when timing out an idle user. It starts displaying these messages 5 minutes before timing out the user.

```
user@host# Session will be closed in 5 minutes if there is no activity.  
Warning: session will be closed in 1 minute if there is no activity  
Warning: session will be closed in 10 seconds if there is no activity  
Idle timeout exceeded: closing session
```

If you configure a timeout value, the session closes after the specified time has elapsed, unless the user is running telnet or monitoring interfaces using the **monitor interface** or **monitor traffic** command.

Related Documentation

- [Defining Junos OS Login Classes on page 52](#)
- [idle-timeout \(System-Login\) on page 1428](#)

Troubleshooting Loss of the Root Password

Problem **Description:** If you forget the root password for a switch, use the password recovery procedure to reset the root password.



NOTE: You need physical access to the switch to recover the root password.

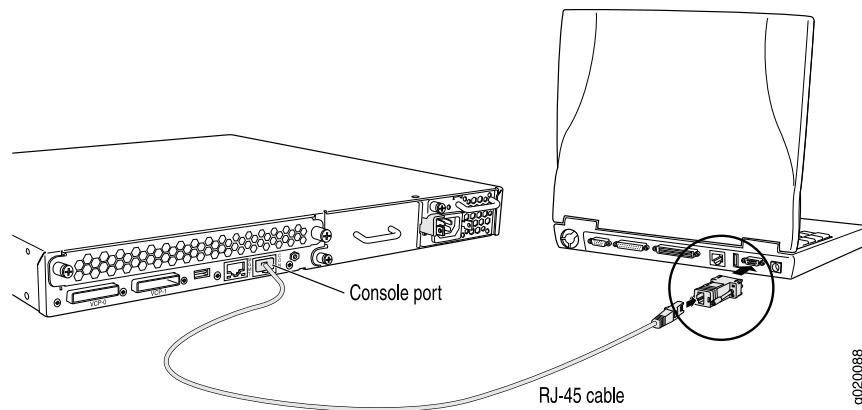


TIP: For a video on recovering the root password for routers, see [“Recovering the Root Password” on page 167](#). The procedure is similar for switches.

Solution To recover the root password:

1. Power off your switch by unplugging the power cord or turning off the power at the wall switch.
2. Insert one end of the Ethernet cable into the serial port on the management device and connect the other end to the console port on the back of the switch. See [Figure 1 on page 62](#).

Figure 1: Connecting to the Console Port on the EX Series Switch



3. On the management device, start your asynchronous terminal emulation application (such as Microsoft Windows Hyperterminal) and select the appropriate COM port to use (for example, COM1).
4. Configure the port settings as follows:
 - Bits per second: 9600
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: None
5. Power on your switch by plugging in the power cord or turning on the power at the wall switch.



NOTE: On EX2300 and EX3400 switches after step 5, use the following procedure:

In the main menu that appears, select **[M]ore options > Recovery mode - [C]LI**.

A series of messages describe consistency checks, mounting of filesystems, and initialization and checkout of management services. Then the CLI prompt appears.

Proceed to Step 9 in this procedure.

6. When the following prompt appears, press the Spacebar to access the switch's bootstrap loader command prompt:

```
Hit [Enter] to boot immediately, or space bar for command prompt.
Booting [kernel] in 1 second...
```



NOTE: If the switch is in unattended mode for U-Boot, access to the bootstrap loader command prompt is blocked. If the root password is lost, you must reset the switch to the factory default configuration using the LCD panel. For more information, see *Reverting to the Default Factory Configuration for the EX Series Switch*.

7. At the following prompt, type **boot -s** to start up the system in single-user mode:
loader> boot -s
8. At the following prompt, type **recovery** to start the root password recovery procedure:
Enter full path name of shell or 'recovery' for root password recovery or RETURN for /bin/sh: recovery

A series of messages describe consistency checks, mounting of filesystems, and initialization and checkout of management services. Then the CLI prompt appears.
9. Enter configuration mode in the CLI:
user@switch> configure
10. Set the root password. For example:
user@switch# set system root-authentication plain-text-password
11. At the following prompt, enter the new root password. For example, **juniper1**:
user@switch# juniper1

```
Retype new password:
```

12. At the second prompt, reenter the new root password.

13. If you are finished configuring the network, commit the configuration.

```
root@switch# commit
```

```
commit complete
```

14. Exit configuration mode in the CLI.

```
root@switch# exit
```

15. Exit operational mode in the CLI.

```
root@switch> exit
```

16. At the prompt, enter **y** to reboot the switch.

```
Reboot the system? [y/n] y
```

**Related
Documentation**

- *Connecting and Configuring an EX Series Switch (CLI Procedure)*
- *Connecting and Configuring an EX Series Switch (J-Web Procedure)*
- For information about configuring an encrypted root password, configuring SSH keys to authenticate root logins, and configuring special requirements for plain-text passwords, see [Configuring the Root Password on page 160](#).

CHAPTER 2

Configuring Junos OS User Accounts

- [Junos OS User Accounts Overview on page 65](#)
- [Configuring Junos OS User Accounts on page 67](#)
- [Example: Configuring User Accounts on page 68](#)
- [Example: Configuring New Users on page 69](#)
- [Configuring Local User Template Accounts for User Authentication on page 75](#)
- [Configuring Remote Template Accounts for User Authentication on page 77](#)
- [Example: Creating Template Accounts on page 77](#)
- [Junos-FIPS Crypto Officer and User Accounts Overview on page 80](#)
- [Configuring Time-Based User Access on page 80](#)
- [Examples: Configuring Time-Based User Access on page 82](#)
- [Configuring a Local Administrator Account on page 83](#)
- [Configuring Junos OS User Accounts by Using a Configuration Group on page 84](#)
- [Limiting the Number of User Login Attempts for SSH and Telnet Sessions on page 87](#)
- [Example: Limiting the Number of Login Attempts for SSH and Telnet Sessions to Prevent Unauthorized Access on page 88](#)
- [Understanding Administrative Roles on page 89](#)
- [Example: Configuring Administrative Roles on page 91](#)
- [Login Retry Options on page 98](#)
- [Example: Configuring Login Retry Options on page 99](#)
- [Managing Users \(J-Web Procedure\) on page 103](#)

Junos OS User Accounts Overview

User accounts provide one way for users to access the device. (Users can access the device without accounts if you configured RADIUS or TACACS+ servers, as described in [“Junos OS User Authentication Methods” on page 185](#).) For each account, you define the login name for the user and, optionally, information that identifies the user. After you have created an account, the software creates a home directory for the user.

For each user account, you can define the following:

- Username—Name that identifies the user. It must be unique within the device. Do not include spaces, colons, or commas in the username. The username can be up to 64 characters long.
- User's full name—(Optional) If the full name contains spaces, enclose it in quotation marks. Do not include colons or commas.
- User identifier (UID)—(Optional) Numeric identifier that is associated with the user account name. The identifier must be in the range from 100 through 64,000 and must be unique within the device. If you do not assign a UID to a username, the software assigns one when you commit the configuration, preferring the lowest available number.

You must ensure that the UID is unique. However, it is possible to assign the same UID to different users. If you do this, the CLI displays a warning when you commit the configuration and then assigns the duplicate UID.

- User's access privilege—(Required) One of the login classes you defined in the **class** statement at the **[edit system login]** hierarchy level, or one of the default classes listed in [“Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies”](#) on page 117.
- Authentication method or methods and passwords that the user can use to access the device—(Optional) You can use SSH or a Message Digest 5 (MD5) password, or you can enter a plain-text password that the Junos OS encrypts using MD5-style encryption before entering it in the password database. For each method, you can specify the user's password. If you configure the **plain-text-password** option, you are prompted to enter and confirm the password:

```
[edit system login user username]  
user@host# set authentication plain-text-password  
New password: type password here  
Retype new password: retry password here
```

The default requirements for plain-text passwords are:

- The password must be between 6 and 128 characters long.
- You can include most character classes in a password (uppercase letters, lowercase letters, numbers, punctuation marks, and other special characters). Control characters are not recommended.
- Valid passwords must contain at least one change of case or character class.

Junos-FIPS and Common Criteria have special password requirements. FIPS and Common Criteria passwords must be between 10 and 20 characters in length. Passwords must use at least three of the five defined character sets (uppercase letters, lowercase letters, digits, punctuation marks, and other special characters). If Junos-FIPS is installed on the device, you cannot configure passwords unless they meet this standard.

For SSH authentication, you can copy the contents of an SSH key file into the configuration or directly configure SSH key information. Use the **load-key-file** *URL filename* command to load an SSH key file that was previously generated, e.g. by using **ssh-keygen**. The *URL*

filename is the path to the file's location and name. This command loads RSA (SSH version 1 and SSH version 2) and DSA (SSH version 2) public keys. The contents of the SSH key file are copied into the configuration immediately after you enter the **load-key-file** statement. Optionally, you can use the **ssh-dsa public key <from hostname>** and the **ssh-rsa public key <from hostname>** statements to directly configure SSH keys.

Starting in Junos OS Release 18.3R1, the **ssh-dss** and **ssh-dsa** hostkey algorithms are deprecated—rather than immediately removed—to provide backward compatibility and a chance to bring your configuration into compliance with the new configuration.

For each user account and for root logins, you can configure more than one public RSA or DSA key for user authentication. When a user logs in using a user account or as root, the configured public keys are referenced to determine whether the private key matches any of them.

To view the SSH keys entries, use the configuration mode **show** command. For example:

```
[edit system login user boojum]
user@host# set authentication load-key-file my-host:.ssh/id_dsa.pub
.file.19692 | 0 KB | 0.3 kB/s | ETA: 00:00:00 | 100%
[edit system]
user@host# show
root-authentication {
  ssh-rsa "$ABC123"; # SECRET-DATA
}
```

An account for the user **root** is always present in the configuration. You configure the password for **root** using the **root-authentication** statement, as described in [“Configuring the Root Password” on page 160](#).

Release History Table

Release	Description
18.3R1	Starting in Junos OS Release 18.3R1, the ssh-dss and ssh-dsa hostkey algorithms are deprecated—rather than immediately removed—to provide backward compatibility and a chance to bring your configuration into compliance with the new configuration.

Related Documentation

- [Configuring Junos OS User Accounts by Using a Configuration Group on page 84](#)
- [Junos OS Login Classes Overview on page 47](#)

Configuring Junos OS User Accounts

User accounts provide one way for users to access the router or switch. For each account, you define the login name for the user and, optionally, information that identifies the user. After you have created an account, the software creates a home directory for the user.

To create user accounts, include the **user** statement at the **[edit system login]** hierarchy level:

```
[edit system login]
user username {
  class class-name;
  class {
    (encrypted-password "password" | plain-text-password);
    ssh-rsa "public-key";
    ssh-dsa "public-key";
  }
  full-name complete-name;
  uid uid-value;
  class class-name;
}
```

**Related
Documentation**

- [Example: Configuring User Accounts on page 68](#)
- [Configuring a Local Administrator Account on page 83](#)
- [Junos OS User Accounts Overview on page 65](#)
- [Limiting the Number of User Login Attempts for SSH and Telnet Sessions on page 87](#)

Example: Configuring User Accounts

The following example shows how to create accounts for four router or switch users, and create an account for the template user **remote**. All users use one of the default system login classes. User **alexander** also has two digital signal algorithm (DSA) public keys configured for SSH authentication.

```
[edit]
system {
  login {
    user philip {
      full-name "Philip of Macedonia";
      uid 1001;
      class super-user;
      authentication {
        encrypted-password "$ABC123";
      }
    }
    user alexander {
      full-name "Alexander the Great";
      uid 1002;
      class view;
      authentication {
        encrypted-password "$ABC123";
        ssh-dsa "8924 37 5678 5678@gaugamela.per";
        ssh-dsa "6273 94 9283@boojum.per";
      }
    }
    user darius {
      full-name "Darius King of Persia";
      uid 1003;
      class operator;
    }
  }
}
```



```
authentication {  
  ssh-rsa "1024 37 12341234@ecbatana.per";  
}  
user anonymous {  
  class unauthorized;  
}  
user remote {  
  full-name "All remote users";  
  uid 9999;  
  class read-only;  
}  
}
```

- Related Documentation**
- [Junos OS User Accounts Overview on page 65](#)
 - [Limiting the Number of User Login Attempts for SSH and Telnet Sessions on page 87](#)

Example: Configuring New Users

This example shows how to configure new users.

- [Requirements on page 69](#)
- [Overview on page 69](#)
- [Configuration on page 70](#)
- [Verification on page 74](#)

Requirements

No special configuration beyond device initialization is required before configuring this feature.

Overview

You can add new users to the device's local database. For each account, you define a login name and password for the user and specify a login class for access privileges. The login password must meet the following criteria:

- The password must be at least six characters long.
- You can include most character classes in a password (alphabetic, numeric, and special characters), but not control characters.
- The password must contain at least one change of case or character class.

In this example, you create a login class named `operator-and-boot` and allow it to reboot the device. You can define any number of login classes. You then allow the `operator-and-boot` login class to use commands defined in the `clear`, `network`, `reset`, `trace`, and `view` permission bits.

Then you create user accounts. User accounts enable you to access the device. (You can access the device without accounts if you configured RADIUS or TACACS+ servers.) You set the username as `cmartin` and the login class as `superuser`. Finally, you define the encrypted password for the user.

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 system login class operator-and-boot allow-commands "request system reboot"
set class system login operator-and-boot permissions [clear network reset trace view]
set system login user cmartin class superuser authentication encrypted-password
$1$ABC123
```

GUI Step-by-Step Procedure

To configure new users:

1. In the J-Web user interface, select **Configure>System Properties>User Management**.
2. Click **Edit**. The Edit User Management dialog box appears.
3. Select the **Users** tab.
4. Click **Add** to add a new user. The Add User dialog box appears.
5. In the User name box, type a unique name for the user.
Do not include spaces, colons, or commas in the username.
6. In the User ID box, type a unique ID for the user.
7. In the Full Name box, type the user's full name.
If the full name contains spaces, enclose it in quotation marks. Do not include colons or commas.
8. In the Password and Confirm Password boxes, enter a login password for the user and verify your entry.
9. From the Login Class list, select the user's access privilege:
 - **operator**
 - **read-only**
 - **unauthorized**

This list also includes any user-defined login classes.

10. Click **OK** in the Add User dialog box and Edit User Management dialog box.
11. Click **OK** to check your configuration and save it as a candidate configuration.
12. If you are done configuring the device, click **Commit Options>Commit**.

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 [CLI User Guide](#).

To configure new users:

1. Set the name of the login class and allow the use of the reboot command.

```
[edit system login]
user@host# set class operator-and-boot allow-commands "request system reboot"
```

2. Set the permission bits for the login class.

```
[edit system login]
user@host# set class operator-and-boot permissions [clear network reset trace view]
```

3. Set the username, login class, and encrypted password for the user.

```
[edit system login]
user@host# set user cmartin class superuser authentication encrypted-password $1$ABC123
```

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

```
[edit]
user@host# show system login
  class operator-and-boot {
    permissions [ clear network reset trace view ];
    allow-commands "request system reboot";
  }
  user cmartin {
    class superuser;
    authentication {
      encrypted-password "$1$ABC123";
    }
  }
```

```
}
```

The following example shows how to create accounts for four router or switch users, and create an account for the template user **remote**. All users use one of the default system login classes. User **alexander** also has two digital signal algorithm (DSA) public keys configured for SSH authentication.

```
[edit]
system {
  login {
    user philip {
      full-name "Philip of Macedonia";
      uid 1001;
      class super-user;
      authentication {
        encrypted-password "$ABC123";
      }
    }
    user alexander {
      full-name "Alexander the Great";
      uid 1002;
      class view;
      authentication {
        encrypted-password "$ABC123";
        ssh-dsa "8924 37 5678 5678@gaugamela.per";
        ssh-dsa "6273 94 9283@boojum.per";
      }
    }
    user darius {
      full-name "Darius King of Persia";
      uid 1003;
      class operator;
      authentication {
        ssh-rsa "1024 37 12341234@ecbatana.per";
      }
    }
    user anonymous {
      class unauthorized;
    }
    user remote {
      full-name "All remote users";
      uid 9999;
      class read-only;
    }
  }
}
```

The following example shows how to create accounts for four router or switch users, and create an account for the template user **remote**. All users use one of the default system login classes. User **alexander** also has two digital signal algorithm (DSA) public keys configured for SSH authentication.

```
[edit]
system {
```

```

login {
  user philip {
    full-name "Philip of Macedonia";
    uid 1001;
    class super-user;
    authentication {
      encrypted-password "$ABC123";
    }
  }
  user alexander {
    full-name "Alexander the Great";
    uid 1002;
    class view;
    authentication {
      encrypted-password "$ABC123";
      ssh-dsa "8924 37 5678 5678@gaugamela.per";
      ssh-dsa "6273 94 9283@boojum.per";
    }
  }
  user darius {
    full-name "Darius King of Persia";
    uid 1003;
    class operator;
    authentication {
      ssh-rsa "1024 37 12341234@ecbatana.per";
    }
  }
  user anonymous {
    class unauthorized;
  }
  user remote {
    full-name "All remote users";
    uid 9999;
    class read-only;
  }
}

```

The following example shows how to create accounts for four router or switch users, and create an account for the template user **remote**. All users use one of the default system login classes. User **alexander** also has two digital signal algorithm (DSA) public keys configured for SSH authentication.

```

[edit]
system {
  login {
    user philip {
      full-name "Philip of Macedonia";
      uid 1001;
      class super-user;
      authentication {
        encrypted-password "$ABC123";
      }
    }
  }
}

```

```
user alexander {
  full-name "Alexander the Great";
  uid 1002;
  class view;
  authentication {
    encrypted-password "$ABC123";
    ssh-dsa "8924 37 5678 5678@gaugamela.per";
    ssh-dsa "6273 94 9283@boojum.per";
  }
}
user darius {
  full-name "Darius King of Persia";
  uid 1003;
  class operator;
  authentication {
    ssh-rsa "1024 37 12341234@ecbatana.per";
  }
}
user anonymous {
  class unauthorized;
}
user remote {
  full-name "All remote users";
  uid 9999;
  class read-only;
}
}
```

If you are done configuring the device, enter **commit** from configuration mode.



NOTE: To completely set up RADIUS or TACACS+ authentication, you must configure at least one RADIUS or TACACS+ server and specify a user template account. Do one of the following tasks:

- Configure a RADIUS server. See [“Example: Configuring a RADIUS Server for System Authentication”](#) on page 209.
 - Configure a TACACS+ server. See [“Example: Configuring a TACACS+ Server for System Authentication”](#) on page 233.
 - Configure a user. See [“Example: Configuring New Users”](#) on page 69.
 - Configure template accounts. See [“Example: Creating Template Accounts”](#) on page 77.
-

Verification

Confirm that the configuration is working properly.

Verifying the New Users Configuration

Purpose	Verify that the new users have been configured.
Action	From operational mode, enter the show system login command.
Related Documentation	<ul style="list-style-type: none"> • Junos OS User Authentication Methods on page 185 • Junos OS User Accounts Overview on page 65 • Junos OS User Authentication Methods on page 185 • Configuring Local User Template Accounts for User Authentication on page 75

Configuring Local User Template Accounts for User Authentication

You use local user template accounts when you need different types of templates for authentication. Each template can define a different set of permissions appropriate for the group of users who use that template. These templates are defined locally on the router or switch and referenced by the TACACS+ and RADIUS authentication servers.

When you configure local user templates and a user logs in, Junos OS issues a request to the authentication server to authenticate the user's login name. If a user is authenticated, the server returns the local username to Junos OS, which then determines whether a local username is specified for that login name (**local-username** for TACACS+, **Juniper-Local-User** for RADIUS). If so, Junos OS selects the appropriate local user template locally configured on the router or switch. If a local user template does not exist for the authenticated user, the router or switch defaults to the **remote** template.

To configure different access privileges for users who share the local user template account, include the **allow-commands** and **deny-commands** commands in the authentication server configuration file.

To configure a local user template, include the **user local-username** statement at the **[edit system login]** hierarchy level and specify the privileges you want to grant to the local users to whom the template applies:

```
[edit system login]
user local-username {
  full-name "Local user account";
  uid uid-value;
  class class-name;
}
```

This example configures the **sales** and **engineering** local user templates:

```
[edit]
system {
  login {
```

```
user sales {
  uid uid-value;
  class class-name;
}
user engineering {
  uid uid-value;
  class class-name;
}
}
```

```
user = simon {
  ...
  service = junos-exec {
    local-user-name = sales
    allow-commands = "configure"
    deny-commands = "shutdown"
  }
}
user = rob {
  ...
  service = junos-exec {
    local-user-name = sales
    allow-commands = "(request system) | (show rip neighbor)"
    deny-commands = "clear"
  }
}
user = harold {
  ...
  service = junos-exec {
    local-user-name = engineering
    allow-commands = "monitor | help | show | ping | traceroute"
    deny-commands = "configure"
  }
}
user = jim {
  ...
  service = junos-exec {
    local-user-name = engineering
    allow-commands = "show bgp neighbor"
    deny-commands = "telnet | ssh"
  }
}
```

When the login users Simon and Rob are authenticated, the router or switch applies the sales local user template. When login users Harold and Jim are authenticated, the router or switch applies the engineering local user template.

- Related Documentation**
- [Example: Configuring Authentication Order on page 193](#)
 - [user \(Access\) on page 1883](#)

Configuring Remote Template Accounts for User Authentication

By default, the Junos OS uses remote template accounts for user authentication when:

- The authenticated user does not exist locally on the router or switch.
- The authenticated user's record in the authentication server specifies local user, or the specified local user does not exist locally on the router or switch.

To configure the remote template account, include the **user remote** statement at the **[edit system login]** hierarchy level and specify the privileges you want to grant to remote users:

```
[edit system login]
user remote {
  full-name "All remote users";
  uid uid-value;
  class class-name;
}
```

To configure different access privileges for users who share the remote template account, include the **allow-commands** and **deny-commands** statements in the authentication server configuration file.

- Related Documentation**
- [Example: Configuring Authentication Order on page 193](#)
 - [user \(Access\) on page 1883](#)

Example: Creating Template Accounts

This example shows how to create template accounts.

- [Requirements on page 77](#)
- [Overview on page 77](#)
- [Configuration on page 78](#)
- [Verification on page 80](#)

Requirements

No special configuration beyond device initialization is required before configuring this feature.

Overview

You can create template accounts that are shared by a set of users when you are using RADIUS or TACACS+ authentication. When a user is authenticated by a template account, the CLI username is the login name, and the privileges, file ownership, and effective user ID are inherited from the template account.

By default, Junos OS uses the **remote** template account when:

- The authenticated user does not exist locally on the device.
- The authenticated user's record in the RADIUS or TACACS+ server specifies local user, or the specified local user does not exist locally on the device.

In this example, you create a remote template account and set the username to remote and the login class for the user as operator. You create a remote template that is applied to users authenticated by RADIUS or TACACS+ that do not belong to a local template account.

You then create a local template account and set the username as admin and the login class as superuser. You use local template accounts when you need different types of templates. Each template can define a different set of permissions appropriate for the group of users who use that template.

Configuration

- [Creating a Remote Template Account on page 78](#)
- [Creating a Local Template Account on page 79](#)

Creating a Remote Template Account

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 system login user remote class operator
```

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 *CLI User Guide*.

To create a remote template account:

- Set the username and the login class for the user.

```
[edit system login]
user@host# set user remote class operator
```

Results

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

```
[edit]
user@host# show system login
user remote {
  class operator;
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Creating a Local Template Account

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 system login user admin class superuser
```

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 *CLI User Guide*.

To create a local template account:

1. Set the username and the login class for the user.

```
[edit system login]
user@host# set user admin class superuser
```

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

```
[edit]
user@host# show system login
user admin {
  class super-user;
}
```

If you are done configuring the device, enter **commit** from configuration mode.



NOTE: To completely set up RADIUS or TACACS+ authentication, you must configure at least one RADIUS or TACACS+ server and specify a system authentication order. Do one of the following tasks:

- Configure a RADIUS server. See [“Example: Configuring a RADIUS Server for System Authentication” on page 209](#).
- Configure a TACACS+ server. See [“Example: Configuring a TACACS+ Server for System Authentication” on page 233](#).
- Configure system authentication order. See [“Example: Configuring Authentication Order” on page 193](#).

Verification

Confirm that the configuration is working properly.

Verifying the Template Accounts Creation

Purpose Verify that the template accounts have been created.

Action From operational mode, enter the **show system login** command.

Related Documentation

- [Junos OS User Authentication Methods on page 185](#)
- [Junos OS User Accounts Overview on page 65](#)
- [Junos OS User Authentication Methods on page 185](#)
- [Configuring Local User Template Accounts for User Authentication on page 75](#)

Junos-FIPS Crypto Officer and User Accounts Overview

Junos-FIPS defines a restricted set of user roles. Unlike the Junos OS, which enables a wide range of capabilities to users, FIPS 140-2 defines specific types of users (Crypto Officer, User, and Maintenance). Crypto Officers and FIPS Users perform all FIPS-related configuration tasks and issue all FIPS-related commands. Crypto Officer and FIPS User configurations must follow FIPS 140-2 guidelines. Typically, no user besides a Crypto Officer can perform FIPS-related tasks.

Crypto Officer User Configuration

Junos-FIPS offers finer control of user permissions than those mandated by FIPS 140-2. For FIPS 140-2 conformance, any Junos-FIPS user with the **secret**, **security**, and **maintenance** permission bits set is a Crypto Officer. In most cases, the **super-user** class should be reserved for a Crypto Officer. A FIPS User can be defined as any Junos-FIPS user that does not have the **secret**, **security**, and **maintenance** bits set.

FIPS User Configuration

A Crypto Officer sets up FIPS Users. FIPS Users can be granted permissions normally reserved for a Crypto Officer; for example, permission to zeroize the system and individual AS-II FIPS PICs.

Related Documentation

- [Junos OS User Accounts Overview on page 65](#)

Configuring Time-Based User Access

The Junos OS enables you to configure time-based restrictions for user access to log in to a device. This is useful for restricting the time and duration of user logins for all users

belonging to a login class. You can specify the days of the week when users can log in, the access start time, and the access end time.

- To configure user access on specific days of the week, without any restrictions on the duration of login, include the **allowed-days** statement only.

```
[edit system]
login {
  class class-name {
    allowed-days [ days-of-the-week ];
  }
}
```

- To configure user access on all the days of the week for a specific duration, include the **access-start** and **access-end** statements only.

```
[edit system]
login {
  class class-name {
    access-start HH:MM;
    access-end HH:MM;
  }
}
```

- To configure user access on specific days of the week for a specified duration, include the **allowed-days**, **access-start**, and **access-end** statements.

```
[edit system]
login {
  class class-name {
    allowed-days [ days-of-the-week ];
    access-start HH:MM;
    access-end HH:MM;
  }
}
```

Specify the start time and end time in **HH:MM** (24-hour) format, where **HH** represents the hours and **MM** represents the minutes.



NOTE: Access start time and end time that spans across 12:00 AM on a specified day results in the user having access until the next day, even if the access day is not explicitly configured. For instance, the following configuration results in the user having access until 6:00 AM on Tuesday and Thursday, although the `allowed-days` statement specifies access only on Monday and Wednesday:

```
[edit system]
login {
  class operator-night-shift {
    allowed-days [ monday wednesday ];
    access-start 2000;
    access-end 0600;
  }
}
```

**Related
Documentation**

- [Examples: Configuring Time-Based User Access on page 59](#)
- [Defining Junos OS Login Classes on page 52](#)
- [access-end on page 1131](#)
- [access-start on page 1133](#)
- [allowed-days on page 1171](#)
- [access-end](#)

Examples: Configuring Time-Based User Access

The following example shows how to configure user access for the **operator-round-the-clock-access** login class from Monday through Friday without any restriction on access time or duration of login:

```
[edit system]
login {
  class operator-round-the-clock-access {
    allowed-days [ monday tuesday wednesday thursday friday ];
  }
}
```

The following example shows how to configure user access for the **operator-day-shift** login class on Monday, Wednesday, and Friday from 8:30 AM to 4:30 PM:

```
[edit system]
login {
  class operator-day-shift {
    allowed-days [ monday wednesday friday ];
    access-start 0830;
    access-end 1630;
  }
}
```

```
}
```

Alternatively, you can also specify the login start time and end time for the **operator-day-shift** login class to be from 8:30 AM to 4:30 PM in the following format:

```
[edit system]
login {
  class operator-day-shift {
    allowed-days [ monday wednesday friday ];
    access-start 08:30am;
    access-end 04:30pm;
  }
}
```

The following example shows how to configure user access for the **operator-day-shift-all-days-of-the-week** login class to be on all days of the week from 8:30 AM to 4:30 PM:

```
[edit system]
login {
  class operator-day-shift-all-days-of-the-week {
    access-start 0830;
    access-end 1630;
  }
}
```

Related Documentation

- [Configuring Time-Based User Access on page 80](#)

Configuring a Local Administrator Account

The following example shows how to configure a password-protected local administration account called **admin** with superuser privileges. Superuser privileges give a user permission to use any command on the router and are generally reserved for a select few users such as system administrators. It is important to protect the local administrator account with a password to prevent unauthorized users from gaining access to superuser commands that can be used to alter the system configuration. Even users with RADIUS authentication should configure a local password. If RADIUS fails or becomes unreachable, the login process will revert to password authentication on the local administrator account.

```
[edit]
system {
  login {
    user admin {
      uid 1000;
      class superuser;
      authentication {
        encrypted-password "<PASSWORD>"; # SECRET-DATA
      }
    }
  }
}
```

```
}  
}  
}
```

**Related
Documentation**

- [Junos OS Login Classes Overview on page 47](#)
- [Configuring Junos OS User Accounts by Using a Configuration Group on page 84](#)

Configuring Junos OS User Accounts by Using a Configuration Group

User accounts provide a way for users to access a router or switch. Junos OS requires that all users have a predefined user account before they can log in to the device. For each user account, you define the login name for the user and, optionally, information that identifies the user. After you have created an account, the software creates a home directory for the user.

It is a common practice to use remote authentication servers to centrally store information about users. Even so, it is also a good practice to configure at least one nonroot user directly on each device, in case access to the remote authentication server is disrupted. This one nonroot user commonly has a generic name, such as **admin**.

Because user accounts are configured on multiple devices, they are commonly configured inside of a configuration group. As such, the examples shown here are in a configuration group called **global**. Using a configuration group for your user accounts is optional.

To create a user account:

1. Add a new user, using the user's assigned account login name.

```
[edit groups global]  
user@host# edit system login user username
```

2. (Optional) Configure a full descriptive name for the account.

If the full name includes spaces, enclose the entire name in quotation marks.

```
[edit groups global system login user user-name]  
user@host# set full-name complete-name
```

For example:

```
user@host# show groups  
global {  
  system {  
    login {  
      user admin {  
        full-name "general administrator";  
      }  
    }  
  }  
}
```


3. (Optional) Set the user identifier (UID) for the account.

As with UNIX systems, the UID enforces user permissions and file access. If you do not set the UID, Junos OS assigns one for you. The format of the UID is a number in the range of 100 to 64000.

```
[edit groups global system login user user-name]
user@host# set uid uid-value
```

For example:

```
user@host# show groups
global {
  system {
    login {
      user admin {
        uid 9999;
      }
    }
  }
}
```

4. Assign the user to a login class.

You can define your own login classes or assign one of the predefined Junos OS login classes.

The predefined login classes are as follows:

- super-user—all permissions
- operator—clear, network, reset, trace, and view permissions
- read-only—view permissions
- unauthorized—no permissions

```
[edit groups global system login user user-name]
user@host# set class class-name
```

For example:

```
user@host# show groups
global {
  system {
    login {
      user admin {
        class super-user;
      }
    }
  }
}
```

5. Use one of the following methods to configure the user password.

- To enter a clear-text password that the system encrypts for you, use the following command to set the user password:

```
[edit groups global system login user user-name]  
user@host# set authentication plain-text-password password  
New Password: type password here  
Retype new password: retry password here
```

As you enter the password in plain text, Junos OS encrypts it immediately. You do not have to configure Junos OS to encrypt the password as in some other systems. Plain-text passwords are therefore hidden and marked as ## SECRET-DATA in the configuration.

- To enter a password that is already encrypted, use the following command to set the user password:



CAUTION: Do not use the encrypted-password option unless the password is *already* encrypted, and you are entering the encrypted version of the password.

If you accidentally configure the encrypted-password option with a plain-text password or with blank quotation marks (" "), you will not be able to log in to the device as this user.

```
[edit groups global system login user user-name]  
user@host# set authentication encrypted-password "password"  
New Password: type password here  
Retype new password: retry password here
```

- To load previously generated public keys from a named file at a specified URL location, use the following command to set the user password:

```
[edit groups global system login user user-name]  
user@host# set authentication load-key-file URL filename
```

- To enter an ssh public string, use the following command to set the user password:

```
[edit groups global system login user user-name]  
user@host# set authentication (ssh-dsa | ssh-ecdsa | ssh-rsa) authorized-key
```

6. 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
```

7. Commit the configuration.

```
user@host# commit
```

8. To verify the configuration, log out and log back in as the new user.

**Related
Documentation**

- [Defining Junos OS Login Classes on page 52](#)
- [Example: Creating Login Classes with Specific Privileges on page 53](#)
- [Junos OS User Accounts Overview on page 65](#)
- [Limiting the Number of User Login Attempts for SSH and Telnet Sessions on page 87](#)

Limiting the Number of User Login Attempts for SSH and Telnet Sessions

You can limit the number of times a user can attempt to enter a password while logging in through SSH or Telnet. The connection is terminated if a user fails to log in after the number of attempts specified. You can also specify a delay, in seconds, before a user can try to enter a password after a failed attempt. In addition, you can specify the threshold for the number of failed attempts before the user experiences a delay in being able to enter a password again.

To specify the number of times a user can attempt to enter a password while logging in, include the **retry-options** statement at the **[edit system login]** hierarchy level:

```
[edit system login]
retry-options {
  tries-before-disconnect number;
  backoff-threshold number;
  backoff-factor seconds;
  maximum-time seconds;
  minimum-time seconds;
}
```

You can configure the following options:

- **tries-before-disconnect**—Number of times a user can attempt to enter a password when logging in. The connection closes if a user fails to log in after the number specified. The range is from 1 through 10, and the default is 10.
- **backoff-threshold**—Threshold for the number of failed login attempts before the user experiences a delay in being able to enter a password again. Use the **backoff-factor** option to specify the length of the delay in seconds. The range is from 1 through 3, and the default is 2.
- **backoff-factor**—Length of time, in seconds, before a user can attempt to log in after a failed attempt. The delay increases by the value specified for each subsequent attempt after the threshold. The range is from 5 through 10, and the default is 5 seconds.
- **maximum-time *seconds***—Maximum length of time, in seconds, that the connection remains open for the user to enter a username and password to log in. If the user remains idle and does not enter a username and password within the configured

maximum-time, the connection is closed. The range is from 20 through 300 seconds, and the default is 120 seconds.

- **minimum-time**—Minimum length of time, in seconds, that a connection remains open while a user is attempting to enter a correct password. The range is from 20 through 60, and the default is 40.

**Related
Documentation**

- [Example: Limiting the Number of Login Attempts for SSH and Telnet Sessions to Prevent Unauthorized Access on page 88](#)
- [Configuring Junos OS User Accounts by Using a Configuration Group on page 84](#)

Example: Limiting the Number of Login Attempts for SSH and Telnet Sessions to Prevent Unauthorized Access

Limiting the number of SSH and Telnet login attempts per user is one of the most effective methods of stopping brute force attacks from compromising your network security. Brute force attackers execute a large number of login attempts in a short period of time to illegitimately gain access to a private network. By configuring the **retry-options** command, you can create an increasing delay after each failed login attempt, eventually disconnecting any user who passes your set threshold of login attempts.

The following example shows how to limit the user to four attempts when the user enters a password while logging in through SSH or Telnet. Set the **backoff-threshold** to 2, the **back-off-factor** to 5 seconds, and the **minimum-time** to 40 seconds. The user experiences a delay of 5 seconds after the second attempt to enter a correct password fails. After each subsequent failed attempt, the delay increases by 5 seconds. After the fourth and final failed attempt to enter a correct password, the user experiences an additional 10-second delay, and the connection closes after a total of 40 seconds.

The additional variables **maximum-time** and **lockout-period** are not set in this example.

```
[edit]
system {
  login {
    retry-options {
      backoff-threshold 2;
      backoff-factor 5;
      minimum-time 40;
      tries-before-disconnect 4;
    }
    password {
    }
  }
}
```



NOTE: This sample only shows the portion of the [edit system login] hierarchy level being modified.

- Related Documentation**
- [Limiting the Number of User Login Attempts for SSH and Telnet Sessions on page 87](#)
 - [login on page 1505](#)

Understanding Administrative Roles

A system user can be a member of a class that allows the user to act as a particular kind of administrator for the system. Requiring a specific role to view or modify an item restricts the extent of information a user can obtain from the system. It also limits how much of the system is open to intentional or unintentional modification or observation by a user. We recommend that you use the following guidelines when you are designing administrative roles:

- Do not allow any user to log in to the system as **root**.
- Restrict each user to the smallest set of privileges needed to perform the user's duties.
- Do not allow any user to belong to a login class containing the **shell** permission flag. The **shell** permission flag allows users to run the **start shell** command from the CLI.
- Allow users to have rollback permissions. Rollback permissions allow users to undo an action performed by an administrator but does not allow them to commit the changes.

You can assign an administrative role to a user by configuring a login class to have the privileges required for that role. You can configure each class to allow or deny access to configuration statements and commands by name. These specific restrictions override and take precedence over any permission flags also configured in the class. You can assign one of the following role attributes to an administrative user.

- **Crypto-administrator**—Allows the user to configure and monitor cryptographic data.
- **Security-administrator**—Allows the user to configure and monitor security data.
- **Audit-administrator**—Allows the user to configure and monitor audit data.
- **IDS-administrator**—Allows the user to monitor and clear the intrusion detection service (IDS) security logs.

Each role can perform the following specific management functions:

- **Cryptographic Administrator**
 - Configures the cryptographic self-test.
 - Modifies the cryptographic security data parameters.
- **Audit Administrator**
 - Configures and deletes the audit review search and sort feature.
 - Searches and sorts audit records.
 - Configures search and sort parameters.
 - Manually deletes audit logs.

- **Security Administrator**

- Invokes, determines, and modifies the cryptographic self-test behavior.
- Enables, disables, determines, and modifies the audit analysis and audit selection functions and configures the device to automatically delete audit logs.
- Enables or disables security alarms.
- Specifies limits for quotas on Transport Layer connections.
- Specifies the limits, network identifiers, and time periods for quotas on controlled connection-oriented resources.
- Specifies the network addresses permitted to use Internet Control Message Protocol (ICMP) or Address Resolution Protocol (ARP).
- Configures the time and date used in time stamps.
- Queries, modifies, deletes, and creates the information flow or access control rules and attributes for the unauthenticated information flow security function policy (SFP), the authenticated information flow SFP, the unauthenticated device services, and the discretionary access control policy.
- Specifies initial values that override default values when object information is created under unauthenticated information flow SFP, the authenticated information flow SFP, the unauthenticated target of evaluation (TOE) services, and the discretionary access control policy.
- Creates, deletes, or modifies the rules that control the address from which management sessions can be established.
- Specifies and revokes security attributes associated with the users, subjects, and objects.
- Specifies the percentage of audit storage capacity at which the device alerts administrators.
- Handles authentication failures and modifies the number of failed authentication attempts through SSH or from the CLI that can occur before progressive throttling is enforced for further authentication attempts and before the connection is dropped.
- Manages basic network configuration of the device.

- **IDS Administrator**—Specifies IDS security alarms, intrusion alarms, audit selections, and audit data.

You need to set the security-role attribute in the classes created for these administrative roles. This attribute restricts which users can show and clear the security logs, actions that cannot be performed through configuration alone.

For example, you need to set the security-role attribute in the **ids-admin** class created for the IDS administrator role if you want to restrict clearing and showing IDS logs to the IDS administrator role. Likewise, you need to set the security-role to one of the other admin values to restrict that class from being able to clear and show non-IDS logs only.



NOTE: When a user deletes an existing configuration, the configuration statements under the hierarchy level of the deleted configuration (that is, the child objects that the user does not have permission to modify), now remain in the device.

Related Documentation

- [Example: Configuring Administrative Roles on page 91](#)

Example: Configuring Administrative Roles

This example shows how to configure individual administrative roles for a distinct, unique set of privileges apart from all other administrative roles.

- [Requirements on page 91](#)
- [Overview on page 91](#)
- [Configuration on page 92](#)
- [Verification on page 97](#)

Requirements

No special configuration beyond device initialization is required before configuring this feature.

Overview

This example configures four users:

- **audit-officer** of the class **audit-admin**
- **crypto-officer** of the class **crypto-admin**
- **security-officer** of the class **security-admin**
- **ids-officer** of the class **ids-admin**

When a **security-admin** class is configured, the privileges for creating administrators are revoked from the user who created the **security-admin** class. Creation of new users and logins is at the discretion of the **security-officer**.

In this example, you create audit admin, crypto admin, security admin, and ids admin with permission flags pertaining to this role. Then you allow or deny access to configuration statements and commands by name for each administrative role. These specific restrictions take precedence over the permission flags also configured in the class. For example, only the **crypto-admin** can run the **request system set-encryption-key** command, which requires having the **security** permission flag to access it. Only the **security-admin** can include the **system time-zone** statement in the configuration, which requires having the **system-control** permission flag.

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 system login class audit-admin permissions security
set system login class audit-admin permissions trace
set system login class audit-admin permissions maintenance
set system login class audit-admin allow-commands "^clear (log|security log)"
set system login class audit-admin deny-commands "^clear (security alarms|system
login lockout)|^file (copy|delete|rename)|^request (security|system
set-encryption-key)|^rollback|^set date|^show security
(alarms|dynamic-policies|match-policies|policies)|^start shell";
set system login class audit-admin security-role audit-administrator
set system login class crypto-admin permissions admin-control
set system login class crypto-admin permissions configure
set system login class crypto-admin permissions maintenance
set system login class crypto-admin permissions security-control
set system login class crypto-admin permissions system-control
set system login class crypto-admin permissions trace
set system login class crypto-admin allow-commands "^request system
set-encryption-key"
set system login class crypto-admin deny-commands "^clear (log|security alarms|security
log|system login lockout)|^file (copy|delete|rename)|^rollback|^set date|^show security
(alarms|dynamic-policies|match-policies|policies)|^start shell"
set system login class crypto-admin allow-configuration-regexps "security (ike|ipsec)
(policy|proposal)" "security ipsec ^vpn$ .* manual
(authentication|encryption|protocol|spi)" "system fips self-test after-key-generation"
set system login class crypto-admin security-role crypto-administrator
set system login class security-admin permissions all
set system login class security-admin deny-commands "^clear (log|security
log)|^(clear|show) security alarms alarm-type idp|^request (security|system
set-encryption-key)|^rollback|^start shell"
set system login class security-admin deny-configuration-regexps "security alarms
potential-violation idp" "security (ike|ipsec) (policy|proposal)" "security ipsec ^vpn$
.* manual (authentication| encryption|protocol|spi)" "security log cache" "security log
exclude .* event-id IDP_.*" "system fips self-test after-key- generation"
set system login class security-admin security-role security-administrator
set system login class ids-admin permissions configure
set system login class ids-admin permissions security-control
set system login class ids-admin permissions trace
set system login class ids-admin permissions maintenance
set system login class ids-admin allow-configuration-regexps "security alarms
potential-violation idp" "security log exclude .* event-id IDP_.*"
set system login class ids-admin deny-commands "^clear log|^ (clear|show) security
alarms (alarm-id|all|newer-than|older- than|process|severity)|^(clear|show) security
alarms alarm-type
(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)|^file (copy|delete|rename)|^request
(security|system set-encryption-key)|^rollback|
```



```

^set date|^show security (dynamic-policies|match-policies|policies)|^start shell"
set system login class ids-admin deny-configuration-regexps "security alarms
  potential-violation (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)"
set system login class ids-admin security-role ids-admin
set system login user audit-officer class audit-admin
set system login user crypto-officer class crypto-admin
set system login user security-officer class security-admin
set system login user ids-officer class ids-admin
set system login user audit-officer authentication plain-text-password
set system login user crypto-officer authentication plain-text-password
set system login user security-officer authentication plain-text-password
set system login user ids-officer authentication plain-text-password

```

Step-by-Step Procedure

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

To configure users in administrative roles:

1. Create the **audit-admin** login class.

```

[edit]
user@host# set system login class audit-admin
[edit system login class audit-admin]
user@host# set permissions security
user@host# set permissions trace
user@host# set permissions maintenance

```

2. Configure the **audit-admin** login class restrictions.

```

[edit system login class audit-admin]
user@host# set allow-commands "^clear (log|security log)"
user@host# set deny-commands "^clear (security alarms|system login logout)|^file
(copy|delete|rename)|^request (security|system
set-encryption-key)|^rollback|^set date|^show security
(alarms|dynamic-policies|match-policies|policies)|^start shell"
user@host# set security-role audit-administrator

```

3. Create the **crypto-admin** login class.

```

[edit]
user@host# set system login class crypto-admin

[edit system login class crypto-admin]
user@host# set permissions admin-control
user@host# set permissions configure
user@host# set permissions maintenance
user@host# set permissions security-control

```

```
user@host# set permissions system-control
user@host# set permissions trace
```

4. Configure the **crypto-admin** login class restrictions.

```
[edit system login class crypto-admin]
user@host# set allow-commands "^request system set-encryption-key"
user@host# set deny-commands "^clear (log|security alarms|security log|system
login lockout)|^file (copy|delete|rename)|^rollback|^set date|^show security
(alarms|dynamic-policies|match-policies|policies)|^start shell"
user@host# set allow-configuration-regexps "security (ike|ipsec) (policy|proposal)"
"security ipsec ^vpn$.* manual (authentication|encryption|protocol|spi)" "system
fips self-test after-key-generation"
user@host# set security-role crypto-administrator
```

5. Create the **security-admin** login class.

```
[edit]
user@host# set system login class security-admin

[edit system login class security-admin]
user@host# set permissions all
```

6. Configure the **security-admin** login class restrictions.

```
[edit system login class security-admin]
user@host# set deny-commands "^clear (log|security log)|^(clear|show) security
alarms alarm-type idp|^request (security|system
set-encryption-key)|^rollback|^start shell"
user@host# set deny-configuration-regexps "security alarms potential-violation
idp" "security (ike|ipsec) (policy|proposal)" "security ipsec ^vpn$.* manual
(authentication| encryption|protocol|spi)" "security log cache" "security log
exclude.* event-id IDP_.*" "system fips self-test after-key- generation"
user@host# set security-role security-administrator
```

7. Create the **ids-admin** login class.

```
[edit]
user@host# set system login class ids-admin

[edit system login class ids-admin]
user@host# set permissions configure
user@host# set permissions maintenance
user@host# set permissions security-control
user@host# set permissions trace
```

8. Configure the **ids-admin** login class restrictions.

```
[edit system login class ids-admin]
user@host# set allow-configuration-regexps "security alarms potential-violation
  idp" "security log exclude .* event-id IDP_.*"
set system login class ids-admin deny-commands "^clear log|^ (clear|show) security
  alarms (alarm-id|all|newer-than|older-than|process|severity)|^ (clear|show)
  security alarms alarm-type
  (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)|^ file
  (copy|delete|rename)|^ request (security|system set-encryption-key)|
  ^rollback|^set date|^show security (dynamic-policies|match-policies|policies)|^start
  shell"
set system login class ids-admin deny-configuration-regexps "security alarms
  potential-violation (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)"
user@host# set security-role ids-administrator
```

9. Assign users to the roles.

```
[edit]
user@host# set system login

[edit system login]
user@host# set user audit-officer class audit-admin
user@host# set user crypto-officer class crypto-admin
user@host# set user security-officer class security-admin
user@host# set user ids-officer class ids-admin
```

10. Configure passwords for the users.

```
[edit system login]
user@host# set user audit-officer authentication plain-text-password
user@host# set user crypto-officer authentication plain-text-password
user@host# set user security-officer authentication plain-text-password
user@host# set user ids-officer authentication plain-text-password
```

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@host# show system
system {
  login {
    class audit-admin {
      permissions [ maintenance security trace ];
```

```

allow-commands "^clear (log|security log)";
deny-commands "^clear (security alarms|system login lockout)|^file
  (copy|delete|rename)|^request (security|system
    set-encryption-key)|^rollback|^set date|^show security
    (alarms|dynamic-policies|match-policies|policies)|^start shell";
security-role audit-administrator;
}

class crypto-admin {
  permissions [ admin-control configure maintenance security-control system-control
    trace ];
  allow-commands "^request (system set-encryption-key)";
  deny-commands "^clear (log|security alarms|security log|system login lockout)|^file
    (copy|delete|rename)|^rollback|^set date|^show security
    (alarms|dynamic-policies|match-policies|policies)|^start shell";
  allow-configuration-regexps "security (ike|ipsec) (policy|proposal)" "security ipsec
    ^vpn$.* manual (authentication|encryption|protocol|spi)" "system fips self-test
    after-key-generation";
  security-role crypto-administrator;
}

class security-admin {
  permissions [ all];
  deny-commands "^clear (log|security log)|^(clear|show) security alarms alarm-type
    idp|^request (security|system set-encryption-key)|^rollback|^start shell";
  deny-configuration-regexps "security alarms potential-violation idp" "security
    (ike|ipsec) (policy|proposal)" "security ipsec ^vpn$.* manual
    (authentication|encryption|protocol|spi)" "security log exclude.* event-id IDP_.*"
    "system fips self-test after-key-generation";
  security-role security-administrator;
}

class ids-admin {
  permissions [ configure maintenance security-control trace ];
  deny-commands "^clear log|^ (clear|show) security alarms
    (alarm-id|all|newer-than|older-than|process|severity)|^(clear|show) security
    alarms alarm-type
    (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) | ^file (copy|delete|rename)
    |^request (security|system set-encryption-key) | ^rollback |
    ^set date | ^show security (dynamic-policies|match-policies|policies) |^start shell";
  allow-configuration-regexps "security alarms potential-violation idp" "security log
    exclude.* event-id IDP_.*";
  deny-configuration-regexps "security alarms potential-violation
    (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)"
  security-role ids-administrator;
}

user audit-officer {
  class audit-admin;
  authentication {
    encrypted-password "$1$ABC123"; ## SECRET-DATA
  }
}

user crypto-officer {
  class crypto-admin;

```

```

    authentication {
        encrypted-password "$1$ABC123."; ## SECRET-DATA
    }
}
user security-officer {
    class security-admin;
    authentication {
        encrypted-password "$1$ABC123."; ## SECRET-DATA
    }
}
user ids-officer {
    class ids-admin;
    authentication {
        encrypted-password "$1$ABC123/"; ## SECRET-DATA
    }
}
}
}

```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

Verifying the Login Permissions

Purpose Verify the login permissions for the current user.

Action From operational mode, enter the **show cli authorization** command.

```

user@host>show cli authorization

Current user: 'example' class 'super-user'
Permissions:
  admin      -- Can view user accounts
  admin-control-- Can modify user accounts
  clear      -- Can clear learned network info
  configure  -- Can enter configuration mode
  control    -- Can modify any config
  edit       -- Can edit full files
  field      -- Can use field debug commands
  floppy     -- Can read and write the floppy
  interface  -- Can view interface configuration
  interface-control-- Can modify interface configuration
  network    -- Can access the network
  reset      -- Can reset/restart interfaces and daemons
  routing    -- Can view routing configuration
  routing-control-- Can modify routing configuration
  shell      -- Can start a local shell
  snmp       -- Can view SNMP configuration
  snmp-control-- Can modify SNMP configuration
  system     -- Can view system configuration
  system-control-- Can modify system configuration
  trace      -- Can view trace file settings

```

```
trace-control-- Can modify trace file settings
view          -- Can view current values and statistics
maintenance  -- Can become the super-user
firewall      -- Can view firewall configuration
firewall-control-- Can modify firewall configuration
secret        -- Can view secret statements
secret-control-- Can modify secret statements
rollback      -- Can rollback to previous configurations
security      -- Can view security configuration
security-control-- Can modify security configuration
access        -- Can view access configuration
access-control-- Can modify access configuration
view-configuration-- Can view all configuration (not including secrets)
flow-tap      -- Can view flow-tap configuration
flow-tap-control-- Can modify flow-tap configuration
idp-profiler-operation-- Can Profiler data
pgcp-session-mirroring-- Can view pgcp session mirroring configuration
pgcp-session-mirroring-control-- Can modify pgcp session mirroring configuration
Individual command authorization:
Allow regular expression: none
Deny regular expression: none
Allow configuration regular expression: none
Deny configuration regular expression: none
```

This output summarizes the login permissions.

Related Documentation

- [Understanding Administrative Roles on page 89](#)

Login Retry Options

The security administrator can configure the number of times a user can try to log in to the device with invalid login credentials. The device can be locked after the specified number of unsuccessful authentication attempts. This helps to protect the device from malicious users attempting to access the system by guessing an account's password. The security administrator can unlock the user account or define a time period for the user account to remain locked.

The system **lockout-period** defines the amount of time the device can be locked for a user account after a specified number of unsuccessful login attempts.

The security administrator can configure a period of time after which an inactive session will be locked and require re-authentication to be unlocked. This helps to protect the device from being idle for a long period before the session times out.

The system **idle-timeout** defines length of time the CLI operational mode prompt remains active before the session times out.

The system **message** defines the system login message. This message appears before a user logs in.

The number of reattempts the device allows is defined by the **tries-before-disconnect** option. The device allows 3 unsuccessful attempts by default or as configured by the administrator. The device prevents the locked users to perform activities that require authentication, until a security administrator manually clears the lock or the defined time period for the device to remain locked has elapsed. However, the existing locks are ignored when the user attempts to log in from the local console.



NOTE: To clear the console during an administrator-initiated logout, the administrator must configure the set system login message “message string” such that, the message-string contains newline (\n) characters and a login banner message at the end of the \n characters.

To ensure that configuration information is cleared completely, the administrator can enter 50 or more \n characters in the *message-string* of the command set system login message “message string”.

For example, set system login message

"~~~~~
Welcome to Junos!!!"

Related Documentation

- [Example: Configuring Login Retry Options on page 99](#)

Example: Configuring Login Retry Options

This example shows how to configure system retry options to protect the device from malicious users.

- Requirements on page 99
- Overview on page 100
- Configuration on page 102
- Verification on page 103

Requirements

Before you begin, you should understand “Login Retry Options” on page 98.

No special configuration beyond device initialization is required before configuring this feature.

Overview

Malicious users sometimes try to log in to a secure device by guessing an authorized user account's password. Locking out a user account after a number of failed authentication attempts helps protect the device from malicious users.

Device lockout allows you to configure the number of failed attempts before the user account is locked out of the device and configure the amount of time before the user can attempt to log in to the device again. You can configure the amount of time in-between failed login attempts of a user account and can manually lock and unlock user accounts.

**NOTE:**

This example includes the following settings:

- **backoff-factor** — Sets the length of delay in seconds after each failed login attempt. When a user incorrectly logs in to the device, the user must wait the configured amount of time before attempting to log in to the device again. The length of delay increases by this value for each subsequent login attempt after the value specified in the **backoff-threshold** statement. The default value for this statement is five seconds, with a range of five to ten seconds.
- **backoff-threshold** — Sets the threshold for the number of failed login attempts on the device before the user experiences a delay when attempting to reenter a password. When a user incorrectly logs in to the device and hits the threshold of failed login attempts, the user experiences a delay that is set in the **backoff-factor** statement before attempting to log in to the device again. The default value for this statement is two, with a range of one through three.
- **lockout-period** — Sets the amount of time in minutes before the user can attempt to log in to the device after being locked out due to the number of failed login attempts specified in the **tries-before-disconnect** statement. When a user fails to correctly login after the number of allowed attempts specified by the **tries-before-disconnect** statement, the user must wait the configured amount of minutes before attempting to log in to the device again. The lockout-period must be greater than zero. The range at which you can configure the lockout-period is one through 43,200 minutes.
- **tries-before-disconnect** — Sets the maximum number of times the user is allowed to enter a password to attempt to log in to the device through SSH or Telnet. When the user reaches the maximum number of failed login attempts, the user is locked out of the device. The user must wait the configured amount of minutes in the **lockout-period** statement before attempting to log back in to the device. The **tries-before-disconnect** statement must be set when the **lockout-period** statement is set; otherwise, the **lockout-period** statement is meaningless. The default number of attempts is ten, with a range of one through ten attempts.

Once a user is locked out of the device, if you are the security administrator, you can manually remove the user from this state using the `clear system login lockout <username>` command. You can also use the `show system login lockout` command to view which users are currently locked out, when the lockout period began for each user, and when the lockout period ends for each user.

If the security administrator is locked out of the device, he can log in to the device from the console port, which ignores any user locks. This provides a way for the administrator to remove the user lock on their own user account.

In this example the user waits for the **backoff-threshold** multiplied by the **backoff-factor** interval, in seconds, to get the login prompt. In this example, the user must wait 5 seconds after the first failed login attempt and 10 seconds after the second failed login attempt to get the login prompt. The user gets disconnected after 15 seconds after the third failed attempt because the **tries-before-disconnect** option is configured as 3.

The user cannot attempt another login until 120 minutes has elapsed, unless a security administrator manually clears the lock sooner.

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 system login retry-options backoff-factor 5
set system login retry-options backoff-threshold 1
set system login retry-options lockout-period 120
set system login retry-options tries-before-disconnect 3
```

Step-by-Step Procedure To configure system retry-options:

1. Configure the backoff factor.

```
[edit ]
user@host# set system login retry-options backoff-factor 5
```

2. Configure the backoff threshold.

```
[edit]
user@host# set system login retry-options backoff-threshold 1
```

3. Configure the amount of time the device gets locked after failed attempts.

```
[edit]
user@host# set system login retry-options lockout-period 5
```

4. Configure the number of unsuccessful attempts during which, the device can remain unlocked.

```
[edit]
user@host# set system login retry-options tries-before-disconnect 3
```

Results From configuration mode, confirm your configuration by entering the **show system login retry-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 system login retry-options
backoff-factor 5;
backoff-threshold 1;
lockout-period 5;
tries-before-disconnect 3;
```

Confirm that the configuration is working properly.

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Displaying the Locked User Logins

Purpose	Verify that the login lockout configuration is enabled.
Action	Attempt three unsuccessful logins for a particular username. The device will be locked for that username; then log in to the device with a different username. From operational mode, enter the show system login lockout command.
Meaning	When you perform three unsuccessful login attempts with a particular username, the device is locked for that user for five minutes, as configured in the example. You can verify that the device is locked for that user by logging in to the device with a different username and entering the show system login lockout command.
Related Documentation	<ul style="list-style-type: none"> • Login Retry Options on page 98

Managing Users (J-Web Procedure)

You can use the Users Configuration page for user information to add new users to an EX Series switch. For each account, you define a login name and password for the user and specify a login class for access privileges.

To configure users:

1. Select **Configure > System Properties > User Management**.

The User Management page displays details of users, the authentication order, the RADIUS servers and TACACS servers present.

2. Click **Edit**.

3. Click any of the following options on the **Users** tab:

- **Add**—Select this option to add a user. Enter details as described in [Table 5 on page 104](#).

- **Edit**—Select this option to edit an existing user's details. Enter details as described in [Table 5 on page 104](#).
 - **Delete**—Select this option to delete a user.
4. Click an option on the **Authentication Methods and Order** tab:
- **Authentication Order**—Drag and drop the authentication type from the Available Methods section to the Selected Methods. Click the up or down buttons to modify the authentication order.
 - **RADIUS server**—Click one of the following options:
 - **Add**—Select this option to add an authentication server. Enter details as described in [Table 6 on page 105](#).
 - **Edit**—Select this option to modify the authentication server details. Enter details as described in [Table 6 on page 105](#).
 - **Delete**—Select this option to delete an authentication server from the list.
 - **TACACS server**—Click one of the following options:
 - **Add**—Select this option to add an authentication server. Enter details as described in [Table 6 on page 105](#).
 - **Edit**—Select this option to modify the authentication server details. Enter details as described in [Table 6 on page 105](#).
 - **Delete**—Select this option to delete an authentication server from the list.



NOTE: After you make changes to the configuration on this page, you must commit the changes for them to take effect. To commit all changes to the active configuration, select **Commit Options > Commit**. See [Using the Commit Options to Commit Configuration Changes](#) for details about all commit options.

Table 5: User Management Configuration Page Summary

Field	Function	Your Action
User Information		
Username (required)	Specifies the name that identifies the user.	Type the username. It must be unique within the switching platform. Do not include spaces, colons, or commas in the username.
User Id	Specifies the user identification.	Type the user's ID.
Full Name	Specifies the user's full name.	Type the user's full name. If the full name contains spaces, enclose it in quotation marks. Do not include colons or commas.

Table 5: User Management Configuration Page Summary (continued)

Field	Function	Your Action
Login Class (required)	Defines the user's access privilege.	<p>Select the user's login class from the list:</p> <ul style="list-style-type: none"> • operator • read-only • super-user/superuser • unauthorized <p>This list also includes any user-defined login classes.</p>
Password	Specifies the login password for this user.	<p>Type the login password for this user. The login password must meet these criteria:</p> <ul style="list-style-type: none"> • The password must be at least 6 characters long. • It can include alphabetic, numeric, and special characters, but not control characters. • It must contain at least one change of case or character class.
Confirm Password	Verifies the login password for this user.	Retype the login password for this user.

Table 6: Add an Authentication Server

Field	Function	Your Action
IP Address	Specifies the IP address of the server.	Type the server's 32-bit IP address, in dotted decimal notation.
Password	Specifies the password of the server.	Type the password of the server.
Confirm Password	Verifies that the password of the server is entered correctly.	Retype the password of the server.
Server Port	Specifies the port with which the server is associated.	Type the port number.
Source Address	Specifies the source address of the server.	Type the server's 32-bit IP address, in dotted decimal notation.
Retry Attempts	Specifies the number of login retries allowed after a login failure.	<p>Type the number.</p> <p>NOTE: Only 1 retry is permitted for a TACACS server.</p>
Time out	Specifies the time interval to wait before the connection to the server is closed.	Type the interval in seconds.

Related Documentation

- *Configuring Management Access for the EX Series Switch (J-Web Procedure)*

CHAPTER 3

Configuring User Access Privileges

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies on page 117](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [Examples of Defining Access Privileges Using allow-configuration and deny-configuration Statements on page 151](#)
- [Example: Using Additive Logic With Regular Expressions to Specify Access Privileges on page 153](#)
- [Understanding User and Access Management Features on the QFabric System on page 156](#)

Understanding Junos OS Access Privilege Levels

Each top-level CLI command and each configuration statement have an access privilege level associated with them. Users can execute only those commands and configure and view only those statements for which they have access privileges. The access privileges for each login class are defined by one or more permission flags.

For each login class, you can explicitly deny or allow the use of operational and configuration mode commands that would otherwise be permitted or not allowed by a privilege level specified in the **permissions** statement.

The following sections provide additional information about permissions:

- [Junos OS Login Class Permission Flags on page 107](#)
- [Allowing or Denying Individual Commands for Junos OS Login Classes on page 111](#)

Junos OS Login Class Permission Flags

Permission flags are used to grant a user access to operational mode commands and configuration hierarchy levels and statements. By specifying a specific permission flag on the user's login class at the **[edit system login class]** hierarchy level, you grant the user

access to the corresponding commands and configuration hierarchy levels and statements. To grant access to all commands and configuration statements, use the **all** permissions flag.



NOTE: Each command listed represents that command and all subcommands with that command as a prefix. Each configuration statement listed represents the top of the configuration hierarchy to which that flag grants access.

The **permissions** statement specifies one or more of the permission flags listed in [Table 7 on page 108](#). Permission flags are not cumulative, so for each class you must list all the permission flags needed, including **view** to display information and **configure** to enter configuration mode. Two forms of permissions control for individual parts of the configuration are:

- "Plain" form—Provides read-only capability for that permission type. An example is **interface**.
- Form that ends in **-control**—Provides read and write capability for that permission type. An example is **interface-control**.

For permission flags that grant access to configuration hierarchy levels and statements, the flags grant read-only privilege to that configuration. For example, the **interface** permissions flag grants read-only access to the **[edit interfaces]** hierarchy level. The **-control** form of the flag grants read-write access to that configuration. Using the preceding example, **interface-control** grants read-write access to the **[edit interfaces]** hierarchy level.

[Table 7 on page 108](#) lists the Junos OS login class permission flags that you can configure by including the **permissions** statement at the **[edit system login class class-name]** hierarchy level.

The permission flags grant a specific set of access privileges. Each permission flag is listed with the operational mode commands and configuration hierarchy levels and statements for which that flag grants access.

Table 7: Login Class Permission Flags

Permission Flag	Description
"access" on page 842	Can view the access configuration in configuration mode and with the show configuration operational mode command.
"access-control" on page 846	Can view and configure access information at the [edit access] hierarchy level.
"admin" on page 847	Can view user account information in configuration mode and with the show configuration operational mode command.
"admin-control" on page 850	Can view user account information and configure it at the [edit system] hierarchy level.

Table 7: Login Class Permission Flags (continued)

Permission Flag	Description
"all-control" on page 851	Can view user accounts and configure them at the [edit system login] hierarchy level.
all	Can access all operational mode commands and configuration mode commands. Can modify configuration in all the configuration hierarchy levels.
"clear" on page 851	Can clear (delete) information learned from the network that is stored in various network databases by using the clear commands.
"configure" on page 922	Can enter configuration mode by using the configure command.
"control" on page 923	Can perform all control-level operations—all operations configured with the -control permission flags.
"field" on page 923	Can view field debug commands. Reserved for debugging support.
"firewall" on page 924	Can view the firewall filter configuration in configuration mode.
"firewall-control" on page 928	Can view and configure firewall filter information at the [edit firewall] hierarchy level.
"floppy" on page 928	Can read from and write to the removable media.
"flow-tap" on page 929	Can view the flow-tap configuration in configuration mode.
"flow-tap-control" on page 932	Can view the flow-tap configuration in configuration mode and can configure flow-tap configuration information at the [edit services flow-tap] hierarchy level.
"flow-tap-operation" on page 933	<p>Can make flow-tap requests to the router or switch. For example, a Dynamic Tasking Control Protocol (DTCP) client must have flow-tap-operation permission to authenticate itself to the Junos OS as an administrative user.</p> <p>NOTE: The flow-tap-operation option is not included in the all-control permissions flag.</p>
"idp-profiler-operation" on page 933	Can view profiler data.
"interface" on page 933	Can view the interface configuration in configuration mode and with the show configuration operational mode command.

Table 7: Login Class Permission Flags (continued)

Permission Flag	Description
"interface-control" on page 937	Can view chassis, class of service (CoS), groups, forwarding options, and interfaces configuration information. Can edit configuration at the following hierarchy levels: <ul style="list-style-type: none"> • [edit chassis] • [edit class-of-service] • [edit groups] • [edit forwarding-options] • [edit interfaces]
"maintenance" on page 938	Can perform system maintenance, including starting a local shell on the router or switch and becoming the superuser in the shell by using the su root command, and can halt and reboot the router or switch by using the request system commands.
"network" on page 947	Can access the network by using the ping , ssh , telnet , and traceroute commands.
"pgcp-session-mirroring" on page 949	Can view the pgcp session mirroring configuration.
"pgcp-session-mirroring-control" on page 952	Can modify the pgcp session mirroring configuration.
"reset" on page 953	Can restart software processes by using the restart command and can configure whether software processes are enabled or disabled at the [edit system processes] hierarchy level.
"rollback" on page 953	Can use the rollback command to return to a previously committed configuration other than the most recently committed one.
"routing" on page 954	Can view general routing, routing protocol, and routing policy configuration information in configuration and operational modes.
"routing-control" on page 961	Can view general routing, routing protocol, and routing policy configuration information and can configure general routing at the [edit routing-options] hierarchy level, routing protocols at the [edit protocols] hierarchy level, and routing policy at the [edit policy-options] hierarchy level.
"secret" on page 965	Can view passwords and other authentication keys in the configuration.
"secret-control" on page 970	Can view passwords and other authentication keys in the configuration and can modify them in configuration mode.
"security" on page 971	Can view security configuration in configuration mode and with the show configuration operational mode command.

Table 7: Login Class Permission Flags (continued)

Permission Flag	Description
"security-control" on page 978	Can view and configure security information at the [edit security] hierarchy level.
"shell" on page 981	Can start a local shell on the router or switch by using the start shell command.
"snmp" on page 981	Can view Simple Network Management Protocol (SNMP) configuration information in configuration and operational modes.
"snmp-control" on page 985	Can view SNMP configuration information and can modify SNMP configuration at the [edit snmp] hierarchy level.
"system" on page 985	Can view system-level information in configuration and operational modes.
"system-control" on page 991	Can view system-level configuration information and configure it at the [edit system] hierarchy level.
"trace" on page 992	Can view trace file settings and configure trace file properties.
"trace-control" on page 1001	Can modify trace file settings and configure trace file properties.
"view" on page 1006	Can use various commands to display current system-wide, routing table, and protocol-specific values and statistics. Cannot view the secret configuration.
"view-configuration" on page 1898	Can view all of the configuration excluding secrets, system scripts, and event options. NOTE: Only users with the maintenance permission can view commit script, op script, or event script configuration.

Allowing or Denying Individual Commands for Junos OS Login Classes

By default, all top-level CLI commands have associated access privilege levels. Users can execute only those commands and view only those statements for which they have access privileges. For each login class, you can explicitly deny or allow the use of operational and configuration mode commands that would otherwise be permitted or not allowed by a privilege level specified in the **permissions** statement.

Permission flags are used to grant a user access to operational mode commands and configuration hierarchy levels and statements. By specifying a specific permission flag on the user's login class at the **[edit system login class]** hierarchy level, you grant the user access to the corresponding commands and configuration hierarchy levels and statements. To grant access to all commands and configuration statements, use the **all** permissions flag. For permission flags that grant access to configuration hierarchy levels and statements, the flags grant read-only privilege to that configuration. For example,

the **interface** permissions flag grants read-only access to the **[edit interfaces]** hierarchy level. The **-control** form of the flag grants read-write access to that configuration. Using the preceding example, **interface-control** grants read-write access to the **[edit interfaces]** hierarchy level.

- The **all** login class permission bits take precedence over extended regular expressions when a user issues **rollback** command with **rollback** permission flag enabled.
- Expressions used to allow and deny commands for users on RADIUS and TACACS+ servers have been simplified. Instead of a single, long expression with multiple commands (**allow-commands=cmd1 cmd2 ... cmdn**), you can specify each command as a separate expression. This new syntax is valid for **allow-configuration**, **deny-configuration**, **allow-commands**, **deny-commands**, and all user permission bits.
- Users cannot issue the **load override** command when specifying an extended regular expression. Users can only issue the **merge**, **replace**, and **patch** configuration commands.
- If you allow and deny the same commands, the **allow-commands** permissions take precedence over the permissions specified by the **deny-commands**. For example, if you include **allow-commands "request system software add"** and **deny-commands "request system software add"**, the login class user is allowed to install software using the **request system software add** command.
- Regular expressions for **allow-commands** and **deny-commands** can also include the **commit**, **load**, **rollback**, **save**, **status**, and **update** commands.
- If you specify a regular expression for **allow-commands** and **deny-commands** with two different variants of a command, the longest match is always executed.

For example, if you specify a regular expression for **allow-commands** with the **commit-synchronize** command and a regular expression for **deny-commands** with the **commit** command, users assigned to such a login class would be able to issue the **commit synchronize** command, but not the **commit** command. This is because **commit-synchronize** is the longest match between **commit** and **commit-synchronize** and it is specified for **allow-commands**.

Likewise, if you specify a regular expression for **allow-commands** with the **commit** command and a regular expression for **deny-commands** with the **commit-synchronize** command, users assigned to such a login class would be able to issue the **commit** command, but not the **commit-synchronize** command. This is because **commit-synchronize** is the longest match between **commit** and **commit-synchronize** and it is specified for **deny-commands**.

Related Documentation

- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies on page 117](#)
- [Understanding Junos OS Access Privilege Levels on page 107](#)

Example: Configuring User Permissions with Access Privilege Levels

This example shows how to view permissions for a user account and configure the user permissions with access privileges for a login class. This enables users to execute only those commands and configure and view only those statements for which they have access privileges. This prevents unauthorized users from executing or configuring sensitive commands and statements that could potentially cause damage to the network.

- [Requirements on page 113](#)
- [Overview on page 113](#)
- [Configuration on page 114](#)
- [Verification on page 116](#)

Requirements

This example uses the following hardware and software components:

- One Juniper Networks device
- One TACACS+ (or RADIUS) server
- Junos OS build running on the Juniper Networks device

Before you begin:

- Establish connection between the device and the TACACS+ server.

For information on configuring a TACACS+ server, see [“Configuring TACACS+ Authentication” on page 229](#).

- Configure at least one user assigned to a login class on the Juniper Networks device. There can be more than one login class, each with varying permission configurations, and more than one user on the device.

Overview

Each top-level command-line interface (CLI) command and each configuration statement in Junos OS has an access privilege level associated with it. For each login class, you can explicitly deny or allow the use of operational and configuration mode commands that would otherwise be permitted or not allowed by a privilege level. Users can execute only those commands and configure and view only those statements for which they have access privileges. To configure access privilege levels, include the **permissions** statement at the **[edit system login class *class-name*]** hierarchy level.

The access privileges for each login class are defined by one or more permission flags specified in the **permissions** statement. Permission flags are used to grant a user access to operational mode commands, statements, and configuration hierarchies. Permission flags are not cumulative, so for each login class you must list all the permission flags needed, including **view** to display information and **configure** to enter configuration mode. By specifying a specific permission flag on the user's login class, you grant the user access to the corresponding commands, statements, and configuration hierarchies. To grant

access to all commands and configuration statements, use the **all** permissions flag. The permission flags provide read-only (“plain” form) and read and write (form that ends in -control) capability for a permission type.



NOTE: The **all** login class permission bits take precedence over extended regular expressions when a user issues a rollback command with the rollback permission flag enabled.

To configure user access privilege levels:

1. View permissions for a user account.

You can view the permissions for a user account before configuring the access privileges for those permissions.

To view the user permissions, enter **?** at the **[edit]** hierarchy level:

```
[edit]
?
```

2. Configure user permissions with access privileges.

All users who can log in to a device must be in a login class. For each login class, you can configure the access privileges that the associated users can have when they are logged in to the device.

To configure access privilege levels for user permissions, include the **permissions** statement at the **[edit system login class class-name]** hierarchy level, followed by the user permission, the **permissions** option, and the required permission flags.

```
[edit system login]
user@host# set class class-name permissions user-permission permissions [permission
flags];
```

Configuration

Configuring User Permissions with Access Privilege Levels

Step-by-Step Procedure

To configure access privileges:

1. From the device, view the list of permissions available for the user account. In this example, the username of the user account is **host**.

```
[edit]
user@host> ?
Possible completions:
clear                Clear information in the system
configure            Manipulate software configuration information
file                 Perform file operations
help                 Provide help information
load                 Load information from file
```

monitor	Show real-time debugging information
mtrace	Trace multicast path from source to receiver
op	Invoke an operation script
ping	Ping remote target
quit	Exit the management session
request	Make system-level requests
restart	Restart software process
save	Save information to file
set	Set CLI properties, date/time, craft interface
message	
show	Show system information
ssh	Start secure shell on another host
start	Start shell
telnet	Telnet to another host
test	Perform diagnostic debugging
traceroute	Trace route to remote host

The output lists the permissions for the user host. Customized login classes can be created by configuring different access privileges on these user permissions.

2. Configure an access privilege class to enable user host to configure and view SNMP parameters only. In this example, this login class is called `network-management`. To customize the `network-management` login class, include the SNMP permission flags to the **configure** user permission.

```
[edit system login class network-management]
user@host# set permissions configure permissions snmp
user@host# set permissions configure permissions snmp-control
```

Here, the configured permission flags provide both read (snmp) and read-and-write (snmp-control) capability for SNMP, and this is the only allowed access privilege for the `network-management` login class. In other words, all other access privileges other than configuring and viewing SNMP parameters are denied.

Results

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

```
user@host# show system login
class network-management {
  permissions [ configure snmp snmp-control ];
}
```

Verification

Log in as the username assigned with the new login class, and confirm that the configuration is working properly.

- [Verifying SNMP Configuration on page 116](#)
- [Verifying non-SNMP Configuration on page 116](#)

Verifying SNMP Configuration

Purpose Verify that SNMP configuration can be executed.

Action From configuration mode, execute basic SNMP commands at the **[edit snmp]** hierarchy level.

```
[edit snmp]
user@host# set name device1
user@host# set description switch1
user@host# set location Lab1
user@host# set contact example.com
user@host# commit
```

Meaning The user host assigned to the network-management login class is able to configure SNMP parameters, as the permission flags specified for this class include both snmp (read capabilities) and snmp-control (read and write capabilities) permission bits.

Verifying non-SNMP Configuration

Purpose Verify that non-SNMP configuration is denied for the network-management login class.

Action From the configuration mode, execute any non-SNMP configuration, for example, interfaces configuration.

```
[edit]
user@host# edit interfaces
Syntax error, expecting <statement> or <identifier>.
```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies on page 117](#)

Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies

This topic contains the following sections:

- [Understanding Regular Expressions on page 117](#)
- [Specifying Regular Expressions on page 119](#)
- [Regular Expressions Operators on page 121](#)
- [Regular Expression Examples on page 123](#)

Understanding Regular Expressions

You can use extended regular expressions to specify which operational mode commands, configuration statements, and hierarchies are denied or allowed. You specify these regular expressions locally in the **allow/deny-commands**, **allow/deny-configuration**, and **allow/deny-commands-regexps** and **allow/deny-configuration-regexp** statements at the **[edit system login class class-name]** hierarchy level, or remotely by specifying Juniper Networks vendor-specific TACACS+ or RADIUS attributes in your authorization server's configuration.



NOTE: Starting in Junos OS Release 18.1, the **allow-commands-regexps** and **deny-commands-regexps** statements are supported for TACACS+ authorization.

The difference between a local and remote authorization configuration is the pattern in which the regular expressions statements are executed. While it is possible to specify multiple regular expressions using strings in the local authorization configuration, in a remote configuration, the regular expressions statements need to be split and specified in individual strings. When the authorization parameters are configured both remotely and locally, the regular expressions received during TACACS+ or RADIUS authorization get merged with any regular expressions available on the local device.

When specifying multiple regular expressions in a local configuration using the **allow-configuration**, **deny-configuration**, **allow-commands**, or **deny-commands** statements, regular expressions are configured within parentheses and separated using the pipe symbol. The complete expression is enclosed in double quotes. For example, you can specify multiple **allow-commands** parameters with the following syntax:

```
allow-commands "(cmd1)|(cmd2)|(cmdn)"
```

The same expression configured remotely on the authorization server uses the following syntax:

```
allow-commands1 = "cmd1"
allow-commands2 = "cmd2"
allow-commandsn = "cmdn"
```

When specifying multiple regular expressions in a local configuration using the **allow-configuration-regexps**, **deny-configuration-regexps**, **allow-commands-regexps**, or **deny-commands-regexps** statements, regular expressions are configured within double quotes and separated using the space operator. The complete expression is enclosed in square brackets. For example, you can specify multiple allow-commands parameters with the following syntax:

```
allow-commands-regexps [ "cmd1" "cmd2" "cmdn" ]
```

The same expression configured remotely on the authorization server uses the following syntax:

```
allow-commands-regexps1 = "cmd1"
allow-commands-regexps2 = "cmd2"
allow-commands-regexpsn = "cmdn"
```

[Table 8 on page 118](#) differentiates the local and remote authorization configuration using regular expressions.

Table 8: Sample Local and Remote Authorization Configuration Using Regular Expressions

Local Configuration	Remote Configuration
<pre>login { class local { permissions configure; allow-commands "(ping.*)" (traceroute .*) (show.*)" (configure .*) (edit) (exit) (commit) (rollback.*)" deny-commands .*; allow-configuration "(interfaces.* unit 0 family ethernet-switching vlan mem.* .*) (interfaces.* native.*.*)" (interfaces .* unit 0 family ethernet-switching interface-mo.*.*)" (interfaces.* unit .*) (interfaces.* disable) (interfaces.* description.*)" (vlans.* vlan-.*.*)" deny-configuration .*; } }</pre>	<pre>user = remote { login = username service = junos-exec { allow-commands1 = "ping.*)" allow-commands2 = "traceroute.*)" allow-commands3 = "show.*)" allow-commands4 = "configure" allow-commands5 = "edit" allow-commands6 = "exit" allow-commands7 = "commit" allow-commands8 = ".*xml-mode" <<<<< allow-commands9 = ".*netconf" <<<<< allow-commands10 = ".*need-trailer" <<<<< allow-commands11 = "rollback.*)" deny-commands1 = ".*" allow-configuration1 = "interfaces.* unit 0 family ethernet-switching vlan mem.*.*)" allow-configuration2 = "interfaces.* native.*.*)" allow-configuration3 = "interfaces.* unit 0 family ethernet-switching interface-mo.*.*)" allow-configuration4 = "interfaces.* unit.*)" allow-configuration5 = "interfaces.* disable" allow-configuration6 = "interfaces.* description.*)" allow-configuration7 = "interfaces.*" allow-configuration8 = "vlans.* vlan-.*.*)" deny-configuration1 = ".*" local-user-name = local-username user-permissions = "configure" } }</pre>

**NOTE:**

- You need to explicitly allow access to the NETCONF mode, either locally or remotely, by issuing the following three commands: `xml-mode`, `netconf`, and `need-trailer`.
- When the `deny-configuration = ".*"` statement is used, all the other desired configurations should be allowed using the `allow-configuration` statement. This can affect the allowed regular expressions buffer limit for the `allow-configuration` statement. When this limit exceeds, the allowed configuration might not work. This regular expression buffer size limit has been increased in Junos OS Release 14.1x53-D40, 15.1, and 16.1.

Specifying Regular Expressions



WARNING: When you specify regular expression for commands and configuration statements, pay close attention to the following examples, as regular expression with invalid syntax might not produce the desired results, even if the configuration is committed without any error.

Regular expressions for commands and configuration statements should be specified in the same manner as executing the complete command or statement. [Table 9 on page 120](#) lists the regular expressions for configuring access privileges for the `[edit interfaces]` and `[edit vlans]` statement hierarchies, and for the `delete interfaces` command.

Table 9: Specifying Regular Expressions

Statement	Regular Expression	Configuration Notes
<p>[edit interfaces]</p> <p>The set command for interfaces is executed as follows:</p> <pre>[edit] user@host# set interfaces interface-name unit interface-unit-number</pre>	<p>The set interfaces statement is incomplete by itself, and requires the unit option to execute the statement.</p> <p>As a result, the regular expression required for denying the set interfaces configuration must specify the entire executable string with the .* operator in place of statement variables:</p> <pre>[edit system login class class-name] user@host# set permissions configure user@host# set deny-configuration "interfaces .* unit ."</pre>	<ul style="list-style-type: none"> The .* operator denotes everything from the specified point onward for that particular command or statement. In this example, it denotes any interface name with any unit value. Specifying only the deny-configuration "interfaces ." statement is incorrect and does not deny access to the interfaces configuration for the specified login class. Other valid options can be included in the regular expression, for example: <pre>[edit system login class class-name] user@host# set permissions configure user@host# set deny-configuration "interfaces .* description ."</pre> <pre>[edit system login class class-name] user@host# set permissions configure user@host# set allow-configuration-regexps ["interfaces .* description ." "interfaces .* unit .* description ." "interfaces .* unit .* family inet address ." "interfaces .* disable"]</pre> <pre>[edit system login class class-name] user@host# set permissions configure user@host# set allow-configuration "interfaces .* unit 0 family ethernet-switching vlan mem.*."</pre> <p>Note: The mem.* regular expression in this example is used when multiple strings starting with the mem keyword are expected to be included in the specified regular expression. When only one member string is expected to be included, the member .* regular expression is used.</p>
<p>delete interfaces</p> <p>The delete command for interfaces is executed as follows:</p> <pre>[edit] user@host# delete interfaces interface-name</pre>	<p>The delete interfaces statement can be executed by itself and does not require additional statements to be complete.</p> <p>As a result, the regular expression required for denying the delete interfaces statement should specify the following:</p> <pre>[edit system login class class-name] user@host# set permissions configure user@host# set allow-configuration "interfaces ."</pre> <pre>user@host# set deny-configuration "interfaces ."</pre>	<ul style="list-style-type: none"> The .* operator denotes everything from the specified point onward for that particular command or statement. In this example, it denotes any interface name. For the deny-configuration "interfaces ." regular expression to take effect, the specified login class should allow configuration permissions for the interfaces hierarchy using the allow-configuration "interfaces ." regular expression.

Table 9: Specifying Regular Expressions (continued)

Statement	Regular Expression	Configuration Notes
[edit vlans] The set command for VLANs is executed as follows: [edit] user@host# set vlans vlan-name vlan-id vlan-id	Here, the set vlans statement is incomplete by itself, and requires the vlan-id option to execute the statement. As a result, the regular expression required for allowing the set vlans configuration must specify the entire executable string with the .* operator in place of statement variables: [edit system login class class-name] user@host# set permissions configure user@host# set allow-configuration "vlangs .* vlan-id ."	<ul style="list-style-type: none"> The .* operator denotes everything from the specified point onward for that particular command or statement. In this example, it denotes any VLAN name with any VLAN ID. Other valid options under the [edit vlans] statement hierarchy can be included in the regular expression, for example: [edit system login class class-name] user@host# set permissions configure user@host# set allow-configuration-regexps ["vlangs .* vlan-id ." description ." filter ."]"]

Regular Expressions Operators

Table 10 on page 121 lists common regular expression operators that you can use for allowing or denying operational and configuration modes.

Command regular expressions implement the extended (modern) regular expressions, as defined in POSIX 1003.2.

Table 10: Common Regular Expression Operators

Operator	Match	Example
	One of two or more terms separated by the pipe. Each term must be a complete standalone expression enclosed in parentheses (), with no spaces between the pipe and the adjacent parentheses.	[edit system login class test] user@host# set permissions configure user@host# set allow-commands "(ping) (traceroute) (show system alarms) (show system software)" user@host# set deny-configuration "(access) (access-profile) (accounting-options) (applications) (apply-groups) (bridge-domains) (chassis) (class-of-service)" With the above configuration, the users assigned to the test login class have operational mode access restricted to only the commands specified in the allow-commands statement, and access to the configuration mode, excluding the hierarchy levels specified in the deny-configuration statement.

Table 10: Common Regular Expression Operators (continued)

Operator	Match	Example
<code>^</code>	At the beginning of an expression, used to denote where the command begins, where there might be some ambiguity.	<pre>[edit system login class test] user@host# set permissions interface user@host# set permissions interface-control user@host# set allow-commands "(^show) (log interfaces policer))!(^monitor)"</pre> <p>With the above configuration, the users assigned to the test login class have access to configuring and viewing interface configuration from the operational and configuration mode. The allow-commands statement specifies access to commands that begin with show and monitor keywords.</p> <p>For the first filter, the commands specified include the show log, show interfaces, and show policer commands. The second filter specifies all commands starting with the monitor keyword, such as monitor interfaces or monitor traffic commands.</p>
<code>\$</code>	Character at the end of a command. Used to denote a command that must be matched exactly up to that point.	<pre>[edit system login class test] user@host# set permissions interface user@host# set allow-commands "(show interfaces\$)"</pre> <p>With the above configuration, the users assigned to the test login class can view the interface configuration in the configuration mode and with the show configuration operational mode command with the interface user permission. However, the regular expression specified in the allow-commands statement restricts the users to execute only the show interfaces command and denies access to the command extensions, such as show interfaces detail or show interfaces extensive.</p>
<code>[]</code>	Range of letters or digits. To separate the start and end of a range, use a hyphen (-).	<pre>[edit system login class test] user@host# set permissions clear user@host# set permissions configure user@host# set permissions network user@host# set permissions trace user@host# set permissions view user@host# set allow-configuration-regexps ["interfaces [gx]e-.* unit [0-9]* description .*"]</pre> <p>With the above configuration, the users assigned to the test login class have operator-level user permissions, and have access to configure interfaces within the specified range of interface name and unit number (0 through 9).</p>
<code>()</code>	A group of commands, indicating a complete, standalone expression to be evaluated. The result is then evaluated as part of the overall expression. Parentheses must be used in conjunction with pipe operators, as explained.	<pre>[edit system login class test] user@host# set permissions all user@host# set allow-commands "(clear) (configure)" user@host# deny-commands "(mtrace) (start) (delete)"</pre> <p>With the above configuration, users assigned to the test login class have superuser-level permissions, and have access to the commands specified in the allow-commands statement.</p>

Table 10: Common Regular Expression Operators (continued)

Operator	Match	Example
*	Zero or more terms.	<pre>[edit system login class test] user@host# set permissions configure user@host# set deny-configuration "(system login class m*)"</pre> <p>With the above configuration, users assigned to the test login class whose login username begins with m are denied configuration access.</p>
+	One or more terms.	<pre>[edit system login class test] user@host# set permissions configure user@host# set deny-configuration "(system login class m+)"</pre> <p>With the above configuration, users assigned to the test login class whose login username begins with m are denied configuration access.</p>
.	Any character except for a space " ".	<pre>[edit system login class test] user@host# set permissions configure user@host# set deny-configuration "(system login class m.)"</pre> <p>With the above configuration, users assigned to the test login class whose login username begins with m are denied configuration access.</p>
.*	Everything from the specified point onward.	<pre>[edit system login class test] user@host# set permissions configure user@host# set deny-configuration "(system login class m.*)"</pre> <p>With the above configuration, users assigned to the test login class whose login username begins with m are denied configuration access.</p> <p>Similarly, the deny-configuration "protocols.*" statement denies all configuration access under the [edit protocols] hierarchy level.</p> <p>NOTE:</p> <ul style="list-style-type: none"> The *, +, and . operations can be achieved by using .*. The deny-commands.* and deny-configuration.* statements deny access to all operational mode commands and configuration hierarchies, respectively.



NOTE: Junos OS does not support the **!** regular expression operator.

Regular Expression Examples

Table 11 on page 124 lists the regular expressions used to allow configuration options under two configuration hierarchies—**[edit system ntp server]** and **[edit protocols rip]**—as an example for specifying regular expressions.



NOTE: Table 11 on page 124 does not provide a comprehensive list of all regular expressions and keywords for all configuration statements and hierarchies. The regular expressions listed in the table are supported in Junos OS Release 16.1, and are validated only for the **[edit system ntp server]** and **[edit protocols rip]** statement hierarchies.

Table 11: Regular Expressions Examples

Statement Hierarchy	Regular Expressions	Allowed Configuration	Denied Configuration
[edit system ntp server]			
key <i>key-number</i>	[edit system login class test] set permissions configure set allow-configuration-regexps ["system ntp server .*" "system ntp server .* key .*"] set deny-configuration-regexps ["system ntp server .* version .*" "system ntp server .* prefer"]	<ul style="list-style-type: none"> server IP server IP and key 	<ul style="list-style-type: none"> version prefer
version <i>version-number</i>	[edit system login class test] set permissions configure set allow-configuration-regexps ["system ntp server .*" "system ntp server .* version .*"] set deny-configuration-regexps ["system ntp server .* key .*" "system ntp server .* prefer"]	<ul style="list-style-type: none"> server IP server IP and version 	<ul style="list-style-type: none"> key prefer
prefer	[edit system login class test] set permissions configure set allow-configuration-regexps ["system ntp server .*" "system ntp server .* prefer"]; set deny-configuration-regexps ["system ntp server .* key .*" "system ntp server .* version .*"]	<ul style="list-style-type: none"> server IP server IP and prefer 	<ul style="list-style-type: none"> key version
[edit protocols rip]			
message-size <i>message-size</i>	[edit system login class test] set permissions configure set allow-configuration-regexps "protocols rip message-size .*" set deny-configuration-regexps ["protocols rip metric-in .*" "protocols rip route-timeout .*" "protocols rip update-interval .*"]	<ul style="list-style-type: none"> message-size 	<ul style="list-style-type: none"> metric-in route-timeout update-interval
metric-in <i>metric-in</i>	[edit system login class test] set permissions configure set allow-configuration-regexps "protocols rip metric-in .*" set deny-configuration-regexps ["protocols rip message-size .*" "protocols rip route-timeout .*" "protocols rip update-interval .*"]	<ul style="list-style-type: none"> metric-in 	<ul style="list-style-type: none"> message-size route-timeout update-interval
route-timeout <i>route-timeout</i>	[edit system login class test] set permissions configure set allow-configuration-regexps "protocols rip route-timeout .*" set deny-configuration-regexps ["protocols rip metric-in .*" "protocols rip message-size .*" "protocols rip update-interval .*"]	<ul style="list-style-type: none"> route-timeout 	<ul style="list-style-type: none"> message-size metric-in update-interval

Table 11: Regular Expressions Examples (continued)

Statement Hierarchy	Regular Expressions	Allowed Configuration	Denied Configuration
update-interval <i>update-interval</i>	[edit system login class test] set permissions configure set allow-configuration-regexps "protocols rip update-interval .*" set deny-configuration-regexps ["protocols rip metric-in .*" "protocols rip route-timeout .*" "protocols rip message-size .*"]	<ul style="list-style-type: none"> • update-interval 	<ul style="list-style-type: none"> • message-size • metric-in • route-timeout

Related Documentation

- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)

Example: Configuring User Permissions with Access Privileges for Operational Mode Commands

This example shows how to configure custom login classes and assign access privileges for operational mode commands. This enables users of the customized login class to execute only those operational commands for which access privileges have been specified. This prevents unauthorized users from executing sensitive commands that could potentially cause damage to the network.

- [Requirements on page 125](#)
- [Overview and Topology on page 126](#)
- [Configuration on page 130](#)
- [Verification on page 135](#)

Requirements

This example uses the following hardware and software components:

- One Juniper Networks device
- One TACACS+ (or RADIUS) server
- Junos OS build running on the Juniper Networks device

Before you begin:

- Establish a TCP connection between the device and the TACACS+ server. In the case of the RADIUS server, establish a UDP connection between the device and the RADIUS server.

For information on configuring a TACACS+ server, see [“Configuring TACACS+ Authentication” on page 229](#).

- Configure at least one user assigned to a login class on the Juniper Networks device. There can be more than one login class, each with varying permission configurations, and more than one user on the device.

Overview and Topology

Each top-level command-line interface (CLI) command and each configuration statement in Junos OS has an access privilege level associated with it. For each login class, you can explicitly deny or allow the use of operational and configuration mode commands that would otherwise be permitted or not allowed by a privilege level. Users can execute only those commands and configure and view only those statements for which they have access privileges. To configure access privilege levels, include the **permissions** statement at the **[edit system login class *class-name*]** hierarchy level.

The access privileges for each login class are defined by one or more permission flags specified in the **permissions** statement. In addition to this, you can specify extended regular expressions with the following statements:

- **allow-commands** and **deny-commands**—Allow or deny access to operational mode commands only.
- **allow-configuration** and **deny-configuration**—Allow or deny access to a particular configuration hierarchy only.
- **allow-configuration-regexps** and **deny-configuration-regexps**—Allow or deny access to a particular configuration hierarchy using strings of regular expressions.
- **allow-commands-regexps** and **deny-commands-regexps**—(TACACS+ authorization only) Allow or deny access to a particular command using strings of regular expressions.

The above statements define a user’s access privileges to individual operational mode commands, configuration statements, and hierarchies. These statements take precedence over the login class permissions set for a user.

Configuration Notes

When configuring the **allow-commands**, **deny-commands**, **allow-configuration**, and **deny-configuration** statements with access privileges, take the following into consideration:

- You can include the allow/deny statement only once in each login class.
- If the exact same command is configured under both **allow-commands** and **deny-commands** statements, or both **allow-configuration** and **deny-configuration** statements, then the allow operation takes precedence over the deny statement.

For instance, with the following configuration, a user assigned to login class test is allowed to install software using the **request system software add** command, although the **deny-commands** statement also includes it:

```
[edit system login]
user@host# set class test permissions allow-commands "request system software
add"
user@host# set class test permissions deny-commands "request system software add"
```

For instance, with the following configuration, a user assigned to login class test is allowed to access the **[edit system services]** configuration hierarchy, although the **deny-configuration** statement also includes it:

```
[edit system login]
user@host# set class test permissions allow-configuration "system services"
user@host# set class test permissions deny-configuration "system services"
```

- If you specify a regular expression for **allow-commands** and **deny-commands** statements with two different variants of a command, the longest match is always executed.

For instance, for the following configuration, a user assigned to test login class is allowed to execute the **commit synchronize** command and not the **commit** command. This is because **commit-synchronize** is the longest match between **commit** and **commit-synchronize**, and it is specified for **allow-commands**.

```
[edit system login]
user@host# set class test allow-commands "commit-synchronize"
user@host# set class test deny-commands commit
```

- Regular expressions for **allow-commands** and **deny-commands** statements can also include the **commit**, **load**, **rollback**, **save**, **status**, and **update** commands.
- Explicitly allowing configuration mode hierarchies or regular expressions using the **allow-configuration** statement adds to the regular permissions set using the **permissions** statement. Likewise, explicitly denying configuration mode hierarchies or regular expressions using the **deny-configuration** statement removes permissions for the specified configuration mode hierarchy, from the default permissions provided by the **permissions** statement.

For example, for the following configuration, the login class user can edit the configuration at the **[edit system services]** hierarchy level and issue configuration mode commands (such as **commit**), in addition to just entering the configuration mode using the **configure** command, which is the permission specified by the **configure** permission flag:

```
[edit system login]
user@host# set class test permissions configure allow-configuration "system services"
```

Likewise, for the following configuration, the login class user can perform all operations allowed by the **all** permissions flag, except issuing configuration mode commands (such as **commit**) or modifying the configuration at the **[edit system services]** hierarchy level:

```
[edit system login]
user@host# set class test permissions all deny-configuration "system services"
```

- The **allow/deny-configuration** statements are mutually exclusive with the **allow/deny-configuration-regexps** statements, and the **allow-deny-commands** statements are mutually exclusive with the **allow/deny-commands-regexps** statements. For example, you cannot configure both **allow-configuration** and **allow-configuration-regexps** in the same login class.
- If you have existing configurations using the **allow/deny-configuration** or **allow/deny-commands** statements, using the same configuration options with the **allow/deny-configuration-regexps** or **allow/deny-commands-regexps** statements might not produce the same results, as the search and match methods differ in the two forms of these statements.
- To define access privileges to parts of the configuration hierarchy, specify the full paths in the extended regular expressions with the **allow-configuration** and **deny-configuration** statements. Use parentheses around an extended regular expression that connects two or more expressions with the pipe (|) symbol.

For example:

```
[edit system login]
user@host# set class test deny-configuration "(system login class) | (system services)"
```

- If the regular expression contains any spaces, operators, or wildcard characters, enclose the expression in quotation marks. Regular expressions are not case-sensitive; for example, **allow-commands "show interfaces"**.
- Modifiers such as *set*, *log*, and *count* are not supported within the regular expression string to be matched. If a modifier is used, then nothing is matched.

Incorrect configuration:

```
[edit system login]
user@host# set class test permission deny-commands "set protocols"
```

Correct configuration:

```
[edit system login]
user@host# set class test permission deny-commands protocols
```

- Anchors are required when specifying complex regular expressions with the **allow-commands** statement.

For example:

```
[edit system login]
user@host# set class test permissions allow-commands "(^monitor) | (^ping) | (^show) | (^exit)"

OR

set class test permissions allow-commands "allow-commands = "(monitor | ping | show | exit)"
```

- When specifying extended regular expressions using the **allow/deny-commands** and **allow/deny-configuration** statements, each expression separated by a pipe (|) symbol

must be a complete standalone expression, and must be enclosed in parentheses (). Do not use spaces between regular expressions separated with parentheses and connected with the pipe (|) symbol.

For example:

```
[edit system login]
user@host# set class test allow-commands "(ping .*)|(traceroute .*)|(show
.*)"|(configure .*)|(edit)|(exit)|(commit)|(rollback .*)"
user@host# set class test deny-configuration "(system login class)|(system services)"
```

- When specifying extended regular expressions using the **allow/deny-configuration-regexps** or **allow/deny-commands-regexps** statement, each expression enclosed within quotes (") and separated by a space must be enclosed in angular brackets [].

For example:

```
[edit system login]
user@host# set class test allow-configuration-regexps [ "interfaces.* description.*"
"interfaces.* unit.* description.*" "interfaces.* unit.* family inet address.*"
"interfaces.* disable" ]
```

- You can use the * wildcard character when denoting regular expressions. However, it must be used as a portion of a regular expression. You cannot use [*] or [.*] alone.
- You cannot configure the **allow-configuration** statement with the (interfaces (description (.*) regular expression, as this evaluates to **allow-configuration = .*** regular expression.
- You can configure as many regular expressions as needed to be allowed or denied. Regular expressions to be denied take precedence over configurations to be allowed.

Topology

Figure 2: Configuring TACACS+ Server Authentication



Figure 2 on page 129 illustrates a simple topology, where Router R1 is a Juniper Networks device and has a TCP connection established with a TACACS+ server.

In this example, R1 is configured with three customized login classes—Class1, Class2, and Class3—for specifying access privileges with extended regular expressions using the **allow-commands** and **deny-commands** statements differently.

The purpose of each login class is as follows:

- Class1**—Defines access privileges for the user with the **allow-commands** statement only. This login class provides operator-level user permissions, and should provide authorization for only rebooting the device.

- **Class2**—Defines access privileges for the user with the **deny-commands** statement only. This login class provides operator-level user permissions, and should deny access to **set** commands.
- **Class3**—Defines access privileges for the user with both the **allow-commands** and **deny-commands** statements. This login class provides superuser-level user permissions, and should provide authorization for accessing interfaces and viewing device information. It should also deny access to **edit** and **configure** commands.

Router R1 has three different users, User1, User2, and User3, assigned to Class1, Class2, and Class3 login classes, respectively.

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.

```
R1 set system authentication-order tacplus
set system authentication-order radius
set system authentication-order password
set system radius-server 10.209.1.66 secret "$ABC123"
set system tacplus-server 10.209.1.66
set system radius-options enhanced-accounting
set system tacplus-options enhanced-accounting
set system accounting events login
set system accounting events change-log
set system accounting events interactive-commands
set system accounting traceoptions file auditlog
set system accounting traceoptions flag all
set system accounting destination tacplus server 10.209.1.66
set system login class Class1 permissions clear
set system login class Class1 permissions network
set system login class Class1 permissions reset
set system login class Class1 permissions trace
set system login class Class1 permissions view
set system login class Class1 allow-commands "request system reboot"
set system login class Class2 permissions clear
set system login class Class2 permissions network
set system login class Class2 permissions reset
set system login class Class2 permissions trace
set system login class Class2 permissions view
set system login class Class2 deny-commands set
set system login class Class3 permissions all
set system login class Class3 allow-commands configure
set system login class Class3 deny-commands .*
set system login user User1 uid 2001
set system login user User1 class Class1
set system login user User1 authentication encrypted-password "$ABC123"
set system login user User2 uid 2002
set system login user User2 class Class2
set system login user User2 authentication encrypted-password "$ABC123"
```

```
set system login user User3 uid 2003
set system login user User3 class Class3
set system login user User3 authentication encrypted-password "$ABC123"
set system syslog file messages any any
```

Configuring Authentication Parameters for Router R1

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 *CLI User Guide*.

To configure Router R1 authentication:

1. Configure the order in which authentication should take place for R1. In this example, TACACS+ server authentication is first, followed by RADIUS server authentication, and then the local password.

```
[edit system]
user@R1# set authentication-order tacplus
user@R1# set authentication-order radius
user@R1# set authentication-order password
```

2. Establish R1 connection with the TACACS+ server.

```
[edit system]
user@R1# set tacplus-server 10.209.1.66
user@R1# set tacplus-options enhanced-accounting
user@R1# set accounting destination tacplus server 10.209.1.66
```

3. Configure RADIUS server authentication parameters.

```
[edit system]
user@R1# set radius-server 10.209.1.66 secret "$ABC123"
user@R1# set radius-options enhanced-accounting
```

4. Configure R1 accounting configuration parameters.

```
[edit system]
user@R1# set accounting events login
user@R1# set accounting events change-log
user@R1# set accounting events interactive-commands
user@R1# set accounting traceoptions file auditlog
user@R1# set accounting traceoptions flag all
```

Configuring Access Privileges with `allow-commands` Statement Only (Class1)

Step-by-Step Procedure

To specify regular expressions using the **allow-commands** statement only:

1. Configure Class1 custom login class and assign operator-level user permissions. For information on the predefined system login classes, see the [“Junos OS Login Classes Overview” on page 47](#).

```
[edit system login]
user@R1# set class Class1 permissions clear
user@R1# set class Class1 permissions network
user@R1# set class Class1 permissions reset
user@R1# set class Class1 permissions trace
user@R1# set class Class1 permissions view
```

2. Specify the command to enable rebooting of R1 in the **allow-commands** statement.

```
[edit system login]
user@R1# set class Class1 allow-commands "request system reboot"
```

3. Configure the user account for the Class1 login class.

```
[edit system login]
user@R1# set user User1 uid 2001
user@R1# set user User1 class Class1
user@R1# set user User1 authentication encrypted-password "$ABC123"
```

Configuring Access Privileges with `deny-commands` Statement Only (Class2)

Step-by-Step Procedure

To specify regular expressions using the **deny-commands** statement only:

1. Configure the Class2 custom login class and assign operator-level user permissions. For information on the predefined system login classes, see the [“Junos OS Login Classes Overview” on page 47](#).

```
[edit system login]
user@R1# set class Class1 permissions clear
user@R1# set class Class1 permissions network
user@R1# set class Class1 permissions reset
user@R1# set class Class1 permissions trace
user@R1# set class Class1 permissions view
```

2. Disable execution of any set commands in the **deny-commands** statement.

```
[edit system login]
user@R1# set class Class1 deny-commands "set"
```


3. Configure the user account for the Class2 login class.

```
user@R1# set login user User2 uid 2002
user@R1# set login user User2 class Class2
user@R1# set login user User2 authentication encrypted-password "$ABC123"
```

Configuring Access Privileges with Both allow-commands and deny-commands Statements (Class3)

Step-by-Step Procedure

To specify regular expressions using both the **allow-commands** and **deny-commands** statements:

1. Configure the Class3 custom login class and assign superuser-level user permissions. For information on the predefined system login classes, see the [“Junos OS Login Classes Overview” on page 47](#).

```
[edit system login]
user@R1# set class Class3 permissions all
```

2. Specify the commands to enable only configure commands in the **allow-commands** statement.

```
[edit system login]
user@R1# set class Class3 allow-commands configure
```

3. Disable execution of all commands in the **deny-commands** statement.

```
[edit system login]
user@R1# set class Class3 deny-commands .*
```

4. Configure the user account for the Class1 login class.

```
[edit system login]
user@R1# set login user User3 uid 2003
user@R1# set login user User3 class Class3
user@R1# set login user User3 authentication encrypted-password "$ABC123"
```

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.

```
user@R1# show system
authentication-order [ tacplus radius password ];
radius-server {
```

```
    10.209.1.66 secret "$ABC123";
  }
  tacplus-server {
    10.209.1.66;
  }
  radius-options {
    enhanced-accounting;
  }
  tacplus-options {
    enhanced-accounting;
  }
  accounting {
    events [ login change-log interactive-commands ];
    traceoptions {
      file auditlog;
      flag all;
    }
    destination {
      tacplus {
        server {
          10.209.1.66;
        }
      }
    }
  }
  login {
    class Class1 {
      permissions [ clear network reset trace view ];
      allow-commands "request system reboot";
    }
    class Class2 {
      permissions [ clear network reset trace view ];
      deny-commands set;
    }
    class Class3 {
      permissions all;
      allow-commands configure;
      deny-commands .*;
    }
    user User1 {
      uid 2001;
      class Class1;
      authentication {
        encrypted-password "$ABC123";
      }
    }
    user User2 {
      uid 2002;
      class Class2;
      authentication {
        encrypted-password "$ABC123";
      }
    }
    user User3 {
      uid 2003;
```

```

class Class3;
authentication {
    encrypted-password "$ABC123";
}
}
syslog {
    file messages {
        any any;
    }
}

```

Verification

Log in as the username assigned with the new login class, and confirm that the configuration is working properly.

- [Verifying Class1 Configuration on page 135](#)
- [Verifying Class2 Configuration on page 136](#)
- [Verifying Class3 Configuration on page 138](#)

Verifying Class1 Configuration

Purpose Verify that the permissions and commands allowed in the Class1 login class are working.

Action From operational mode, run the **show system users** command.

```

User1@R1> show system users

12:39PM up 6 days, 23 mins, 6 users, load averages: 0.00, 0.01, 0.00
USER   TTY   FROM          LOGIN@  IDLE WHAT
User1  p0    abc.example.net 12:34AM 12:04 cli
User2  p1    abc.example.net 12:36AM 12:02 -cli (cli)
User3  p2    abc.example.net 10:41AM 11 -cli (cli)

```

From operational mode, run the **request system reboot** command.

```

User1@R1> request system ?

Possible completions:
  reboot                Reboot the system

```

Meaning The Class1 login class to which User1 is assigned has the operator-level user permissions, and is allowed to execute the **request system reboot** command.

The predefined operator login class has the following permission flags specified:

- **clear**—Can clear (delete) information learned from the network that is stored in various network databases by using the **clear** commands.
- **network**—Can access the network by using the **ping**, **ssh**, **telnet**, and **traceroute** commands.
- **reset**—Can restart software processes by using the **restart** command and can configure whether software processes are enabled or disabled at the **[edit system processes]** hierarchy level.
- **trace**—Can view trace file settings and configure trace file properties.
- **view**—Can use various commands to display current system-wide, routing table, and protocol-specific values and statistics. Cannot view the secret configuration.

For the Class1 login class, in addition to the above-mentioned user permissions, User1 can execute the **request system reboot** command. The first output displays the view permissions as an operator, and the second output shows that the only **request** command that User1 can execute as an operator is the **request system reboot** command.

Verifying Class2 Configuration

Purpose Verify that the permissions and commands allowed for the Class2 login class are working.

Action From the operational mode, run the **ping** command.

```
User2@R1> ping 10.209.1.66

ping 10.209.1.66
PING 10.209.1.66 (10.209.1.66): 56 data bytes
64 bytes from 10.209.1.66: icmp_seq=0 ttl=52 time=212.521 ms
64 bytes from 10.209.1.66: icmp_seq=1 ttl=52 time=212.844 ms
64 bytes from 10.209.1.66: icmp_seq=2 ttl=52 time=211.304 ms
64 bytes from 10.209.1.66: icmp_seq=3 ttl=52 time=210.963 ms
^C
--- 10.209.1.66 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max/stddev = 210.963/211.908/212.844/0.792 ms
```

From the CLI prompt, check the available permissions.

```
User2@R1> ?

Possible completions:
clear          Clear information in the system
file           Perform file operations
help           Provide help information
load           Load information from file
monitor        Show real-time debugging information
mtrace         Trace multicast path from source to receiver
op             Invoke an operation script
ping           Ping remote target
quit           Exit the management session
request        Make system-level requests
restart        Restart software process
save           Save information to file
show           Show system information
ssh            Start secure shell on another host
start          Start shell
telnet         Telnet to another host
test           Perform diagnostic debugging
traceroute     Trace route to remote host
```

From the CLI prompt, execute any set command.

```
User2@R1> set

^
unknown command.
```

Meaning The Class2 login class to which User2 is assigned has the operator-level user permissions, and is denied access to all **set** commands. This is displayed in the command outputs.

The permission flags specified for the predefined operator login class are the same as that of Class1.

Verifying Class3 Configuration

Purpose Verify that the permissions and commands allowed for the Class3 login class are working.

Action From the CLI prompt, check the available permissions.

```
User3@R1> ?
```

Possible completions:

```
configure          Manipulate software configuration information
```

From the operational mode, enter configuration mode.

```
User3@R1> configure
```

```
Entering configuration mode
```

```
[edit]
```

```
User3@R1#
```

Meaning The Class3 login class to which User3 is assigned has the superuser (all) user permissions, but is allowed to execute the **configure** command only, and is denied access to all other operational mode commands. Because the regular expressions specified in the **allow/deny-commands** statements take precedence over the user permissions, User3 on R1 has access only to configuration mode, and is denied access to all other operational mode commands.

- Related Documentation**
- [Understanding Junos OS Access Privilege Levels on page 107](#)
 - [Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies on page 117](#)
 - [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
 - [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)

Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies

This example shows how to configure custom login classes and assign access privileges to portions of the configuration hierarchy. This enables users of the customized login class to execute only those configuration statements and hierarchies for which access

privileges have been specified. This prevents unauthorized users from accessing device configurations that could potentially cause damage to the network.

- [Requirements on page 139](#)
- [Overview and Topology on page 139](#)
- [Configuration on page 145](#)
- [Verification on page 149](#)

Requirements

This example uses the following hardware and software components:

- One Juniper Networks device
- One TACACS+ (or RADIUS) server
- Junos OS build running on the Juniper Networks device

Before you begin:

- Establish a TCP connection between the device and the TACACS+ server. In the case of the RADIUS server, establish a UDP connection between the device and the RADIUS server.

For information on configuring a TACACS+ server, see [“Configuring TACACS+ Authentication” on page 229](#).

- Configure at least one user assigned to a login class on the Juniper Networks device. There can be more than one login class, each with varying permission configurations, and more than one user on the device.

Overview and Topology

Each top-level command-line interface (CLI) command and each configuration statement in Junos OS has an access privilege level associated with it. For each login class, you can explicitly deny or allow the use of operational and configuration mode commands that would otherwise be permitted or not allowed by a privilege level. Users can execute only those commands and configure and view only those statements for which they have access privileges. To configure access privilege levels, include the **permissions** statement at the **[edit system login class class-name]** hierarchy level.

The access privileges for each login class are defined by one or more permission flags specified in the **permissions** statement. In addition to this, you can specify extended regular expressions with the following statements:

- **allow-commands** and **deny-commands**—Allow or deny access to operational mode commands.
- **allow-configuration** and **deny-configuration**—Allow or deny access to parts of the configuration hierarchy.

These statements perform slower matching, with more flexibility, especially in wildcard matching. However, it can take a very long time to evaluate all of the possible

statements if a great number of full-path regular expressions or wildcard expressions are configured, possibly impacting performance.

- **allow-configuration-regexps** and **deny-configuration-regexps**—Allow or deny access to a particular configuration hierarchy using strings of regular expressions. These statements are similar to **allow-configuration** and **deny-configuration** statements, except that in the **allow/deny-configuration-regexps** statements you can configure sets of strings in which the strings include spaces when using the first set of statements.

The above statements define a user's access privileges to individual operational mode commands, configuration statements, and hierarchies. These statements take precedence over a login class permissions bit set for a user.

Difference between allow/deny-configuration and allow/deny-configuration-regexps statements

The **allow-configuration** and **deny-configuration** statements were introduced before Junos OS Release 7.4. The **allow-configuration-regexps** and **deny-configuration-regexps** statements were introduced in Junos OS Release 11.2. In Junos OS Release 11.4, the **allow-configuration** and **deny-configuration** statements were deprecated, but because these statements were useful in executing simple configurations, these statements were undeprecated in Junos OS Release 11.4R6, and starting with the 11.4R6 release, both the **allow/deny-configuration** and the **allow/deny-configuration-regexps** statements are supported.

The **allow/deny-configuration-regexps** statements split up the regular expression into tokens and match each piece against each part of the specified configuration's full path, whereas the **allow/deny-configuration** statements match against the full string. For **allow/deny-configuration-regexps** statements, you configure a set of strings in which each string is a regular expression, with spaces between the terms of the string. This provides very fast matching, but with less flexibility. For specifying wildcard expressions you must set up wildcards for each token of the space-delimited string you want to match, and this makes it more tedious to use wildcard expressions for these statements.

For example:

- This example shows that **options** is the only matched expression against the first token of the statement.

```
[edit system]
login {
  class test {
    permissions configure;
    allow-configuration-regexps .*options;
  }
}
```

The above configuration matches the following statements:

- set policy-**options** condition *condition* dynamic-db
- set routing-**options** static route *static-route* next-hop *next-hop*

- set event-**options** generate-event *event* time-interval *seconds*

The above configuration does not match the following statements:

- system host-name host-**options**
- interfaces *interface-name* description **options**
- This example shows that **ssh** is the only matched expression against the third token of the statement.

```
[edit system]
login {
  class test {
    permissions configure;
    allow-configuration-regexps ".*.*.*ssh";
  }
}
```

In the above example, the three tokens include **.***, **.***, and **.*ssh**, respectively.

The above configuration matches the following statements:

- system host-name hostname-**ssh**
- system services **ssh**
- system services outbound-**ssh**

The above configuration does not match the following statement:

- interfaces *interface-name* description **ssh**

You can restrict configuration access easily using the **deny-configuration** statement as compared to using the **deny-configuration-regexps** statement. [Table 12 on page 141](#) illustrates the use of both the **deny-configuration** and **deny-configuration-regexps** statements in different configurations to achieve the same result of restricting access to a particular configuration.

Table 12: Restricting Configuration Access Using deny-configuration and deny-configuration-regexps Statements

Configuration Denied	Using: deny-configuration	Using: deny-configuration-regexps	Result
xnm-ssl	<pre>[edit system] login { class test { permissions configure; allow-configuration .*; deny-configuration .*xnm-ssl; } }</pre>	<pre>[edit system] login { class test { permissions configure; allow-configuration .*; deny-configuration-regexps ".*.*.*-ssl"; } }</pre>	<p>The following configuration statement is denied:</p> <ul style="list-style-type: none"> • system services xnm-ssl

Table 12: Restricting Configuration Access Using `deny-configuration` and `deny-configuration-regexps` Statements (continued)

ssh	<pre>[edit system] login { class test { permissions configure; allow-configuration .*; deny-configuration ".*ssh"; } }</pre>	<pre>[edit system] login { class test { permissions configure; allow-configuration .*; deny-configuration-regexps ".*ssh"; deny-configuration-regexps ".* .*ssh"; deny-configuration-regexps ".*.* .*ssh"; } }</pre>	<p>The following configuration statements are denied:</p> <ul style="list-style-type: none"> • system host-name hostname-ssh • system services ssh • system services outbound-ssh • security ssh-known-host
-----	--	--	---

Although the `allow/deny-configuration` statements are also useful when simple configuration is desired, the `allow/deny-configuration-regexps` statements provide better performance and overcome the ambiguity that existed when combining expressions set in the `allow/deny-configuration` statements.



NOTE: The `allow/deny-configuration` and `allow/deny-configuration-regexps` statements are mutually exclusive and cannot be configured together for a login class. At a given point in time, a login class can include either the `allow/deny-configuration` statement, or the `allow/deny-configuration-regexps` statement. If you have existing configurations using the `allow/deny-configuration` statements, using the same configuration options with the `allow/deny-configuration-regexps` statements might not produce the same results, as the search and match methods differ in the two forms of these statements.

Configuration Notes

When configuring the `allow-configuration`, `deny-configuration`, `allow-configuration-regexps`, and `deny-configuration-regexps` statements with access privileges, take the following into consideration:

- You can include one `deny-configuration` and one `allow-configuration` statement in each login class.
- The `allow/deny-configuration` and `allow/deny-configuration-regexps` statements are mutually exclusive and cannot be configured together for a login class. At a given point in time, a login class can include either the `allow/deny-configuration` statement, or the `allow/deny-configuration-regexps` statement. If you have existing configurations using the `allow/deny-configuration` statements, using the same configuration options with the `allow/deny-configuration-regexps` statements might not produce the same results, as the search and match methods differ in the two forms of these statements.

- Explicitly allowing configuration mode hierarchies or regular expressions using the **allow-configuration** statement adds to the regular permissions set using the **permissions** statement. Likewise, explicitly denying configuration mode hierarchies or regular expressions using the **deny-configuration** statement removes permissions for the specified configuration mode hierarchy, from the default permissions provided by the **permissions** statement.

For example, for the following configuration, the login class user can edit the configuration at the **[edit system services]** hierarchy level and issue configuration mode commands (such as **commit**), in addition to just entering the configuration mode using the **configure** command, which is the permission specified by the **configure** permission flag:

```
[edit system login]
user@host# set class test permissions configure allow-configuration "system services"
```

Likewise, for the following configuration, the login class user can perform all operations allowed by the **all** permissions flag, except issuing configuration mode commands (such as **commit**) or modifying the configuration at the **[edit system services]** hierarchy level:

```
[edit system login]
user@host# set class test permissions all deny-configuration "system services"
```

- To define access privileges to parts of the configuration hierarchy, specify the full paths in the extended regular expressions with the **allow-configuration** and **deny-configuration** statements. Use parentheses around an extended regular expression that connects two or more expressions with the pipe (|) symbol.

For example:

```
[edit system login]
user@host# set class test deny-configuration "(system login class)|(system services)"
```

- When specifying extended regular expressions using the **allow/deny-commands** and **allow/deny-configuration** statements, each expression separated by a pipe (|) symbol must be a complete standalone expression, and must be enclosed in parentheses (). Do not use spaces between regular expressions separated with parentheses and connected with the pipe (|) symbol.

For example:

```
[edit system login]
user@host# set class test allow-commands "(ping.*)"|(traceroute.*)"|(show
.*)|(configure.*)"|(edit)|(exit)|(commit)|(rollback.*)"
user@host# set class test deny-configuration "(system login class)|(system services)"
```

- When specifying extended regular expressions using the **allow-deny-configuration-regexps** statement, each expression enclosed within quotes (") and separated by a space must be enclosed in angular brackets [].

For example:

```
[edit system login]
user@host# set class test allow-configuration-regexps [ "interfaces.*description.*"
"interfaces.*unit.*description.*" "interfaces.*unit.*family inet address.*"
"interfaces.*disable" ]
```

- If the exact same command is configured under both **allow-configuration** and **deny-configuration** statements, then the allow operation takes precedence over the deny statement.

For instance, with the following configuration, a user assigned to login class test is allowed to access the **[edit system services]** configuration hierarchy, although the **deny-configuration** statement also includes it:

```
[edit system login]
user@host# set class test permissions allow-configuration "system services"
user@host# set class test permissions deny-configuration "system services"
```

For instance, if a certain command or configuration is allowed, for example, using permission *all*, then we can use the **deny-configuration** command to deny access to a particular hierarchy.

- Modifiers such as *set*, *log*, and *count* are not supported within the regular expression string to be matched. If a modifier is used, then nothing is matched.

Incorrect configuration:

```
[edit system login]
user@host# set class test permission deny-configuration "set protocols"
```

Correct configuration:

```
[edit system login]
user@host# set class test permission deny-configuration protocols
```

- You can use the *** wildcard character when denoting regular expressions. However, it must be used as a portion of a regular expression. You cannot use *[*]* or *[.*]* alone.
- You cannot configure the **allow-configuration** statement with the *(interfaces (description (|.*)*) regular expression, as this evaluates to **allow-configuration = .*** regular expression.
- You can configure as many regular expressions as needed to be allowed or denied. Regular expressions to be denied take precedence over configurations to be allowed.

Topology

Figure 3: Configuring TACACS+ Server Authentication



Figure 3 on page 144 illustrates a simple topology, where Router R1 is a Juniper Networks device and has a TCP connection established with a TACACS+ server.

In this example, R1 is configured with two customized login classes—Class1 and Class2—for specifying access privileges with extended regular expressions using the **allow-configuration**, **deny-configuration**, **allow-configuration-regexps**, and **deny-configuration-regexps** statements differently.

The purpose of the login classes is as follows:

- **Class1**—Define access privileges for the user with the **allow-configuration** and **deny-configuration** statements. This login class should provide access to configure interfaces hierarchy only, and deny all other access on the device. To do this, the user permissions should include *configure* to provide configuration access. In addition to this, the **allow-configuration** statement should allow interfaces configuration, and the **deny-configuration** statement should deny access to all other configurations. Because the allow statement takes precedence over the deny statement, the users assigned to the Class1 login class can access only the **[edit interfaces]** hierarchy level.
- **Class2**—Define access privileges for the user with the **allow-configuration-regexps** and **deny-configuration-regexps** statements. This login class provides superuser-level user permissions, and in addition, explicitly allows configuration under multiple hierarchy levels for interfaces. It also denies configuration access to the **[edit system]** and **[edit protocols]** hierarchy levels.

Router R1 has two users, User1 and User2, assigned to the Class1 and Class2 login classes, respectively.

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.

```
R1 set system authentication-order tacplus
set system authentication-order radius
set system authentication-order password
set system radius-server 10.209.1.66 secret "$ABC123"
set system tacplus-server 10.209.1.66
set system radius-options enhanced-accounting
set system tacplus-options enhanced-accounting
set system accounting events login
set system accounting events change-log
set system accounting events interactive-commands
set system accounting traceoptions file auditlog
set system accounting traceoptions flag all
set system accounting destination tacplus server 10.209.1.66
set system login class Class1 permissions configure
set system login class Class1 allow-configuration "interfaces .* unit .*"
set system login class Class1 deny-configuration .*
set system login class Class2 permissions all
set system login class Class2 allow-configuration-regexps [ "interfaces .* description .*"
"interfaces .* unit .* description .*" "interfaces .* unit .* family inet address .*"
"interfaces .* disable" ]
```

```
set system login class Class2 deny-configuration-regexps [ "system" "protocols" ]
set system login user User1 uid 2004
set system login user User1 class Class1
set system login user User1 authentication encrypted-password "$ABC123"
set system login user User2 uid 2006
set system login user User2 class Class2
set system login user User2 authentication encrypted-password "$ABC123"
set system syslog file messages any any
```

Configuring Authentication Parameters for Router R1

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 *CLI User Guide*.

To configure Router R1 authentication:

1. Configure the order in which authentication should take place for R1. In this example, TACACS+ server authentication is first, followed by RADIUS server authentication, then the local password.

```
[edit system]
user@R1# set authentication-order tacplus
user@R1# set authentication-order radius
user@R1# set authentication-order password
```

2. Establish R1 connection with the TACACS+ server.

```
[edit system]
user@R1# set tacplus-server 10.209.1.66
user@R1# set tacplus-options enhanced-accounting
user@R1# set accounting destination tacplus server 10.209.1.66
```

3. Configure RADIUS server authentication parameters.

```
[edit system]
user@R1# set radius-server 10.209.1.66 secret "$ABC123"
user@R1# set radius-options enhanced-accounting
```

4. Configure the R1 accounting configuration parameters.

```
[edit system]
user@R1# set accounting events login
user@R1# set accounting events change-log
user@R1# set accounting events interactive-commands
user@R1# set accounting traceoptions file auditlog
user@R1# set accounting traceoptions flag all
```

Configuring Access Privileges with `allow-configuration` and `deny-configuration` Statements (Class1)

Step-by-Step Procedure

To specify regular expressions using the `allow-configuration` and `deny-configuration` statements:

1. Configure the Class1 custom login class and assign configuration user permissions.

```
[edit system login]
user@R1# set class Class1 permissions configure
```

2. Specify the regular expression in the `allow-configuration` statement to allow configuration at the `[edit interfaces]` hierarchy level. To allow `set` commands at the `[edit interfaces]` hierarchy level, the regular expression used is `interfaces.*unit.*`.

```
[edit system login]
user@R1# set class Class1 allow-configuration "interfaces.*unit.*"
```

3. Specify the regular expression in the `deny-configuration` statement to disable all configuration access. The regular expression used to deny all configuration access is `.*`.

```
[edit system login]
user@R1# set class Class1 deny-configuration .*
```

4. Configure the user account for the Class1 login class.

```
[edit system login]
user@R1# set system login user User1 uid 2004
user@R1# set system login user User1 class Class1
user@R1# set system login user User1 authentication encrypted-password "$ABC123"
```

Configuring Access Privileges with `allow-configuration-regexps` and `deny-configuration-regexps` Statements (Class2)

Step-by-Step Procedure

To specify regular expressions using the `allow-configuration-regexps` and `deny-configuration-regexps` statements:

1. Configure the Class2 custom login class and assign superuser (all) user permissions. For information on the predefined system login classes, see [“Junos OS Login Classes Overview” on page 47](#).

```
[edit system login]
user@R1# set class Class2 permissions all
```

2. Specify the regular expression to allow access to multiple hierarchies under the **[edit interfaces]** hierarchy level.

```
[edit system login]
user@R1# set class Class2 allow-configuration-regexps [ "interfaces.*description
.*" "interfaces.*unit.*description.*" "interfaces.*unit.*family inet address.*"
"interfaces.*disable" ]
```

3. Specify the regular expression to deny configuration at the **[edit system]** and **[edit protocols]** hierarchy levels.

```
[edit system login]
user@R1# set class Class2 deny-configuration-regexps [ "system" "protocols" ]
```

4. Configure the user account for the Class2 login class.

```
[edit system login]
user@R1# set system login user User2 uid 2006
user@R1# set system login user User2 class Class2
user@R1# set system login user User2 authentication encrypted-password "$ABC123"
```

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.

```
user@R1# show system
authentication-order [ tacplus radius password ];
radius-server {
    10.209.1.66 secret "$ABC123";
}
tacplus-server {
    10.209.1.66;
}
radius-options {
    enhanced-accounting;
}
tacplus-options {
    enhanced-accounting;
}
accounting {
    events [ login change-log interactive-commands ];
    traceoptions {
        file auditlog;
        flag all;
    }
    destination {
        tacplus {
            server {
```



```

        10.209.1.66;
    }
}
}
login {
  class Class1 {
    permissions configure;
    allow-configuration "interfaces.* unit.*";
    deny-configuration.*;
  }
  class Class2 {
    permissions all;
    allow-configuration-regexps [ "interfaces.* description.*" "interfaces.* unit.*
    description.*" "interfaces.* unit.* family inet address.*" "interfaces.* disable" ];
    deny-configuration-regexps [ "system" "protocols" ];
  }
  user User1 {
    uid 2001;
    class Class1;
    authentication {
      encrypted-password "$ABC123";
    }
  }
  user User2 {
    uid 2002;
    class Class2;
    authentication {
      encrypted-password "$ABC123";
    }
  }
}
syslog {
  file messages {
    any any;
  }
}

```

Verification

Log in as the username assigned with the new login class, and confirm that the configuration is working properly.

- [Verifying Class1 Configuration on page 149](#)
- [Verifying Class2 Configuration on page 150](#)

Verifying Class1 Configuration

Purpose Verify that the permissions allowed in the Class1 login class are working.

Action From the CLI prompt, check the available permissions.

```
User1@R1> ?
```

```
Possible completions:
```

clear	Clear information in the system
configure	Manipulate software configuration information
file	Perform file operations
help	Provide help information
load	Load information from file
op	Invoke an operation script
quit	Exit the management session
request	Make system-level requests
save	Save information to file
set	Set CLI properties, date/time, craft interface message
start	Start shell
test	Perform diagnostic debugging

From the configuration mode, check the available configuration permissions.

```
User1@R1# edit ?
```

```
Possible completions:
```

```
> interfaces      Interface configuration
```

Meaning User1 has *configure* user permissions seen in the first output, and the only configuration access allowed for User1 is at the interfaces hierarchy level. All other configuration is denied, as seen in the second output.

Verifying Class2 Configuration

Purpose Verify that the Class2 configuration is working.

Action From the configuration mode, access the interfaces configuration.

```
[edit interfaces]
```

```
User2@R1# set ?
```

```
Possible completions:
```

<interface-name>	Interface name
+ apply-groups	Groups from which to inherit configuration data
+ apply-groups-except	Don't inherit configuration data from these groups
ge-0/0/3	Interface name
> interface-range	Interface ranges configuration
> interface-set	Logical interface set configuration
> traceoptions	Interface trace options

From the configuration mode, access the system and protocols configuration hierarchies.

```
User2@R1# edit system
```

```
^
```

```
Syntax error, expecting <statement> or <identifier>.
```

```
User2@R1# edit protocols
```

```
      ^
Syntax error, expecting <statement> or <identifier>.
```

Meaning User2 has permissions to configure interfaces of R1, but the **[edit system]** and **[edit protocols]** hierarchy levels are denied access, as seen in the output.

- Related Documentation**
- [Understanding Junos OS Access Privilege Levels on page 107](#)
 - [Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies on page 117](#)
 - [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
 - [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)

Examples of Defining Access Privileges Using **allow-configuration** and **deny-configuration** Statements

You can define access privileges using a combination of the following types of statements:

- permission flags
- **allow-configuration** and **deny-configuration** statements

The permission flags define the larger boundaries of what a person or login class can access and control. The **allow-configuration** and **deny-configuration** statements take precedence over permission flags and give the administrator finer control over exactly what the user has access to.

This topic explains defining access privileges using **allow-configuration** and **deny-configuration** statements by showing a series of examples of login class configuration using these statements. Examples 1 through 3 use both permission flags and **deny-configuration** statements to create login classes that allow users access to all except something. Each **allow-configuration** or **deny-configuration** statement is configured with one or more regular expressions to be allowed or denied.

Notice that *permission bit* and *permission flag* are used interchangeably.

Example 1 To create a login class that allows the user to configure everything except telnet parameters:

1. Set the user's login class permission bit to **all**.

```
[edit system login]
user@host# set class all-except-telnet permissions all
```

2. Include the following **deny-configuration** statement.

```
[edit system login class all-except-telnet]
user@host# set deny-configuration "system services telnet"
```

Example 2 To create a login class that allows the user to configure everything except anything within any login class whose name begins with "m":

1. Set the user's login class permission bit to **all**.

```
[edit system login]
user@host# set class all-except-login-class-m permissions all
```

2. Include the following **deny-configuration** statement.

```
[edit system login class all-except-login-class-m]
user@host# set deny-configuration "system login class m.*"
```

Example 3 This next example shows the creation of a login class with the **all** permission bit that prevents the user from editing a configuration or issuing commands (such as **commit**) at the **[edit system login class]** or **[edit system services]** hierarchy levels:

To create a login class that allows the user to configure everything except at the **[edit system login class]** or **[edit system services]** hierarchy levels:

1. Set the user's login class permission bit to **all**.

```
[edit system login]
user@host# set class all-except-login-class-or-system-services permissions all
```

2. Include the following **deny-configuration** statement.

```
[edit system login class all-except-login-class-or-system-services]
user@host# set deny-configuration "(system login class) | (system services)"
```

The next two examples show how to use the **allow-configuration** and **deny-configuration** statements to determine permissions inverse to each other for the **[edit system services]** hierarchy level.

Example 4 To create a login class that allows the user to have full configuration privileges at the **[edit system services]** hierarchy level and at only the **[edit system services]** hierarchy level:

1. Set the user's login class permission bit to **configure**.

```
[edit system login]
user@host# set class configure-only-system-services permissions configure
```

2. Include the following **allow-configuration** statement.

```
[edit system login class configure-only-system-services]
user@host# set allow-configuration "system services"
```

Example 5 To create a login class that allows the user full permissions for all configuration mode hierarchies except the **[edit system services]** hierarchy level:

1. Set the user's login class permission bit to **all**.

```
[edit system login]
user@host# set class all-except-system-services permissions all
```

2. Include the following **deny-configuration** statement.

```
[edit system login class all-except-system-services]
user@host# set deny-configuration "system services"
```

Related Documentation

- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies on page 117](#)
- [Defining Junos OS Login Classes on page 52](#)
- [Understanding Junos OS Access Privilege Levels on page 107](#)

Example: Using Additive Logic With Regular Expressions to Specify Access Privileges

This example shows how to use additive logic when using regular expressions to set up configuration access privileges.

- [Requirements on page 153](#)
- [Overview on page 154](#)
- [Configuration on page 154](#)
- [Examples on page 155](#)

Requirements

This example uses the following hardware and software components:

- One Juniper Networks J Series, M Series, MX Series, or T Series device

- Junos OS Release 16.1 or later
 - There must be at least one user assigned to a login class.
 - There can be more than one login class, each with varying permission configurations, and more than one user on the device.

Overview

To control who can make configuration changes to the system, and what specifically they can change, you can create regular expressions that indicate specific portions of the configuration hierarchy that users in a named user class are permitted to access. For example, you can create regular expressions that specify a group of routing instances that users are allowed to modify, and prevent the users from making changes to any other routing instances, or to any other configuration level.

You configure regular expressions using the **allow-configuration-regexps** and **deny-configuration-regexps** statements. By default, **deny-configuration-regexps** statements take precedence over **allow-configuration-regexps** statements for users in the named user class to which they are applied.

If a configuration hierarchy appears in a **deny-configuration-regexps** statement for a named user class, it is not visible to the users, regardless of the contents of the **allow-configuration-regexps** statement. If a configuration hierarchy does not appear in a **deny-configuration-regexps** statement, it is visible if it appears in an **allow-configuration-regexps** statement, or if there is no **allow-configuration-regexps** statement configured for the user class..

You can optionally change this default behavior so additive logic (that is, deny all by default / allow some as specified) is used in regular expressions. When additive logic is enabled, the behavior of existing regular expressions changes so that all configuration hierarchies are denied unless they are included in an **allow-configuration-regexps** statement for the named user class.

Configuration

To enable additive logic for regular expressions:

1. To explicitly allow one or more individual configuration mode hierarchies, include the **allow-configuration-regexps** statement at the **[edit system login class *class-name*]** hierarchy level, configured with the regular expressions to be allowed.

```
[edit system login class class-name]  
user@host# set allow-configuration-regexps "regular expression 1" "regular expression 2" "regular expression 3" "regular expression 4" ...
```

2. Assign the login class to one or more users.

```
[edit system login]  
user@host# set user username class class-name
```

3. Enable additive logic for regular expressions.

```
[edit system]
user@host# set regex-additive-logic
```

4. Commit your changes.

Users assigned this login class have access to the configuration hierarchies included in the **allow-configuration-regexps** statement, but no others.

Examples

Using Regular Expressions with Additive Logic

Purpose This section provides examples of regular expressions that use additive logic to give you ideas for creating configurations appropriate for your system.

Allow Specific Routing Instances The following example login class includes a regular expression that allows configuration of routing instances whose names start with **CUST-VRF-**; for example, **CUST-VRF-1**, **CUST-VRF-25**, **CUST-VRF-100**, and so on:

```
[edit system login class class-name]
user@host# set permissions configure view view-configuration
user@host# set allow-configuration-regexps "routing-instances CUST-VRF-.*.*"
```

If the following statement is included in the configuration, it prevents the user from configuring any other routing instances and denies access to any non-routing instance configuration hierarchy:

```
[edit system]
user@host# set regex-additive-logic
```

Allow BGP Peer Configuration Only The following example login class includes a regular expression that allows configuration of BGP peers:

```
[edit system login class class-name]
user@host# set permissions configure view view-configuration
user@host# set allow-configuration-regexps "protocols bgp group *"
```

If the following statement is included in the configuration, it prevents the user from making any other changes, such as deleting or disabling BGP statements:

```
[edit system]
user@host# set regex-additive-logic
```

Verification To verify that you have set the access privileges correctly:

1. Configure a login class and commit the changes.
2. Assign the login class to a *username*.
3. Log in as the *username* assigned with the new login class.
4. Attempt to perform the configurations that have been allowed.
 - You should be able to perform configuration changes to hierarchy levels and regular expressions that have been allowed.
 - All other hierarchies should not be visible.
 - Any allowed or denied expressions should take precedence over any permissions granted with the **permissions** statement.

**Related
Documentation**

- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies on page 117](#)
- [Understanding Junos OS Access Privilege Levels on page 107](#)

Understanding User and Access Management Features on the QFabric System

The QFabric system supports the following user and access management features:

- User authentication
- RADIUS
- Link Layer Discovery Protocol (LLDP)
- SSH
- TACACS+
- Access privilege management

The specific functionality, features, options, syntax, and hierarchy levels of some of the user and access management commands and configuration statements implemented on the QFabric system may differ somewhat from the same commands and configuration statements on standard Junos OS. See the configuration statement or command topic in the documentation set for additional information, and use the help (?) command-line function to display specific information as needed.

Some user and access management features are not yet fully supported in the full QFabric architecture, although full support is planned for future releases. The user and access management features currently unsupported on the QFabric system include:

- Full RADIUS server support, including RADIUS accounting
- **accounting-options** configuration statement hierarchy
- **tacplus-options** configuration statement

CHAPTER 4

Configuring Passwords for User Access

- [Configuring the Root Password on page 160](#)
- [Configuring the Root Password on page 162](#)
- [Example: Protecting Network Security by Configuring the Root Password on page 164](#)
- [Example: Configuring a Plain-Text Password for Root Logins on page 164](#)
- [Example: Configuring SSH Authentication for Root Logins on page 166](#)
- [Recovering the Root Password on page 167](#)
- [Recovering the Root Password on Junos OS with Upgraded FreeBSD on page 169](#)
- [Recovering the Root Password for Switches on page 172](#)
- [Recovering the Root Password for MX80 on page 174](#)
- [Troubleshooting Loss of the Root Password on page 177](#)
- [Changing the Requirements for Junos OS Plain-Text Passwords on page 180](#)
- [Example: Changing the Requirements for Junos OS Plain-Text Passwords on page 181](#)
- [Configuring MS-CHAPv2 for Password-Change Support on page 183](#)

Configuring the Root Password

The Junos OS is preinstalled on the router or switch. When the router or switch is powered on, it is ready to be configured. Initially, you log in as the user **root** with no password. The root directory of a UNIX device is the entry point to all other folders and files on that device. As a result, access to the root directory is restricted by default to a predefined user account known as the *root user*. The root user (also referred to as *superuser*) has unrestricted access and full permissions within the system. The expression “log in as root” is commonly used when an action requires the user to log into the device as the root user.



NOTE: If you configure a blank password using the `encrypted-password` statement at the `[edit system root-authentication]` hierarchy level for root authentication, you can commit a configuration but you *cannot* log in as the root user and gain root level access to the router or switch.

After you log in, you should configure the root (superuser) password by including the **root-authentication** statement at the `[edit system]` hierarchy level and configuring one of the password options:

```
[edit system]
root-authentication {
  (encrypted-password "password"| plain-text-password);
  load-key-file URL filename;
  ssh-dsa "public-key" <from hostname>;
  ssh-ecdsa "public-key" <from hostname>;
  ssh-rsa "public-key" <from hostname>;
}
```

If you configure the **plain-text-password** option, you are prompted to enter and confirm the password:

```
[edit system]
user@host# set root-authentication plain-text-password
New password: type password here
Retype new password: retype password here
```

The default requirements for plain-text passwords are:

- The password must be between 6 and 128 characters long
- You can include most character classes in a password (uppercase letters, lowercase letters, numbers, punctuation marks, and other special characters). Control characters are not recommended.

- Valid passwords must contain at least one uppercase letter or one lowercase letter, or one character class.

You can use the **load-key-file** *URL filename* statement to load an SSH key file that was previously generated using **ssh-keygen**. The *URL filename* is the path to the file's location and name. When using this option, the contents of the key file are copied into the configuration immediately after entering the **load-key-file** *URL* statement. This command loads RSA (SSH version 1 and SSH version 2) and DSA (SSH version 2) public keys.

Starting in Junos OS Release 18.3R1, the **ssh-dss** and **ssh-dsa** hostkey algorithms are deprecated—rather than immediately removed—to provide backward compatibility and a chance to bring your configuration into compliance with the new configuration.

Optionally, you can use the **ssh-dsa**, **ssh-ecdsa**, or **ssh-rsa** statements to directly configure SSH RSA, DSA, or ECDSA keys to authenticate root logins. You can configure more than one public key for SSH authentication of root logins as well as for user accounts. When a user logs in as root, the public keys are referenced to determine whether the private key matches any of them.

```
[edit system]
user@host# set root-authentication load-key-file my-host:.ssh/id_dsa.pub
.file.19692 | 0 KB | 0.3 kB/s | ETA: 00:00:00 | 100%
[edit system]
```

From configuration mode, you can confirm your SSH key entries by entering the **show** command. It should look something like this:

```
[edit system]
user@hos# show
root-authentication {
  ssh-rsa "$ABC123"; #
  SECRET-DATA
}
```

Junos-FIPS software has special password requirements. FIPS passwords must be between 10 and 20 characters in length. Passwords must use at least three of the five defined character sets (uppercase letters, lowercase letters, digits, punctuation marks, and other special characters). If Junos-FIPS is installed on the router or switch, you cannot configure passwords unless they meet this standard.

If you use the **encrypted-password** option, then a null-password (empty) is not permitted. You must configure a password whose number of characters range from 1 through 128 characters and enclose the password in quotation marks.

Release History Table

Release	Description
18.3R1	Starting in Junos OS Release 18.3R1, the ssh-dss and ssh-dsa hostkey algorithms are deprecated— rather than immediately removed—to provide backward compatibility and a chance to bring your configuration into compliance with the new configuration.

Related Documentation

- [Protecting Network Security by Configuring the Root Password](#)
- [Example: Configuring a Plain-Text Password for Root Logins on page 164](#)
- [Example: Configuring SSH Authentication for Root Logins on page 166](#)
- [Example: Changing the Requirements for Junos OS Plain-Text Passwords on page 181](#)
- [Recovering the Root Password on page 167](#)

Configuring the Root Password

Junos OS is preinstalled on the router or switch. When the router or switch is powered on, it is ready to be configured. Initially, you log in as the user “root” with no password.



NOTE: If you configure a blank password using the **encrypted-password** statement at the **[edit system root-authentication]** hierarchy level for root authentication, you can commit a configuration, but you are *not* able to log in as superuser and gain root level access to the router or switch.

After you log in, you should configure the root (superuser) password by including the **root-authentication** statement at the **[edit system]** hierarchy level:

```
[edit system]
root-authentication {
  (encrypted-password "password" | load-key-password URL | plain-text-password);
  ssh-dsa "public-key";
  ssh-rsa "public-key";
}
```

If you configure the **plain-text-password** option, you are prompted to enter and confirm the password:

```
[edit system]
user@switch# set root-authentication plain-text-password
New password: type password here
Retype new password: retype password here
```

To load an SSH key file, enter the **load-key-file** statement. This statement loads RSA (SSH version 1 and SSH version 2) and DSA (SSH version 2) public keys.

You can also configure SSH RSA keys and SSH DSA keys to authenticate root logins. You can configure more than one public RSA or DSA key for SSH authentication of root logins as well as for user accounts. When a user logs in as root, the public keys are referenced to determine whether the private key matches any of them.

If you load the SSH keys file, the contents of the file are copied into the configuration immediately after you enter the **load-key-file** statement. To view the SSH keys entries, use the configuration mode **show** command. For example:

```
[edit system]
user@switch# set root-authentication load-key-file my-host::ssh/identity.pub
.file.19692 | 0 KB | 0.3 kB/s | ETA: 00:00:00 | 100%
[edit system]
user@switch# show
root-authentication {
  ssh-rsa "ABC123"; #
  SECRET-DATA
}
```

Junos-FIPS software has special password requirements. FIPS passwords must be between 10 and 20 characters in length. Passwords must use at least three of the five defined character sets (uppercase letters, lowercase letters, digits, punctuation marks, and other special characters). If Junos-FIPS is installed on the router or switch, you cannot configure passwords unless they meet this standard. If you use the **encrypted-password** option, then a null-password (empty) is not permitted.

You cannot configure a blank password for **encrypted-password** using blank quotation marks (" "). You must configure a password whose number of characters range from 1 through 128 characters and enclose the password in quotation marks.

Related Documentation

- [Recovering the Root Password for Switches on page 172](#)
- [Example: Protecting Network Security by Configuring the Root Password on page 164](#)
- [Example: Configuring a Plain-Text Password for Root Logins on page 164](#)
- [Example: Configuring SSH Authentication for Root Logins on page 166](#)

Example: Protecting Network Security by Configuring the Root Password

Configuring the root password on your Junos OS-enabled router helps prevent unauthorized users from making changes to your network. The root user (also referred to as superuser) has unrestricted access and full permissions within the system, so it is crucial to protect these functions by setting a strong password when setting up a new router.

After a new router is initially powered on, you log in as the user **root** with no password. Junos OS requires configuration of the root password before it accepts a commit operation. On a new device, the root password must always be a part of the configuration submitted with your initial commit.

The following example shows how to configure the root password:

```
[edit]
user@switch# set system root-authentication encrypted-password "$ABC123"
[edit]
user@switch# show
system {
  root-authentication {
    encrypted-password "$ABC123";
  }
}
```

Related Documentation

- [Protecting Network Security by Configuring the Root Password](#)
- [Example: Configuring a Plain-Text Password for Root Logins on page 164](#)
- [Configuring the Root Password on page 162](#)

Example: Configuring a Plain-Text Password for Root Logins

This example shows how to configure a plain-text password for the root-level user (whose username is *root*). Configuring a plain-text password is one way to protect access to the root level by unauthorized users. You must prevent unauthorized users from gaining access to superuser commands that can be used to alter your system configuration.

- [Requirements on page 164](#)
- [Overview on page 165](#)
- [Configuration on page 165](#)
- [Verification on page 166](#)

Requirements

No special configuration beyond device initialization is required before configuring this example.

Make sure that you understand the requirements for a valid plain-text password. For Junos OS, the default requirements for a plain-text password are as follows:

- Must be from 6 up to 128 characters long.
- Can include most character classes (uppercase letters, lowercase letters, numbers, punctuation marks, and other special characters). Control characters are not recommended.
- Must contain at least one change of case or character class.

Overview

Junos OS is preinstalled on the router. When the router is powered on, it is ready to be configured. Initially, you log in as the root-level user with no password. To set the root password, you have several options. This example shows how to enter a plain-text password that Junos OS then encrypts for you.

Configuration

CLI Quick Configuration To quickly configure this example, copy the following command and paste it into the window. When prompted, type the new password, and then when prompted, retype it.

```
set system root-authentication plain-text-password
```

Configuring a Plain-Text Password for User Root

Step-by-Step Procedure To configure a plain-text password for the root-level user:

1. Type the **set** command for the plain-text password and press Enter.

```
[edit]
user@host# set system root-authentication plain-text-password
New password:
```

2. Type the new password next to the **New password** prompt and press Enter.

```
New password: new-password
Retype new password:
```

3. Retype the same password next to the **Retype new password** prompt and press Enter.

Results

From configuration mode, confirm your configuration by using the **show** command. It should look something like this:

```
[edit ]
user@host# show system
root-authentication {
  encrypted-password "$ABC123"; ## SECRET-DATA
}
```

If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

After you have confirmed that the configuration is correct, enter **commit** from configuration mode.

Verification

Verifying the Configuration of a Plain-Text Password for User Root

Purpose Verify the configuration of a plain-text password for the root-level user.

Action From operational mode, confirm your configuration by entering the **show configuration system** command.

```
user@host> show configuration system
root-authentication {
  encrypted-password "$ABC123"; ## SECRET-DATA
}
```

Meaning If you use a clear-text password, Junos OS displays the password as an encrypted string so that users viewing the configuration cannot see the unencrypted password. That is, as you enter the password in plain text, Junos OS encrypts it immediately. You do not have to configure Junos OS to encrypt the password as in some other systems. Plain-text passwords are hidden and marked as ## SECRET-DATA in the configuration.

Related Documentation

- [root-authentication on page 1714](#)
- [Changing the Requirements for Junos OS Plain-Text Passwords on page 180](#)

Example: Configuring SSH Authentication for Root Logins

The following example shows how to configure two public DSA keys for SSH authentication of root logins:

```
[edit system]
root-authentication {
  encrypted-password "$ABC123";
  ## SECRET-DATA;
  ssh-dsa "2354 95 9304@user.device";
  ssh-dsa "0483 02 8362@user.device";
}
```

Related Documentation • [Configuring the Root Password on page 160](#)

Recovering the Root Password

If you forget the root password for the router, you can use the password recovery procedure to reset the root password.



NOTE: You need console access to recover the root password.



NOTE: This password recovery procedure does not apply to devices running Junos OS with Upgraded FreeBSD. See [“Recovering the Root Password on Junos OS with Upgraded FreeBSD” on page 169](#). For MX80 Series routers, try this procedure first, but if it does not work you can manually delete the root-authentication settings from the Junos configuration file and reset the password, as explained here: [“Recovering the Root Password for MX80” on page 174](#).



Video: [Recovering the Root Password](#)

To recover the root password:

1. Power off the router by pressing the power button on the front panel.
2. Turn off the power to the management device, such as a PC or laptop computer, that you want to use to access the CLI.
3. Plug one end of the Ethernet rollover cable supplied with the router into the RJ-45-to-DB-9 serial port adapter supplied with the router.
4. Plug the RJ-45-to-DB-9 serial port adapter into the serial port on the management device.
5. Connect the other end of the Ethernet rollover cable to the console port on the router.
6. Turn on the power to the management device.
7. On the management device, start your asynchronous terminal emulation application (such as Microsoft Windows Hyperterminal) and select the appropriate COM port to use (for example, COM1).
8. Configure the port settings as follows:

- Bits per second: 9600
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: None
9. Power on the router by pressing the power button on the front panel.
- Verify that the POWER LED on the front panel turns green.
- The terminal emulation screen on your management device displays the router's boot sequence.

10. When the following prompt appears, press the Spacebar to access the router's bootstrap loader command prompt:
- Depending on your device hardware, the bootstrap loader might proceed quite quickly at this step without pausing for input. Therefore, you might need to press the spacebar multiple times at the beginning of the boot sequence.

```
Hit [Enter] to boot immediately, or space bar for command prompt.  
Booting [kernel] in 9 seconds...
```

11. At the following prompt, type **boot -s** to start the system in single-user mode.
- ```
ok boot -s
```
12. At the following prompt, type **recovery** to start the root password recovery procedure.
- ```
Enter full pathname of shell or 'recovery' for root password recovery or RETURN  
for /bin/sh: recovery
```
13. Enter configuration mode in the CLI.
14. Set the root password.

```
[edit]  
user@host# set system root-authentication plain-text-password
```

When you configure a plain-text password, Junos OS encrypts the password for you.



CAUTION: Do not use the `encrypted-password` option unless the password is *already* encrypted, and you are entering the encrypted version of the password. If you commit the `encrypted-password` option with a plain-text password or with blank quotation marks (" "), you will not be able to log in to the device as root, and you will need to repeat this password recovery process.

15. At the following prompt, enter the new root password, for example:

```
New password: password
```

```
Retype new password:
```

16. At the second prompt, reenter the new root password.

17. After you have finished configuring the password, commit the configuration.

```
root@host# commit
```

```
commit complete
```

18. Exit configuration mode in the CLI.

19. Exit operational mode in the CLI.

20. At the prompt, type **y** to reboot the router.

```
Reboot the system? [y/n] y
```

**Related
Documentation**

- [Configuring the Root Password on page 160](#)
- [Recovering the Root Password on Junos OS with Upgraded FreeBSD on page 169](#)

Recovering the Root Password on Junos OS with Upgraded FreeBSD

If you forget the root password for a device running Junos OS with Upgraded FreeBSD, you can use the password recovery procedure to reset the root password.



NOTE: You need console access to recover the root password.



NOTE: This password recovery procedure only applies to devices running Junos OS with Upgraded FreeBSD. For password recovery on Junos OS devices, see [“Recovering the Root Password” on page 167](#).

To recover the root password:

1. Power off the router by pressing the power button on the front panel.
2. Turn off the power to the management device, such as a PC or laptop computer, that you want to use to access the CLI.

3. Plug one end of the Ethernet rollover cable supplied with the router into the RJ-45-to-DB-9 serial port adapter supplied with the router.
4. Plug the RJ-45-to-DB-9 serial port adapter into the serial port on the management device.
5. Connect the other end of the Ethernet rollover cable to the console port on the router.
6. Turn on the power to the management device.
7. On the management device, start your asynchronous terminal emulation application (such as Microsoft Windows Hyperterminal) and select the appropriate COM port to use (for example, COM1).
8. Configure the port settings as follows:
 - Bits per second: 9600
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: None
9. Power on the router by pressing the power button on the front panel.

Verify that the POWER LED on the front panel turns green.

The terminal emulation screen on your management device displays the router's boot sequence.
10. Access the Junos Main Menu.
 - Prior to Junos OS Release 17.3, the Junos Main Menu appears for 3 seconds on startup before automatically booting the Junos volume. Press any key within the 3 second window to stop the automatic boot sequence and display the Junos Main Menu.



NOTE: The Junos Main Menu will appear every time you reboot the router while connected to the console.

- Starting in Junos OS Release 17.3, press Ctrl+c at the following part in the reboot to bring up the Junos Main Menu:

```
FreeBSD/x86 bootstrap loader, Revision 1.1
(builder@feyrith.juniper.net, Sun Feb  4 13:06:24 PST 2018)
/
Autoboot in 1 seconds... (press Ctrl-C to interrupt)
```

1. Boot [J]unos volume
2. Boot Junos volume in [S]afe mode
3. [R]eboot
4. [B]oot menu
5. [M]ore options

11. At the Junos Main Menu, press the **M** or **5** key to activate the **5. [M]ore options** menu:

1. Recover [J]unos volume
2. Recovery mode - [C]LI
3. Check [F]ile system
4. Enable [V]erbose boot
5. [B]oot prompt
6. [M]ain menu

12. Press the **C** or **2** key to access the **2. Recovery mode - [C]LI** option. The router will reboot into CLI recovery mode.

13. When prompted, press the **Enter** key to immediately boot the router, or press any other key to bring up the command prompt.

14. Enter configuration mode in the CLI.

```
root># configure
Entering configuration mode
```

15. Set the root password.

When you configure a plain-text password, Junos OS encrypts the password for you.

```
[edit]
root# set system root-authentication plain-text-password
```



CAUTION: Do not use the `encrypted-password` option unless the password is *already* encrypted, and you are entering the encrypted version of the password. If you commit the `encrypted-password` option with a plain-text password or with blank quotation marks (" "), you will not be able to log in to the router as root, and you will need to repeat this password recovery process.

16. At the following prompt, enter the new root password, for example:

```
New password: password
```

```
Retype new password:
```

17. At the second prompt, reenter the new root password.
18. If you used a configuration group, apply the configuration group, substituting **global** with the appropriate group name.

```
[edit]  
root# set apply-groups global
```

19. After you have finished configuring the password, commit the configuration.

```
root@host# commit  
commit complete
```

Related Documentation

- [Configuring the Root Password on page 160](#)
- [Release Information for Junos OS with Upgraded FreeBSD](#)
- [Recovering the Root Password on page 167](#)

Recovering the Root Password for Switches

If you forget the root password, you can use the password recovery procedure to reset the root password.



NOTE: The root password cannot be recovered on a QFabric system.



NOTE: You need console access to the switch to recover the root password.

To recover the root password:

1. Power off the switch by switching off the AC power outlet of the device or, if necessary, by pulling the power cords out of the device's power supplies.
2. Turn off the power to the management device, such as a PC or laptop computer, that you want to use to access the CLI.
3. Plug one end of the Ethernet rollover cable supplied with the device into the RJ-45-to-DB-9 serial port adapter supplied with the device.
4. Plug the RJ-45-to-DB-9 serial port adapter into the serial port on the management device.

5. Connect the other end of the Ethernet rollover cable to the console port on the device.
6. Turn on the power to the management device.
7. On the management device, start your asynchronous terminal emulation application (such as Microsoft Windows Hyperterminal) and select the appropriate **COM** port to use (for example, **COM1**).
8. Configure the port settings as follows:
 - Bits per second: 9600
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: None
9. Power on the device by (if necessary) plugging the power cords into the device's power supply, or turning on the power to the device by switching on the AC power outlet the device is plugged into.

The terminal emulation screen on your management device displays the device's boot sequence.

10. When the following prompt appears, press the Spacebar to access the device's bootstrap loader command prompt:

```
Hit [Enter] to boot immediately, or space bar for command prompt.  
Booting [kernel] in 9 seconds...
```

11. At the following prompt, enter **boot -s** to start up the system in single-user mode.

```
ok boot -s
```

12. At the following prompt, enter **recovery** to start the root password recovery procedure.

```
Enter full pathname of shell or 'recovery' for root password recovery or RETURN  
for /bin/sh: recovery
```

13. Enter configuration mode in the CLI.

14. Set the root password. For example:

```
user@switch# set system root-authentication plain-text-password
```

15. At the following prompt, enter the new root password. For example:

```
New password: ABC123
```

```
Retype new password:
```

16. At the second prompt, reenter the new root password.

17. After you have finished configuring the password, commit the configuration.

```
root@host# commit
commit complete
```

18. Exit configuration mode in the CLI.

19. Exit operational mode in the CLI.

20. At the prompt, enter **y** to reboot the device.

```
Reboot the system? [y/n] y
```

Related Documentation • [Configuring the Root Password on page 162](#)

Recovering the Root Password for MX80

Use the password recovery procedure to reset the root password for MX80 Series routers if the standard method ([“Configuring the Root Password” on page 160](#)) fails. The difference between this method and the standard one is that here, you will manually edit the Junos configuration file to remove the lines associated with the existing (unknown) password. Console access is required in order to reset the root password, and you will need the rollover cable that was supplied with the router, a management device such as a laptop with a serial port, and a terminal emulator such as HyperTerminal (for Windows).

To recover the root password:

1. Physically power off the router using power button on the front panel.
2. Connect one end of the rollover cable to the RJ-45-to-DB-9 serial port adapter on the router, and the other end to the serial port of the management device.
3. On the management device, run the terminal emulator and select the COM port the rollover cable is connected to.
4. Use the following port settings:
 - Bits per second: 9600
 - Data bits: 8
 - Parity: None

- Stop bits: 1
 - Flow control: None
5. Physically power on the router (that is, use the power button), and wait until you see the green LED. On the laptop, you should also begin to see boot sequence commands appear in the terminal emulator.
 6. Watch for the prompt to interrupt the normal boot sequence by pressing the spacebar, and when you see it, press the spacebar to get a command prompt:

```
Hit [Enter] to boot immediately, or space bar for command prompt.
Booting [kernel] in 9 seconds...
```

The boot sequence may happen quickly, and may not pause for input. If so, press the spacebar a few times at the beginning of the boot sequence to catch the interrupt and boot to the loader prompt.

7. At the **loader** prompt, type **boot -s** to start the system in single-user mode.

```
loader> boot -s
```

The router will continue to boot and then pause so you can enter the password recovery sequence.

8. Type **recovery** when prompted, and then hit Enter:

```
Enter full pathname of shell or 'recovery' for root password recovery or RETURN
for /bin/sh:
```

```
recovery
```

The router will again continue to boot and then come to the root command prompt.

9. At the **root** prompt, run the shell so you can access the active configuration file:

```
root> start shell
```

10. Change to the folder where the Junos configuration files are stored:

```
% cd /config
```

11. Unzip the configuration file:

```
% gunzip juniper.conf.gz
```

12. Type the Linux command below to learn which lines the contain the root-authentication configuration so you know which ones to delete. In this example, we learn that the pertinent configuration starts on line 28:

```
% cat -n juniper.conf | grep root-authentication
```

```
28 root-authentication {
```

13. There are three lines related to root-authentication. Use the native VI editor to delete them, as shown here:

```
% vi -e juniper.conf
```

```
juniper.conf: unmodified: line 426
: 28 delete 3
: wq
juniper.conf: 423 lines, 11969 characters
%
```

14. Confirm the deletion by grepping **root-authentication** again (this time nothing should be returned):

```
% cat juniper.conf | grep root-authentication
```

```
%
```

15. Recompress the configuration file:

```
% gzip juniper.conf
```

16. Start the Junos OS CLI:

```
% cli
```

17. Reboot the router:

```
root>request system reboot
```

18. Log in as **root** after the router restarts (no password is needed at this time, so just hit Enter), and then start the CLI:

```
login: root
root@host% cli
```

19. Enter configuration mode and set a new password using plain text (when you configure a plain-text password, Junos OS automatically encrypts the password. Do not use

the **encrypted-password** option, which is only for entering the encrypted form of known password).

```
root@host>configure
root@host# set system root-authentication plain-text-password
root@host# New password:
```

20. Commit the change, and, optionally, reboot the router:

```
root@host# commit
commit complete
```

Related Documentation

- [Configuring the Root Password on page 160](#)
- [Recovering the Root Password on Junos OS with Upgraded FreeBSD on page 169](#)

Troubleshooting Loss of the Root Password

Problem **Description:** If you forget the root password for a switch, use the password recovery procedure to reset the root password.



NOTE: You need physical access to the switch to recover the root password.

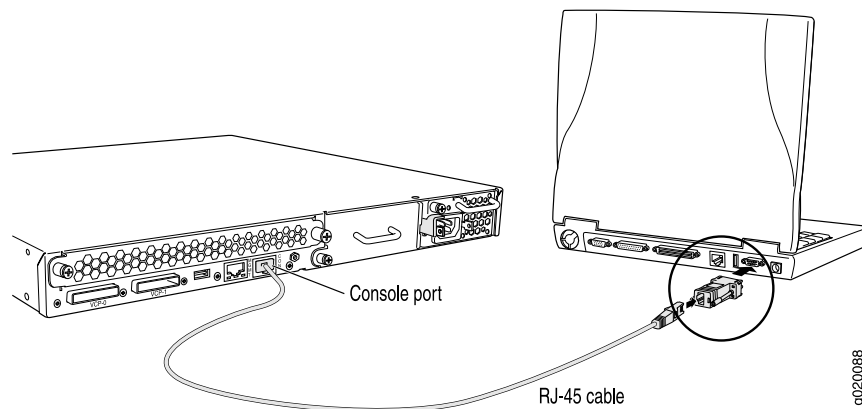


TIP: For a video on recovering the root password for routers, see [“Recovering the Root Password” on page 167](#). The procedure is similar for switches.

Solution To recover the root password:

1. Power off your switch by unplugging the power cord or turning off the power at the wall switch.
2. Insert one end of the Ethernet cable into the serial port on the management device and connect the other end to the console port on the back of the switch. See [Figure 1 on page 62](#).

Figure 4: Connecting to the Console Port on the EX Series Switch



3. On the management device, start your asynchronous terminal emulation application (such as Microsoft Windows Hyperterminal) and select the appropriate COM port to use (for example, COM1).
4. Configure the port settings as follows:
 - Bits per second: 9600
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: None
5. Power on your switch by plugging in the power cord or turning on the power at the wall switch.



NOTE: On EX2300 and EX3400 switches after step 5, use the following procedure:

In the main menu that appears, select **[M]ore options > Recovery mode - [C]LI**.

A series of messages describe consistency checks, mounting of filesystems, and initialization and checkout of management services. Then the CLI prompt appears.

Proceed to Step 9 in this procedure.

6. When the following prompt appears, press the Spacebar to access the switch's bootstrap loader command prompt:

```
Hit [Enter] to boot immediately, or space bar for command prompt.
Booting [kernel] in 1 second...
```



NOTE: If the switch is in unattended mode for U-Boot, access to the bootstrap loader command prompt is blocked. If the root password is lost, you must reset the switch to the factory default configuration using the LCD panel. For more information, see *Reverting to the Default Factory Configuration for the EX Series Switch*.

7. At the following prompt, type **boot -s** to start up the system in single-user mode:
loader> boot -s

8. At the following prompt, type **recovery** to start the root password recovery procedure:
Enter full path name of shell or 'recovery' for root password recovery or RETURN for /bin/sh: recovery

A series of messages describe consistency checks, mounting of filesystems, and initialization and checkout of management services. Then the CLI prompt appears.

9. Enter configuration mode in the CLI:
user@switch> configure

10. Set the root password. For example:
user@switch# set system root-authentication plain-text-password

11. At the following prompt, enter the new root password. For example, juniper1:
user@switch# juniper1

```
Retype new password:
```

12. At the second prompt, reenter the new root password.

13. If you are finished configuring the network, commit the configuration.
root@switch# commit

```
commit complete
```

14. Exit configuration mode in the CLI.
root@switch# exit

15. Exit operational mode in the CLI.

```
root@switch> exit
```

16. At the prompt, enter **y** to reboot the switch.

```
Reboot the system? [y/n] y
```

**Related
Documentation**

- [Connecting and Configuring an EX Series Switch \(CLI Procedure\)](#)
- [Connecting and Configuring an EX Series Switch \(J-Web Procedure\)](#)
- For information about configuring an encrypted root password, configuring SSH keys to authenticate root logins, and configuring special requirements for plain-text passwords, see [Configuring the Root Password on page 160](#).

Changing the Requirements for Junos OS Plain-Text Passwords

To change the requirements for plain-text passwords, include the **password** statement at the **[edit system login]** hierarchy level:

```
[edit system login]
password {
  change-type (set-transitions | character-set);
  format (sha1 | sha256 | sha512);
  maximum-length length;
  maximum-lifetime days
  minimum-changes number;
  minimum-character-changes number
  minimum-length length;
  minimum-lifetime days
  minimum-lower-cases number;
  minimum-numeric number;
  minimum-reuse number
  minimum-punctuations number;
  minimum-upper-cases number;
}
```



NOTE: These statements apply to plain-text passwords only, not encrypted passwords.

**Related
Documentation**

- [Configuring the Root Password on page 160](#)
- [Example: Changing the Requirements for Junos OS Plain-Text Passwords on page 181](#)

Example: Changing the Requirements for Junos OS Plain-Text Passwords

This example shows how to set various maximum and minimum requirements for plain-text passwords to increase password strength.

- [Requirements on page 181](#)
- [Overview on page 181](#)
- [Configuration on page 181](#)

Requirements

This example requires a device running Junos 12.2 or greater. The **minimum-length** and **maximum-length** password requirements statements are available in earlier releases, however, you must have Junos OS Release 12.2 or greater to configure **minimum-lower-cases**, **minimum-numeric**s, **minimum-punctuations**, or **minimum-upper-cases**.

Overview

You can use a variety of requirements to strengthen plain-text passwords for greater security. Junos OS provides a number of possible configurations at the **[edit system login password]** hierarchy level that allow you to require users to create plain-text passwords that conform to a particular set of requirements that may include such things as length, number of changes, type of characters, numbers, or letter case.

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 login password minimum-length 12
set system login password maximum-length 22
set system login password minimum-numeric 1
set system login password minimum-upper-cases 1
set system login password minimum-lower-cases 1
set system login password minimum-punctuations 1
```

Configuring Requirements for Plain-Text Passwords

Step-by-Step Procedure

This example configures password requirements that require the user to create a password that has a minimum length of 12 characters, a maximum length of 22 characters, and that includes at least one lower-case letter, at least one upper-case letter, at least one punctuation character, and at least one numeric character.

1. Navigate to configuration mode in the **[system login password]** hierarchy level.

```
user@host> edit
```

```
[edit]
user@host# edit system login password
```

2. Set a minimum length requirement of 12 characters and a maximum length requirement of 22 characters for user passwords.

```
[edit system login password]
user@host# set minimum-length 12
[edit system login password]
user@host# set maximum-length 22
```

3. Require users to set a password that has at least one lower-case letter and at least one upper-case letter.

```
[edit system login password]
user@host# set minimum-lower-cases 1
[edit system login password]
user@host# set minimum-upper-cases 1
```

4. Require users to set a password that has at least one punctuation-class character and at least one number.

```
[edit system login password]
user@host# set minimum-punctuations 1
[edit system login password]
user@host# set minimum-numeric 1
```

Results

From configuration mode, confirm your configuration by entering the show command at the edit system login password hierarchy level. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
[edit system login password]
user@host# show
minimum-length 12;
maximum-length 22;
minimum-numeric 1;
minimum-upper-cases 1;
minimum-lower-cases 1;
```

Related Documentation

- [password \(Login\) on page 1610](#)

Configuring MS-CHAPv2 for Password-Change Support

You can configure the Microsoft implementation of the Challenge Handshake Authentication Protocol version 2 (MS-CHAPv2) on the router or switch to support changing of passwords. This feature provides users accessing a router or switch the option of changing the password when the password expires, is reset, or is configured to be changed at next login.

Before you configure MS-CHAPv2 for password-change support, ensure that you have done the following:

- Configured RADIUS server authentication parameters.
- Set the first tried option in the authentication order to RADIUS server.

To configure MS-CHAP-v2, include the following statements at the **[edit system radius-options]** hierarchy level:

```
[edit system radius-options]
password-protocol mschap-v2;
```

The following example shows statements for configuring the MS-CHAPv2 password protocol, password authentication order, and user accounts:

```
[edit]
system {
  authentication-order [ radius password ];
  radius-server {
    192.168.69.149 secret "$9$G-j.5Qz6tpBk.1hrlXxUjjq5Qn/C"; ## SECRET-DATA
  }
  radius-options {
    password-protocol mschap-v2;
  }
  login {
    user bob {
      class operator;
    }
  }
}
```

Related Documentation

- *Configuring Access Profiles for L2TP or PPP Parameters*

CHAPTER 5

Configuring Authentication Order for RADIUS, TACACS+, and Local Password

- [Junos OS User Authentication Methods on page 185](#)
- [Understanding Remote Authentication Servers on page 186](#)
- [Junos OS Authentication Order for RADIUS, TACACS+, and Password Authentication on page 187](#)
- [Example: Configuring Authentication Order on page 193](#)
- [Configuring the Junos OS Authentication Order for RADIUS, TACACS+, and Local Password Authentication on page 197](#)
- [Example: Configuring System Authentication for RADIUS, TACACS+, and Password Authentication on page 199](#)

Junos OS User Authentication Methods

The Junos OS supports three methods of user authentication: local password authentication, Remote Authentication Dial-In User Service (RADIUS), and Terminal Access Controller Access Control System Plus (TACACS+).

With local password authentication, you configure a password for each user allowed to log in to the router or switch.

RADIUS and TACACS+ are authentication methods for validating users who attempt to access the router or switch using telnet. They are both distributed client-server systems—the RADIUS and TACACS+ clients run on the router or switch, and the server runs on a remote network system.

You can configure the router or switch to be both a RADIUS and TACACS+ client, and you can also configure authentication passwords in the Junos OS configuration file. You can prioritize the methods to configure the order in which the software tries the different authentication methods when verifying user access.

You can control access to your network using several different authentication methods—media access control (MAC) RADIUS, for example. Authentication prevents unauthorized devices and users from gaining access to your LAN. For MAC RADIUS authentication, end devices must be authenticated before they receive an IP address from a DHCP server.



NOTE: Note about the MAC RADIUS authentication:

- You can enable end devices to access the network without authenticating on the RADIUS server by configuring the MAC address of the end device in the static MAC bypass list by configuring the MAC address using the `authentication-whitelist` statement.
- You can configure one or more authentication methods on a single interface and thereby enable fallback to the next method if the first or second method is unsuccessful.
- On a single interface you can configure one or a combination of several authentication methods.
- The EAP method supported for MAC RADIUS authentication is EAP-MD5.
- You can configure MAC RADIUS authentication on interfaces that are connected to end devices.
- When you configure the `mac-radius restrict` option, the switch immediately attempts a MAC- RADIUS authentication by sending a request to the RADIUS server for authentication of the MAC address of the end device. If MAC address of the end device is configured for RADIUS authentication, LAN access between the two switches is created.

**Related
Documentation**

- [Configuring RADIUS Server Authentication on page 203](#)
- [Configuring TACACS+ Authentication on page 229](#)
- [Junos OS Authentication Order for RADIUS, TACACS+, and Password Authentication on page 187](#)

Understanding Remote Authentication Servers

You probably already use a remote authentication server (or servers) in your network. It is a recommended best practice, because the servers allow you to centrally create a consistent set of user accounts for all devices in your network. There are many good reasons for implementing a authentication, authorization, and accountability (AAA) solution in your network, not the least of which is to make the management of user accounts easier.

There are two basic methods of remote authentication in use by most enterprises today—RADIUS and TACACS+. Junos OS supports both types and can be configured to query multiple remote authentication servers of both types. The idea behind a RADIUS or TACACS+ server is simple, a central authentication server that routers, switches, security devices, and even servers can use to authenticate users as they attempt to gain access to these systems. Think of the advantages that a central user directory brings for authentication auditing and access control in a client server model, and you have your justification for RADIUS or TACACS+ for your networks infrastructure.

Using a central server has multiple advantages over the alternative of creating local users on each device, a time-consuming and error-prone task. A central authentication system also simplifies the use of one-time password systems such as SecureID, which offer protection against password sniffing and password replay attacks, in which someone uses a captured password to pose as a system administrator.

- **RADIUS**—You should use RADIUS when your priorities are interoperability and performance.
 - **Interoperability**—RADIUS is more interoperable than TACACS+, primarily because of the proprietary nature of TACACS+. While TACACS+ supports more protocols, RADIUS is universally supported.
 - **Performance**—RADIUS is much lighter on your routers and switches and for this reason, network engineers generally prefer RADIUS over TACACS+.
- **TACACS+**—You should use TACACS+ when your priorities are security and flexibility.
 - **Security**—TACACS+ is more secure than RADIUS. Not only is the full session encrypted, but authorization and authentication are done separately to prevent someone from trying to force their way into your network.
 - **Flexibility**—TCP is a more flexible transport protocol than UDP. You can do more with it in more advanced networks. In addition, TACACS+ supports more of the enterprise protocols like NetBios or Appletalk.

Related •
Documentation

Junos OS Authentication Order for RADIUS, TACACS+, and Password Authentication

Using the **authentication-order** statement, you can prioritize the order in which the Junos OS tries the different authentication methods when verifying user access to a router or switch.

If RADIUS and/or TACACS+ servers are configured in the authentication order but there is no response from them to a request, the Junos OS always defaults to trying local password authentication as a last resort. If the authentication order is set to **authentication-order password**, that will be the only authentication method attempted.



NOTE: It is not possible and would make no sense to try to configure local password authentication ahead of RADIUS or TACACS+ in the order because “no response” cannot happen. A local authentication request will always either be accepted or rejected.

The handling of a rejected authentication request when RADIUS or TACACS+ are present is more complicated.

- If **password** (local password authentication) is *not* in the authentication order, a RADIUS and/or TACACS+ rejection ends with the rejection.

- If **password** is included at the end of the authentication order and RADIUS and/or TACACS+ rejects the authentication, the Junos OS tries for a local authentication check.

In other words, including **password** as a final authentication order option is a means by which you can choose whether a RADIUS and/or TACACS+ rejection ends there or if the request is to be given one last chance for authentication locally.

Using RADIUS or TACACS+ Authentication

You can configure the Junos OS to be both a RADIUS and TACACS+ authentication client.

If an authentication method included in the **[authentication-order]** statement is not available, or if the authentication is available but returns a reject response, the Junos OS tries the next authentication method included in the **authentication-order** statement.

The RADIUS or TACACS+ server authentication might fail because of the following reasons:

- The authentication method is configured, but the corresponding authentication servers are not configured. For instance, the RADIUS and TACACS+ authentication methods are included in the **authentication-order** statement, but the corresponding RADIUS or TACACS+ servers are not configured at the respective **[edit system radius-server]** and **[edit system tacplus-server]** hierarchy levels.
- The RADIUS or TACACS+ server does not respond within the timeout period configured at the **[edit system radius-server]** or **[edit system tacplus-server]** hierarchy levels.
- The RADIUS or TACACS+ server is not reachable because of a network problem.

The RADIUS or TACACS+ server authentication might return a reject response because of the following reasons:

- The user profiles of users accessing a router or switch might not be configured on the RADIUS or TACACS+ server.
- The user enters incorrect logon credentials.

Using Local Password Authentication

You can explicitly configure the password authentication method or use this method as a fallback mechanism when remote authentication servers fail. The password authentication method consults the local user profiles configured at the **[edit system login]** hierarchy level. Users can log in to a router or switch using their local username and password in the following scenarios:

- The password authentication method (password) is explicitly configured as one of the authentication methods in the **[authentication-order authentication-methods]** statement. In this case, the password authentication method is tried if no previous authentication accepts the logon credentials. This is true whether the previous authentication method fails to respond or returns a reject response because of an incorrect username or password.

- The password authentication method is not explicitly configured as one of the authentication methods in the **authentication-order authentication-methods** statement. In this case, the password authentication method is tried only if all configured authentication methods fail to respond. It is not consulted if any configured authentication method returns a reject response because of an incorrect username or password.

Order of Authentication Attempts

Table 13 on page 189 describes how the **authentication-order** statement at the [edit system] hierarchy level determines the procedure that the Junos OS uses to authenticate users for access to a router or switch.

Table 13: Order of Authentication Attempts

Syntax	Order of Authentication Attempts
authentication-order radius;	<ol style="list-style-type: none"> 1. Try configured RADIUS authentication servers. 2. If RADIUS server is available and authentication is accepted, grant access. 3. If RADIUS server is available but authentication is rejected, deny access. 4. If RADIUS servers are not available, try password authentication. <p>NOTE: If a RADIUS server is available, password authentication is not attempted, because it is not explicitly configured in the authentication order.</p>
authentication-order [radius password];	<ol style="list-style-type: none"> 1. Try configured RADIUS authentication servers. 2. If RADIUS servers fail to respond or return a reject response, try password authentication, because it is explicitly configured in the authentication order.

Table 13: Order of Authentication Attempts (continued)

Syntax	Order of Authentication Attempts
authentication-order [radius tacplus];	<ol style="list-style-type: none"> 1. Try configured RADIUS authentication servers. 2. If RADIUS server is available and authentication is accepted, grant access. 3. If RADIUS servers fail to respond or return a reject response, try configured TACACS+ servers. 4. If TACACS+ server is available and authentication is accepted, grant access. 5. If TACACS+ server is available but authentication is rejected, deny access. 6. If both RADIUS and TACACS+ servers are not available, try password authentication. <p>NOTE: If either RADIUS or TACACS+ servers are available, password authentication is not attempted, because it is not explicitly configured in the authentication order.</p>
authentication-order [radius tacplus password];	<ol style="list-style-type: none"> 1. Try configured RADIUS authentication servers. 2. If RADIUS server is available and authentication is accepted, grant access. 3. If RADIUS servers fail to respond or return a reject response, try configured TACACS+ servers. 4. If TACACS+ server is available and authentication is accepted, grant access. 5. If TACACS+ servers fail to respond or return a reject response, try password authentication, because it is explicitly configured in the authentication order.

Table 13: Order of Authentication Attempts (continued)

Syntax	Order of Authentication Attempts
authentication-order tacplus;	<ol style="list-style-type: none"> 1. Try configured TACACS+ authentication servers. 2. If TACACS+ server is available and authentication is accepted, grant access. 3. If TACACS+ server is available but authentication is rejected, deny access. 4. If TACACS+ servers are not available, try password authentication. <p>NOTE: If a TACACS+ server is available, password authentication is not attempted, because it is not explicitly configured in the authentication order.</p>
authentication-order [tacplus password];	<ol style="list-style-type: none"> 1. Try configured TACACS+ authentication servers. 2. If TACACS+ servers fail to respond or return a reject response, try password authentication, because it is explicitly configured in the authentication order.
authentication-order [tacplus radius];	<ol style="list-style-type: none"> 1. Try configured TACACS+ authentication servers. 2. If TACACS+ server is available and authentication is accepted, grant access. 3. If TACACS+ servers fail to respond or return a reject response, try configured RADIUS servers. 4. If RADIUS server is available and authentication is accepted, grant access. 5. If RADIUS server is available but authentication is rejected, deny access. 6. If both TACACS+ and RADIUS servers are not available, try password authentication. <p>NOTE: If either TACACS+ or RADIUS servers are available, password authentication is not attempted, because it is not explicitly configured in the authentication order.</p>

Table 13: Order of Authentication Attempts (continued)

Syntax	Order of Authentication Attempts
authentication-order [tacplus radius password];	<ol style="list-style-type: none">1. Try configured TACACS+ authentication servers.2. If TACACS+ server is available and authentication is accepted, grant access.3. If TACACS+ servers fail to respond or return a reject response, try configured RADIUS servers.4. If RADIUS server is available and authentication is accepted, grant access.5. If RADIUS servers fail to respond or return a reject response try password authentication, because it is explicitly configured in the authentication order.
authentication-order password;	<ol style="list-style-type: none">1. Try to authenticate the user, using the password configured at the [edit system login] hierarchy level.2. If the authentication is accepted, grant access.3. If the authentication is rejected, deny access.



NOTE: If SSH public keys are configured, SSH user authentication first tries to perform public key authentication before using the authentication methods configured in the authentication-order statement. If you want SSH logins to use the authentication methods configured in the authentication-order statement without first trying to perform public key authentication, do not configure SSH public keys.

In a routing matrix based on a TX Matrix router, the authentication order must be configured only at the configuration groups `re0` and `re1`. The authentication order must not be configured at the `[edit system]` hierarchy. This is because the authentication order for the routing matrix is controlled on the switch-card chassis (or TX Matrix router) or switch-fabric chassis (for TX Matrix Plus router) only.

In Junos OS Release 10.0 and later, the superuser (belonging to the super-user login class) is also authenticated based on the authentication order that is configured for TACACS+, RADIUS, or password authentication using the authentication-order statement. For example, if the only configured authentication order is TACACS+, the superuser can only be authenticated by the TACACS+ server and password authentication cannot be used as an alternative. However, in Junos OS Release 9.6 and earlier, the superuser can use password authentication to login, even if password authentication is not configured explicitly using the authentication-order statement.

Related Documentation

- [Example: Configuring Authentication Order on page 193](#)
- [Configuring the Junos OS Authentication Order for RADIUS, TACACS+, and Local Password Authentication on page 197](#)
- [Limiting the Number of User Login Attempts for SSH and Telnet Sessions on page 87](#)
- [Example: Configuring System Authentication for RADIUS, TACACS+, and Password Authentication on page 199](#)

Example: Configuring Authentication Order

This example shows how to configure authentication order.

- [Requirements on page 193](#)
- [Overview on page 194](#)
- [Configuration on page 194](#)
- [Verification on page 196](#)

Requirements

Before you begin, perform the initial device configuration. See the Getting Started Guide for your device.

Overview

You can configure the authentication methods that the device uses to verify that a user can gain access. For each login attempt, the device tries the authentication methods in order, starting with the first one, until the password matches. If you do not configure system authentication, users are verified based on their configured local passwords.

This example configures the device to attempt user authentication with the local password first, then with the RADIUS server, and finally with the TACACS+ server.

When you use local password authentication, you must create a local user account for every user who wants to access the system. However, when you are using RADIUS or TACACS+ authentication, you can create single accounts (for authorization purposes) that are shared by a set of users. You create these accounts using the remote and local user template accounts. When a user is using a template account, the command-line interface (CLI) username is the login name; however, the privileges, file ownership, and effective user ID are inherited from the template account.

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.

```
insert system authentication-order radius after password
insert system authentication-order tacplus after radius
```

GUI Step-by-Step Procedure

To configure authentication order:

1. In the J-Web user interface, select **Configure > System Properties > User Management**.
2. Click **Edit**. The Edit User Management dialog box appears.
3. Select the **Authentication Method and Order** tab.
4. Under Available Methods, select the authentication method the device should use to authenticate users, and use the arrow button to move the item to the Selected Methods list. Available methods include:
 - RADIUS
 - TACACS+
 - Local Password

If you want to use multiple methods to authenticate users, repeat this step to add the additional methods to the Selected Methods list.

5. Under Selected Methods, use the Up Arrow and Down Arrow to specify the order in which the device should execute the authentication methods.
6. Click **OK** to check your configuration and save it as a candidate configuration.
7. If you are done configuring the device, click **Commit Options>Commit**.

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 *CLI User Guide*.

To configure authentication order:

1. Add RADIUS authentication to the authentication order.

```
[edit]
user@host# insert system authentication-order radius after password
```

2. Add TACACS+ authentication to the authentication order.

```
[edit]
user@host# insert system authentication-order tacplus after radius
```

Results

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

```
[edit]
user@host# show system authentication-order
authentication-order [password, radius, tacplus];
```

If you are done configuring the device, enter **commit** from configuration mode.



NOTE: To completely set up RADIUS or TACACS+ authentication, you must configure at least one RADIUS or TACACS+ server and create user template accounts. Do one of the following tasks:

- Configure a RADIUS server. See [“Example: Configuring a RADIUS Server for System Authentication” on page 209](#).
- Configure a TACACS+ server. See [“Example: Configuring a TACACS+ Server for System Authentication” on page 233](#).
- Configure a user. See [“Example: Configuring New Users” on page 69](#).
- Configure template accounts. See [“Example: Creating Template Accounts” on page 77](#).

Verification

Confirm that the configuration is working properly.

Verifying the Authentication Order Configuration

Purpose Verify that the authentication order has been configured.

Action From operational mode, enter the **show system authentication-order** command.

Related Documentation

- [Junos OS User Authentication Methods on page 185](#)
- [Junos OS User Accounts Overview on page 65](#)
- [Junos OS User Authentication Methods on page 185](#)
- [Configuring Local User Template Accounts for User Authentication on page 75](#)

Configuring the Junos OS Authentication Order for RADIUS, TACACS+, and Local Password Authentication

Using the **authentication-order** statement, you can prioritize the order in which the Junos OS tries the different authentication methods when verifying user access to a router or switch. If you do not set the authentication order, by default users are verified based on their configured passwords.

When configuring a password using plain text and relying on Junos OS to encrypt it, you are still sending the password over the internet in plain text. Using pre-encrypted passwords is more secure because it means that the plain text of the password never has to be sent over the internet. Also, with passwords, only one user can be assigned to a password at a time.

On the other hand, both RADIUS and TACACS+ pre-encrypt passwords. Both let you assign a set of users at a time instead of one by one. But here are how these authentication systems differ:

- RADIUS uses UDP, while TACACS+ uses TCP.
- RADIUS encrypts only the password during transmission whereas TACACS+ encrypts the entire session.
- RADIUS combines authentication (device) and authorization (user) whereas TACACS+ separates authentication, authorization, and accountability.

In short, TACACS+ is the more secure of the two. However, RADIUS has better performance and is more interoperable. RADIUS is widely supported, whereas TACACS+ is a Cisco proprietary product and not widely supported outside of Cisco.

You can configure the authentication order based on your system, its restrictions, and your IT policy and operational preferences.

To configure the authentication order, include the **authentication-order** statement at the **[edit system]** hierarchy level:

```
[edit system]  
authentication-order [ authentication-methods ];
```

For a list of hierarchy levels at which you can include this statement, see the statement summary section for this statement.

Following are the possible authentication order entry options:

- **radius**—Verify the user using RADIUS authentication servers.
- **tacplus**—Verify the user using TACACS+ authentication servers.
- **password**—Verify the user using the username and password configured locally by including the authentication statement at the **[edit system login user]** hierarchy level.

If RADIUS and/or TACACS+ servers are configured in the authentication order but there is no response from them to a request, the Junos OS always defaults to trying local password authentication as a last resort. If the authentication order is set to **authentication-order password**, that will be the only authentication method attempted.



NOTE: It is not possible and would make no sense to try to configure local password authentication ahead of RADIUS or TACACS+ in the order because “no response” cannot happen. A local authentication request will always either be accepted or rejected.

The handling of a rejected authentication request when RADIUS or TACACS+ are present is more complicated.

- If **password** (local password authentication) is *not* in the authentication order, a RADIUS and/or TACACS+ rejection ends with the rejection.
- If **password** is included at the end of the authentication order and RADIUS and/or TACACS+ rejects the authentication, the Junos OS tries for a local authentication check.

In other words, including **password** as a final authentication order option is a means by which you can choose whether a RADIUS and/or TACACS+ rejection ends there or if the request is to be given one last chance for authentication locally.

For more details, see [“Junos OS Authentication Order for RADIUS, TACACS+, and Password Authentication” on page 187](#).

The CHAP authentication sequence cannot take more than 30 seconds. If it takes longer to authenticate a client, the authentication is abandoned and a new sequence is initiated.

For example, if you configure three RADIUS servers so that the router or switch attempts to contact each server three times, and with each retry the server times out after 3 seconds, then the maximum time given to the RADIUS authentication method before CHAP considers it a failure is 27 seconds. If you add more RADIUS servers to this configuration, they might not be contacted because the authentication process might be abandoned before these servers are tried.

The Junos OS enforces a limit on the number of standing authentication server requests that the CHAP authentication can have at one time. Thus, an authentication server method—RADIUS, for example—might fail to authenticate a client when this limit is exceeded. If it fails, the authentication sequence is reinitiated by the router or switch until authentication succeeds and the link is brought up. However, if the RADIUS servers are

not available and if additional authentication methods such as **tacplus** or **password** are configured along with **radius**, the next authentication method is tried.

The following example shows how to configure **radius** and **password** authentication:

```
[edit system]
user@switch# authentication-order [ radius password ];
```

The following example shows how to delete the **radius** statement from the authentication order:

```
[edit system]
user@switch# delete authentication-order radius
```

The following example shows how to insert the **tacplus** statement after the **radius** statement:

```
[edit system]
user@switch# insert authentication-order tacplus after radius
```

Related Documentation

- [Junos OS Authentication Order for RADIUS, TACACS+, and Password Authentication on page 187](#)
- [Using Regular Expressions on a RADIUS or TACACS+ Server to Allow or Deny Access to Commands on page 226](#)
- [Example: Configuring System Authentication for RADIUS, TACACS+, and Password Authentication on page 199](#)
- [authentication-order on page 1188](#)

Example: Configuring System Authentication for RADIUS, TACACS+, and Password Authentication

The following example shows how to configure system authentication for RADIUS, TACACS+, and password authentication.

In this example, only the user Philip and users authenticated by a remote RADIUS server can log in. If a user logs in and is not authenticated by the RADIUS server, the user is denied access to the router or switch. If the RADIUS server is not available, the user is authenticated using the **password** authentication method and allowed access to the router or switch. For more information about the password authentication method, see [“Using Local Password Authentication” on page 188](#).

When Philip tries to log in to the system, if the RADIUS server authenticates him, he is given access and privileges for the **super-user** class. Local accounts are not configured for other users. When they log in to the system and the RADIUS server authenticates them, they are given access using the same user ID (UID) 9999 and the privileges associated with the **operator** class.

```
[edit]
```

```
system {
  authentication-order radius;
  login {
    user philip {
      full-name "Philip";
      uid 1001;
      class super-user;
    }
    user remote {
      full-name "All remote users";
      uid 9999;
      class operator;
    }
  }
}
```



NOTE: For authorization purposes, you can use a template account to create a single account that can be shared by a set of users at the same time. For example, when you create a remote template account, a set of remote users can concurrently share a single UID. For more information about template accounts, see [“Example: Configuring Authentication Order” on page 193](#).

When a user logs in to a device, the user's login name is used by the RADIUS or TACACS+ server for authentication. If the user is authenticated successfully by the authentication server and the user is not configured at the **[edit system login user]** hierarchy level, the device uses the default remote template user account for the user, provided a remote template account is configured at the **edit system login user remote** hierarchy level. The remote template account serves as a default template user account for all users that are authenticated by the authentication server but not having a locally configured user account on the device. Such users share the same login class and UID.

To configure an alternate template user, specify the **user-name** parameter returned in the RADIUS authentication response packet. Not all RADIUS servers allow you to change this parameter. The following shows a sample Junos OS configuration:

```
[edit]
system {
  authentication-order radius;
  login {
    user philip {
      full-name "Philip";
      uid 1001;
      class super-user;
    }
    user operator {
      full-name "All operators";
      uid 9990;
      class operator;
    }
    user remote {
```

```
    full-name "All remote users";  
    uid 9999;  
    class read-only;  
  }  
}  
}
```

Assume your RADIUS server is configured with the following information:

- User Philip with password “olympia”
- User Alexander with password “bucephalus” and username “operator”
- User Darius with password “redhead” and username “operator”
- User Roxane with password “athena”

Philip would be given access as a superuser (**super-user**) because he has his own local user account. Alexander and Darius share UID 9990 and have access as operators. Roxane has no template-user override, so she shares access with all the other remote users, getting read-only access.

**Related
Documentation**

- [Configuring the Junos OS Authentication Order for RADIUS, TACACS+, and Local Password Authentication on page 197](#)

CHAPTER 6

Configuring Radius Authentication

- [Configuring RADIUS Server Authentication on page 203](#)
- [Example: Configuring a RADIUS Server for System Authentication on page 209](#)
- [Example: Configuring RADIUS Authentication on page 212](#)
- [Configuring RADIUS Authentication \(QFX Series or OCX Series\) on page 213](#)
- [Configuring PEAP for MAC RADIUS Authentication on page 217](#)
- [Example: Configuring RADIUS Authentication on a QFabric System on page 218](#)
- [Juniper Networks Vendor-Specific RADIUS Attributes on page 219](#)
- [Understanding RADIUS Accounting on page 222](#)
- [Configuring RADIUS System Accounting on page 223](#)
- [Using Regular Expressions on a RADIUS or TACACS+ Server to Allow or Deny Access to Commands on page 226](#)

Configuring RADIUS Server Authentication

RADIUS authentication is a method of authenticating users who attempt to access the router or switch.

- [Why Use RADIUS on page 203](#)
- [Configuring RADIUS Server Details on page 204](#)
- [Configuring RADIUS To Use the Management Instance on page 208](#)

Why Use RADIUS

The Junos OS supports two protocols for central authentication of users on multiple routers: RADIUS and TACACS+. We recommend RADIUS because it is a multivendor IETF standard, and its features are more widely accepted than those of TACACS+ or other proprietary systems. In addition, we recommend using a one-time-password system for increased security, and all vendors of these systems support RADIUS.

You should use RADIUS when your priorities are interoperability and performance:

- **Interoperability**—RADIUS is more interoperable than TACACS+, primarily because of the proprietary nature of TACACS+. While TACACS+ supports more protocols, RADIUS is universally supported.

- Performance—RADIUS is much lighter on your routers and switches and for this reason, network engineers generally prefer RADIUS over TACACS+.

Configuring RADIUS Server Details

To use RADIUS authentication on the device, configure information about one or more RADIUS servers on the network by including one **radius-server** statement at the **[edit system]** hierarchy level for each RADIUS server.

Because remote authentication is configured on multiple devices, it is commonly configured inside of a configuration group. As such, the steps shown here are in a configuration group called **global**. Using a configuration group is optional.



NOTE: The **remote** statement must always be lowercase.



NOTE: This feature is supported on SRX1500, SRX5400, SRX5600, and SRX5800 devices.

To configure authentication by a RADIUS server:

1. Add an IPv4 or IPv6 server address.

- Configure an IPv4 source-address and server-address:

```
[edit groups global]
user@host# set system radius-server server-address source-address source-address
```

For example:

```
[edit groups global]
user@host# set system radius-server 192.168.17.28 source-address 192.168.17.1
```

- Configure an IPv6 source-address and server address:

```
[edit groups global system radius-server server-address]
user@host# set server-address secret "secretkey" source-address-inet6
source-address
```

For example:

```
[edit groups global system radius-server ::17.22.22.162]
user@host# set secret $9$IPOv87ZGiH.5JGn/AtOB7-dVgo source-address-inet6
::17.22.22.1
```

Source address is a valid IPv4 or IPv6 address configured on one of the router or switch interfaces. This sets a fixed address as the source address for locally generated IP packets.

Server address is a unique IPv4 or IPv6 address that is assigned to a particular server and used to route information to the server. If the Junos OS device has several interfaces that can reach the RADIUS server, assign an IP address that Junos OS can use for all its communication with the RADIUS server.

2. Include a shared secret password.

You must specify a password in the **secret password** statement. If the password contains spaces, enclose it in quotation marks. The secret password used by the local router or switch must match that used by the server. The secret password configures the password that the Junos OS device uses to access the RADIUS server.

```
[edit groups global system radius-server server-address]
user@host# set secret password
```

For example:

```
[edit groups global system radius-server 192.168.69.162]
user@host# set secret $9$gQ4UHf5F36CiH.5Tz9CuO1hreM8xw2oIENVwgZG
```

3. If necessary, specify a port on which to contact the RADIUS server.

By default, port number 1812 is used (as specified in RFC 2865).



NOTE: You can also specify an accounting port to send accounting packets with the **accounting-port** statement. The default is 1813 (as specified in RFC 2866).

```
[edit groups global system radius-server server-address]
user@host# set port port-number
```

For example:

```
[edit groups global system radius-server 192.168.69.162]
user@host# set port 1845
```

4. Specify the order in which Junos OS attempts authentication.

You must include the **authentication-order** statement in your remote authentication configuration.

The example assumes your network includes both RADIUS and TACACS+ servers. In this example, whenever a user attempts to log in, Junos OS begins by querying the RADIUS server for authentication. If it fails, it next attempts authentication with locally configured user accounts. Finally the TACACS+ server is tried.

```
[edit groups global system]
user@host# set authentication-order [ authentication-methods ]
```

For example:

```
[edit groups global system]
user@host# set authentication-order [ radius password tacplus ]
```

5. Assign a login class to RADIUS-authenticated users.

You can assign different user templates and login classes to RADIUS-authenticated users. This allows RADIUS-authenticated users to be granted different administrative permissions on the Junos OS device. By default, RADIUS-authenticated users use the **remote** user template and are assigned to the associated class, which is specified in the **remote** user template, if the **remote** user template is configured. The username **remote** is a special case in Junos OS. It acts as a template for users who are authenticated by a remote server, but do not have a locally configured user account on the device. In this method, Junos OS applies the permissions of the remote template to those authenticated users without a locally defined account. All users mapped to the remote template are of the same login class.

In the Junos OS configuration, a user template is configured in the same way as a regular local user account, except that no local authentication password is configured because the authentication is remotely performed on the RADIUS server.

- To use the same permissions for all RADIUS-authenticated users:

```
[edit groups global system login]
user@host# set user remote class class
```

For example:

```
[edit groups global system login]
user@host# set user remote class super-user
```

- To have different login classes be used for different RADIUS-authenticated users, granting them different permissions:

- a. Create multiple user templates in the Junos OS configuration.

Every user template can be assigned a different login class.

For example:

```
[edit groups global system login]
set user RO class read-only
set user OP class operator
set user SU class super-user
set user remote full-name "default remote access user template"
set user remote class read-only
```

- b. Have the RADIUS server specify the name of the user template to be applied to the authenticated user.

For a RADIUS server to indicate which user template is to be applied, it needs to include the Juniper-Local-User-Name attribute (Vendor 2636, type 1, string) Juniper VSA (vendor-specific attribute) in the RADIUS Access-Accept message. The string value in the Juniper-Local-User-Name must correspond to the name of a configured user template on the device. For a list of relevant Juniper RADIUS VSAs, see "[Juniper Networks Vendor-Specific RADIUS Attributes](#)" on page 219.

If the Juniper-Local-User-Name is not included in the Access-Accept message or the string contains a user template name that does not exist on the device, the user is assigned to the **remote** user template, if configured. If it is not configured, authentication fails for the user.

After logging in, the remotely authenticated user retains the same username that was used to log in. However, the user inherits the user class from the assigned user template.

In a RADIUS server, users can be assigned a Juniper-Local-User-Name string, which indicates the user template to be used in the Junos OS device. From the previous example, the string would be RO, OP, or SU.

Configuration of the RADIUS server depends on the server being used. For information on using FreeRADIUS, see

<https://kb.juniper.net/InfoCenter/index?page=content&id=KB19446>.

Configuring RADIUS To Use the Management Instance

By default, Junos OS routes authentication, authorization, and accounting packets for RADIUS through the default routing instance. Starting in Junos OS Release 18.1R1, existing RADIUS behavior is enhanced to support a management interface in a non-default VRF instance.

When the **routing-instance mgmt_junos** option is configured in both the **radius-server server-ip-address** and the **radius server server-ip-address** statements, provided the **management-instance** statement is also configured, RADIUS packets are routed through the management instance **mgmt_junos**.

```
[edit system]
radius-server server-address {
  accounting-port port-number;
  port number;
  retry number;
  routing-instance routing-instance-name; #use "mgmt_junos" for RI name
  secret password;
  source-address source-address;
  timeout seconds;
}
```

```
[edit system accounting destination radius]
server {
  server-address {
    accounting-port port-number;
    retry number;
    routing-instance routing-instance; #use "mgmt_junos" for RI name
    secret password;
    source-address address;
    timeout seconds;
  }
}
```



NOTE: The **routing-instance mgmt_junos** option must be configured in both the **radius-server** and the **radius server** statements. If not, even if the **management-instance** statement is set, RADIUS packets will still be sent using the default routing instance only.

For more details on this management instance, see *management-instance*.

Release History Table

Release	Description
17.4R1	Starting in Junos OS Release 18.1R1, existing RADIUS behavior is enhanced to support a management interface in a non-default VRF instance.

Related Documentation

- [Example: Configuring System Authentication for RADIUS, TACACS+, and Password Authentication on page 199](#)
- [Juniper Networks Vendor-Specific RADIUS Attributes on page 219](#)
- [Configuring RADIUS System Accounting on page 223](#)
- [Example: Configuring RADIUS Authentication on page 212](#)

Example: Configuring a RADIUS Server for System Authentication

This example shows how to configure a RADIUS server for system authentication.

- [Requirements on page 209](#)
- [Overview on page 209](#)
- [Configuration on page 209](#)
- [Verification on page 211](#)

Requirements

Before you begin:

- Perform the initial device configuration. See the Getting Started Guide for your device.
- Configure at least one RADIUS server. For more details, see [RADIUS Authentication and Accounting Servers Configuration Overview](#).

Overview

In this example, you add a new RADIUS server with an IP address of 172.16.98.1 and specify the shared secret password of the RADIUS server as Radiussecret1. The secret is stored as an encrypted value in the configuration database. Finally, you specify the source address to be included in the RADIUS server requests by the device. In most cases you can use the loopback address of the device, which in this example is 10.0.0.1.

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 system radius-server address 172.16.98.1
set system radius-server 172.16.98.1 secret Radiussecret1
```

```
set system radius-server 172.16.98.1 source-address 10.0.0.1
```

GUI Step-by-Step Procedure

To configure a RADIUS server for system authentication:

1. In the J-Web user interface, select **Configure>System Properties>User Management**.
2. Click **Edit**. The Edit User Management dialog box appears.
3. Select the **Authentication Method and Order** tab.
4. In the RADIUS section, click **Add**. The Add Radius Server dialog box appears.
5. In the IP Address box, type the server's 32-bit IP address.
6. In the Password and Confirm Password boxes, type the secret password for the server and verify your entry.
7. In the Server Port box, type the appropriate port.
8. In the Source Address box, type the source IP address of the server.
9. In the Retry Attempts box, specify the number of times that the server should try to verify the user's credentials.
10. In the Time Out box, specify the amount of time (in seconds) the device should wait for a response from the server.
11. Click **OK** to check your configuration and save it as a candidate configuration.
12. If you are done configuring the device, click **Commit Options>Commit**.

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 *CLI User Guide*.

To configure a RADIUS server for system authentication:

1. Add a new RADIUS server and set its IP address.

```
[edit system]  
user@host# set radius-server address 172.16.98.1
```

2. Specify the shared secret (password) of the RADIUS server.

```
[edit system]
user@host# set radius-server 172.16.98.1 secret Radiussecret1
```

3. Specify the device's loopback address source address.

```
[edit system]
user@host# set radius-server 172.16.98.1 source-address 10.0.0.1
```

Results From configuration mode, confirm your configuration by entering the **show system radius-server** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show system radius-server
radius-server 172.16.98.1 {
  secret Radiussecret1;
  source-address 10.0.0.1;
}
```

If you are done configuring the device, enter **commit** from configuration mode.



NOTE: To completely set up RADIUS authentication, you must create user template accounts and specify a system authentication order. Do one of the following tasks:

- Configure a system authentication order. See [“Example: Configuring Authentication Order” on page 193](#).
- Configure a user. See [“Example: Configuring New Users” on page 69](#).
- Configure local user template accounts. See [“Example: Creating Template Accounts” on page 77](#).

Verification

Confirm that the configuration is working properly.

Verifying the RADIUS Server System Authentication Configuration

Purpose Verify that the RADIUS server has been configured for system authentication.

Action From operational mode, enter the **show system radius-server** command.

Related Documentation

- [Junos OS User Authentication Methods on page 185](#)

- [Junos OS User Accounts Overview on page 65](#)
- [Junos OS User Authentication Methods on page 185](#)
- [Configuring Local User Template Accounts for User Authentication on page 75](#)
- [Example: Configuring a TACACS+ Server for System Authentication on page 233](#)

Example: Configuring RADIUS Authentication

The Junos OS supports two protocols for central authentication of users on multiple routers: RADIUS and TACACS+. We recommend RADIUS because it is a multivendor IETF standard, and its features are more widely accepted than those of TACACS+ or other proprietary systems. In addition, we recommend using a one-time-password system for increased security, and all vendors of these systems support RADIUS.

The Junos OS uses one or more template accounts to perform user authentication. You create the template account or accounts, and then configure the user access to use that account. If the RADIUS server is unavailable, the fallback is for the login process to use the local account that set up on the router or switch.

The following example shows how to configure RADIUS authentication:

```
[edit]
system {
  authentication-order [ radius password ];
  root-authentication {
    encrypted-password "$ABC123; # SECRET-DATA
  }
  name-server {
    10.1.1.1;
    10.1.1.2;
  }
}
```

The following example shows how to enable RADIUS authentication and define the shared secret between the client and the server. The secret enables the client and server to determine that they are talking to the trusted peer.

Define a timeout value for each server, so that if there is no response within the specified number of seconds, the router can try either the next server or the next authentication mechanism.

```
[edit]
system {
  radius-server {
    10.1.2.1 {
      secret "$ABC123"; # SECRET-DATA
      timeout 5;
    }
    10.1.2.2 {
      secret "$ABC123"; # SECRET-DATA
    }
  }
}
```



```

        timeout 5;
    }
}

```

The following example shows how to configure RADIUS template accounts for different users or groups of users:

```

[edit]
system {
  login {
    user observation {
      uid 1001;
      class observation;
    }
    user operation {
      uid 1002;
      class operation;
    }
    user engineering {
      uid 1003;
      class engineering;
    }
  }
}

```

Related Documentation

- [Configuring RADIUS Server Authentication on page 203](#)

Configuring RADIUS Authentication (QFX Series or OCX Series)

RADIUS authentication is a method of authenticating users who attempt to access the router or switch. Tasks to configure RADIUS authentication are:



NOTE: The `source-address` statement is not supported at the `[edit system radius-options]` or `[edit system-radius-server name]` hierarchies on the QFabric system.

- [Configuring RADIUS Server Details on page 213](#)
- [Configuring MS-CHAPv2 for Password-Change Support on page 214](#)
- [Specifying a Source Address for the Junos OS to Access External RADIUS Servers on page 215](#)

Configuring RADIUS Server Details

To use RADIUS authentication on the router or switch, configure information about one or more RADIUS servers on the network by including one **radius-server** statement at the `[edit system]` hierarchy level for each RADIUS server:

```
[edit system]
radius-server server-address {
  accounting-port port-number;
  port number;
  retry number;
  secret password;
  source-address source-address;
  timeout seconds;
}
```

server-address is the address of the RADIUS server.

You can specify a port on which to contact the RADIUS server. By default, port number **1812** is used (as specified in RFC 2865). You can also specify an accounting port to send accounting packets. The default is **1813** (as specified in RFC 2866).

You must specify a password in the **secret password** statement. If the password contains spaces, enclose it in quotation marks. The secret used by the local router or switch must match that used by the server.

Optionally, you can specify the amount of time that the local router or switch waits to receive a response from a RADIUS server (in the **timeout** statement) and the number of times that the router or switch attempts to contact a RADIUS authentication server (in the **retry** statement). By default, the router or switch waits 3 seconds. You can configure this to be a value from 1 through 90 seconds. By default, the router or switch retries connecting to the server three times. You can configure this to be a value from 1 through 10 times.

You can use the **source-address** statement to specify a logical address for individual or multiple RADIUS servers.

To configure multiple RADIUS servers, include multiple **radius-server** statements.

To configure a set of users that share a single account for authorization purposes, you create a template user. To do this, include the **user** statement at the **[edit system login]** hierarchy level, as described in [“Example: Configuring Authentication Order” on page 193](#).

You can also configure RADIUS authentication at the **[edit access]** and **[edit access profile]** hierarchy level. Junos OS uses the following search order to determine which set of servers are used for authentication:

1. **[edit access profile profile-name radius-server server-address]**
2. **[edit access radius-server server-address]**
3. **[edit system radius-server server-address]**

Configuring MS-CHAPv2 for Password-Change Support

You can configure the Microsoft implementation of the Challenge Handshake Authentication Protocol version 2 (MS-CHAPv2) on the router or switch to support changing of passwords. This feature provides users accessing a router or switch the

option of changing the password when the password expires, is reset, or is configured to be changed at the next login.

Before you configure MS-CHAPv2 for password-change support, ensure that you:

- Configure the RADIUS server authentication parameters
- Set the **authentication-order** to use the RADIUS server for the initial password attempt

To configure MS-CHAP-v2, include the following statements at the **[edit system radius-options]** hierarchy level:

```
[edit system radius-options]
password-protocol mschap-v2;
```

The following example shows statements for configuring the MS-CHAPv2 password protocol, password authentication order, and user accounts:

```
[edit]
system {
  authentication-order [ radius password ];
  radius-server {
    192.168.69.149 secret "$ABC123"; ## SECRET-DATA
  }
  radius-options {
    password-protocol mschap-v2;
  }
  login {
    user bob {
      class operator;
    }
  }
}
```

Specifying a Source Address for the Junos OS to Access External RADIUS Servers

You can specify which source address Junos OS uses when accessing your network to contact an external RADIUS server for authentication. You can also specify which source address Junos OS uses when contacting a RADIUS server for sending accounting information.

To specify a source address for a RADIUS server, include the **source-address** statement at the **[edit system radius-server server-address]** hierarchy level:

```
[edit system radius-server server-address]
source-address source-address;
```

source-address is a valid IP address configured on one of the router or switch interfaces.

Related Documentation

- [Example: Configuring RADIUS Authentication on page 212](#)
- [Example: Configuring System Authentication for RADIUS, TACACS+, and Password Authentication on page 199](#)

- [Juniper Networks Vendor-Specific RADIUS Attributes on page 219](#)
- [Example: Configuring Authentication Order on page 193](#)
- [Example: Configuring RADIUS Authentication on page 212](#)
- [Using Regular Expressions on a RADIUS or TACACS+ Server to Allow or Deny Access to Commands on page 226](#)
- [Junos OS User Authentication Methods on page 185](#)

Configuring PEAP for MAC RADIUS Authentication

Extensible Authentication Protocol (EAP) is an extensible protocol that provides support for multiple authentication methods, including password-based authentication methods and more secure certificate-based authentication methods. EAP facilitates the negotiation between the authenticator, or switching device, and the authentication server, to determine which authentication method to use for a supplicant. The default authentication method used for MAC RADIUS authentication is EAP-MD5, in which the server sends the client a random challenge value, and the client proves its identity by hashing the challenge and its password with MD5. Because EAP-MD5 only provides for client authentication and not for server authentication, it can be vulnerable to spoofing attacks.

You can configure the Protected Extensible Authentication Protocol, also known as Protected EAP or simply PEAP, to address the security vulnerabilities of EAP-MD5. PEAP is a protocol that encapsulates EAP packets within an encrypted and authenticated Transport Layer Security (TLS) tunnel. PEAP is referred to as the outer authentication protocol because it sets up the tunnel and is not directly involved with authenticating the endpoints. The inner authentication protocol, used to authenticate the client's MAC address inside the tunnel, is Microsoft Challenge Handshake Authentication Protocol version 2 (MS-CHAPv2). The encrypted exchange of information inside the tunnel ensures that user credentials are safe from eavesdropping.

One of the advantages of PEAP, when used with MS-CHAPv2, is that it requires only a server-side certificate to establish the secure tunnel, and uses server-side public key certificates to authenticate the server. This eliminates the overhead involved in deploying digital certificates for every client that requires authentication.

Once a client has been authenticated on the switch using MAC RADIUS authentication, subsequent clients can use the same outer tunnel that was established by the first client to communicate with the server. This is achieved using the session resumption functionality provided by SSL. Session resumption reduces latency that can occur as subsequent clients wait for a new TLS tunnel to be established.

Before you configure the PEAP authentication protocol for MAC RADIUS authentication, make sure that the authentication server is also configured to use PEAP with MS-CHAPv2 as the inner authentication protocol. For information about configuring the authentication server, consult the documentation for your server.

To configure the PEAP authentication protocol for MAC RADIUS authentication:

- Configure the **eap-peap** option for the **authentication protocol** statement:

```
[edit]
user@switch# set protocols dot1x authenticator interface interface-name mac-radius
authentication-protocol eap-peap
```

- (Optional) Enable session resumption to allow for faster authentication of subsequent clients:

```
[edit]
```

```
user@switch# set protocols dot1x authenticator interface interface-name mac-radius  
authentication-protocol eap-peap resume
```

- Load the server-side SSL certificate using either the filename or path.
 - To load the certificate using the file name:

```
[edit]  
user@root# run load ssl-certificate file certificate-name
```

- To load the certificate using the file path:

```
[edit]  
user@root# run load ssl-certificate path certificate-path
```

- To verify the certificates:

```
[edit]  
user@root# run show ssl-certificates
```



NOTE: The authentication protocol can be configured globally using the `interface all` option as well as locally using the individual interface name. If the authentication protocol is configured both for an individual interface and for all interfaces, the local configuration for that interface overrides the global configuration.

**Related
Documentation**

- [Understanding Authentication on Switches on page 348](#)
- [Example: Configuring MAC RADIUS Authentication on an EX Series Switch on page 502](#)

Example: Configuring RADIUS Authentication on a QFabric System

RADIUS authentication is a method of authenticating users who are attempting to access a network device. On a QFabric system, users are load balanced on each of the Director devices. Each Director device needs to be able to communicate with the RADIUS server. Packets sent to the RADIUS server originate from the Director device IP addresses.

The following example shows how to configure RADIUS authentication on the QFabric system:

Perform the following steps to configure RADIUS authentication on the QFabric system:

1. Configure the order in which the authentication methods are used.

For example:

```
user@switch # set system authentication-order [radius password]
```

In this example, RADIUS authentication is the first authentication method that Junos OS will use when a user logs into the system.

2. Configure the IP address of the RADIUS server and the secret password. The secret password on the switch must match the secret password on the RADIUS server.

For example:

```
user@switch # set system radius-server 172.28.36.108 secret testing123
```

3. Assign the login class and the template account for the user.

For example:

```
user@switch # set system login user remote class super-user
```

Here are the results of your configuration:

```
[edit]
system {
  authentication-order [ radius password ];
  login {
    user remote {
      class super-ruser;
    }
  }
}
radius-server {
  172.28.36.108 {
    secret test123
  }
}
```

Related Documentation

- [Configuring RADIUS Authentication \(QFX Series or OCX Series\) on page 213](#)

Juniper Networks Vendor-Specific RADIUS Attributes

Junos OS supports the configuration of Juniper Networks RADIUS vendor-specific attributes (VSAs). These VSAs are encapsulated in a RADIUS vendor-specific attribute with the vendor ID set to the Juniper Networks ID number, 2636. [Table 14 on page 219](#) lists the Juniper Networks VSAs you can configure.

Table 14: Juniper Networks Vendor-Specific RADIUS Attributes

Name	Description	Type	Length	String
Juniper-Local-User-Name	Indicates the name of the user template used by this user when logging in to a device. This attribute is used only in Access-Accept packets.	1	≥3	One or more octets containing printable ASCII characters.

Table 14: Juniper Networks Vendor-Specific RADIUS Attributes (continued)

Name	Description	Type	Length	String
Juniper-Allow-Commands	Contains an extended regular expression that enables the user to run operational mode commands in addition to the commands authorized by the user's login class permission bits. This attribute is used only in Access-Accept packets.	2	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See "Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies" on page 117.
Juniper-Deny-Commands	Contains an extended regular expression that denies the user permission to run operation mode commands authorized by the user's login class permission bits. This attribute is used only in Access-Accept packets.	3	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See "Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies" on page 117.
Juniper-Allow-Configuration	Contains an extended regular expression that enables the user to run configuration mode commands in addition to the commands authorized by the user's login class permission bits. This attribute is used only in Access-Accept packets.	4	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See "Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies" on page 117.
Juniper-Deny-Configuration	Contains an extended regular expression that denies the user permission to run configuration commands authorized by the user's login class permission bits. This attribute is used only in Access-Accept packets.	5	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See "Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies" on page 117.

Table 14: Juniper Networks Vendor-Specific RADIUS Attributes (continued)

Name	Description	Type	Length	String
Juniper-Interactive-Command	Indicates the interactive command entered by the user. This attribute is used only in Accounting-Request packets.	8	≥3	One or more octets containing printable ASCII characters.
Juniper-Configuration-Change	Indicates the interactive command that results in a configuration (database) change. This attribute is used only in Accounting-Request packets.	9	≥3	One or more octets containing printable ASCII characters.
Juniper-User-Permissions	<p>Contains information the server uses to specify user permissions. This attribute is used only in Access-Accept packets.</p> <p>NOTE: When the Juniper-User-Permissions attribute is configured to grant the Junos OS maintenance or all permissions on a RADIUS server, the UNIX wheel group membership is not automatically added to a user's list of group memberships. Some operations such as running the su root command from a local shell require wheel group membership permissions. However, when a user is configured locally with the permissions maintenance or all, the user is automatically granted membership to the UNIX wheel group. Therefore, we recommend that you create a template user account with the required permissions and associate individual user accounts with the template user account.</p>	10	≥3	<p>One or more octets containing printable ASCII characters.</p> <p>The string is a list of permission flags separated by a space. The exact name of each flag must be specified in its entirety. See Table 7 on page 108.</p>
Juniper-Authentication-Type	Indicates the authentication method (local database, or RADIUS server) used to authenticate a user. If the user is authenticated using a local database, the attribute value shows 'local'. If the user is authenticated using RADIUS server, the attribute value shows 'remote'.	11	≥5	One or more octets containing printable ASCII characters.

Table 14: Juniper Networks Vendor-Specific RADIUS Attributes (continued)

Name	Description	Type	Length	String
Juniper-Session-Port	Indicates the source port number of the established session.	12	size of integer	Integer

For more information about the VSAs, see RFC 2138, *Remote Authentication Dial In User Service (RADIUS)*.

Related Documentation

- [Configuring RADIUS Server Authentication on page 203](#)

Understanding RADIUS Accounting

Devices support IETF RFC 2866, *RADIUS Accounting*. Configuring RADIUS accounting on the device supports collecting statistical data about users logging in to or out from a LAN and sending the data to a RADIUS accounting server. The statistical data gathered can be used for general network monitoring, analyzing and tracking usage patterns, or billing a user based upon the amount of time or type of services accessed.

To configure RADIUS accounting, specify one or more RADIUS accounting servers to receive the statistical data from the device, and select the type of accounting data to be collected.

The RADIUS accounting server you specify can be the same server used for RADIUS authentication, or it can be a separate RADIUS server. You can specify a list of RADIUS accounting servers. If the primary server (the first one configured) is unavailable, each RADIUS server in the list is tried in the order in which they are configured in the Junos OS.

The RADIUS accounting process between the device and a RADIUS server works like this:

1. A RADIUS accounting server listens for User Datagram Protocol (UDP) packets on a specific port. For example, on FreeRADIUS, the default port is 1813.
2. The device forwards an *accounting-request* packet containing an event record to the accounting server. The event record associated with this supplicant contains an *Acct-Status-Type* attribute whose value indicates the beginning of user service for this supplicant. When the supplicant's session ends, the accounting request contains an *Acct-Status-Type* attribute value indicating the end of user service. The RADIUS accounting server records this as a stop-accounting record containing session information and the length of the session.
3. The RADIUS accounting server logs these events in a file as start-accounting or stop-accounting records. On FreeRADIUS, the filename is the server's address; for example, 192.0.2.0.

4. The accounting server sends an *accounting-response* packet back to the device confirming it has received the accounting request.
5. If the device does not receive a response from the server, it continues to send accounting requests until an accounting response is returned from the accounting server.

The statistics collected through this process can be displayed from the RADIUS server; to see those statistics, the user accesses the log file configured to receive them.

Related Documentation • [Configuring RADIUS System Accounting on page 223](#)

Configuring RADIUS System Accounting

With RADIUS accounting enabled, Juniper Networks routers or switches, acting as RADIUS clients, can notify the RADIUS server about user activities such as software logins, configuration changes, and interactive commands. The framework for RADIUS accounting is described in RFC 2866.



NOTE: Supported on SRX1500, SRX5400, SRX5600, and SRX5800 devices only.

Tasks for configuring RADIUS system accounting are:

1. [Configuring Auditing of User Events on a RADIUS Server on page 223](#)
2. [Specifying RADIUS Server Accounting and Auditing Events on page 224](#)
3. [Configuring RADIUS Server Accounting on page 224](#)

Configuring Auditing of User Events on a RADIUS Server

To audit user events, include the following statements at the **[edit system accounting]** hierarchy level:

```
[edit system accounting]
events [ events ];
destination {
  radius {
    server {
      server-address {
        accounting-port port-number;
        retry number;
        routing-instance routing-instance;
        secret password;
        source-address address;
        timeout seconds;
      }
    }
  }
}
```

```
}  
}
```

Specifying RADIUS Server Accounting and Auditing Events

To specify the events you want to audit when using a RADIUS server for authentication, include the **events** statement at the **[edit system accounting]** hierarchy level:

```
[edit system accounting]  
events [ events ];
```

events is one or more of the following:

- **login**—Audit logins
- **change-log**—Audit configuration changes
- **interactive-commands**—Audit interactive commands (any command-line input)

Configuring RADIUS Server Accounting

To configure RADIUS server accounting, include the **server** statement at the **[edit system accounting destination radius]** hierarchy level:

```
server {  
  server-address {  
    accounting-port port-number;  
    retry number;  
    routing-instance routing-instance;  
    secret password;  
    source-address address;  
    timeout seconds;  
  }  
}
```

server-address specifies the address of the RADIUS server. To configure multiple RADIUS servers, include multiple **server** statements.



NOTE: If no RADIUS servers are configured at the **[edit system accounting destination radius]** statement hierarchy level, the Junos OS uses the RADIUS servers configured at the **[edit system radius-server]** hierarchy level.

accounting-port port-number specifies the RADIUS server accounting port number.

The default port number is 1813.



NOTE: If you enable RADIUS accounting at the **[edit access profile profile-name accounting-order]** hierarchy level, accounting is triggered on the default port of 1813 even if you do not specify a value for the **accounting-port** statement.

routing-instance *routing-instance* is the name of the non-default management instance. Use **mgmt_junos** as the routing-instance name. See *Management Interface in a Nondefault Instance*.

You must specify a secret (password) that the local router or switch passes to the RADIUS client by including the **secret** statement. If the password contains spaces, enclose the entire password in quotation marks (" ").

In the **source-address** statement, specify a source address for the RADIUS server. Each RADIUS request sent to a RADIUS server uses the specified source address. The source address is a valid IPv4 address (in case if radius-server address is IPv4) or IPv6 address (in case if radius-server address is IPv6) configured on one of the router or switch interfaces.

Optionally, you can specify the number of times that the router or switch attempts to contact a RADIUS authentication server by including the **retry** statement. By default, the router or switch retries three times. You can configure the router or switch to retry from 1 through 10 times.

Optionally, you can specify the length of time that the local router or switch waits to receive a response from a RADIUS server by including the **timeout** statement. By default, the router or switch waits 3 seconds. You can configure the timeout to be from 1 through 90 seconds.

Starting with Junos OS Release 14.1 and Junos OS Release 17.3R1, you can configure the **enhanced-accounting** statement to view the attribute values of a logged in user. If you use the **enhanced-accounting** statement at the **[edit system radius-options]** hierarchy level, the RADIUS attributes such as access method, remote port, and access privileges can be audited. You can limit the number of attribute values to be displayed for auditing by using the **enhanced-avs-max <number>** statement at the **[edit system accounting]** hierarchy level.

```
[edit system radius-options]
enhanced-accounting;
```

```
[edit system accounting]
enhanced-avs-max <number>;
```

When a Juniper Networks router or switch is configured with RADIUS accounting, it sends **Accounting-Start** and **Accounting-Stop** messages to the RADIUS server. These messages contain information about user activities such as software logins, configuration changes, and interactive commands. This information is typically used for monitoring a network, collecting usage statistics, and ensuring that users are billed properly.

The following example shows three servers (10.5.5.5, 10.6.6.6, and 10.7.7.7) configured for RADIUS accounting:

```
system {
  accounting {
    events [ login change-log interactive-commands ];
    destination {
```

```
radius {
  server {
    10.5.5.5 {
      accounting-port 3333;
      secret $ABC123;
      source-address 10.1.1.1;
      retry 3;
      timeout 3;
    }
    10.6.6.6 secret $ABC123;
    10.7.7.7 secret $ABC123;
  }
}
```

See Also • [Configuring RADIUS Server Authentication on page 203](#)

Using Regular Expressions on a RADIUS or TACACS+ Server to Allow or Deny Access to Commands

Use regular expressions to specify which operational or configuration mode commands are allowed or denied when you use a RADIUS or TACACS+ server for user authentication. You can specify the regular expressions using the appropriate Juniper Networks vendor-specific RADIUS or TACACS+ attributes in your authentication server configuration.

The following attributes are supported for configuring authorizations on RADIUS and TACACS+ servers:

- **user-permissions**
- **allow-configuration**
- **deny-configuration**
- **allow-commands**
- **deny-commands**
- **allow-configuration-regexp**
- **deny-configuration-regexp**
- (TACACS+ only) **allow-commands-regexp**
- (TACACS+ only) **deny-commands-regexp**

You can specify **allow-configuration**, **deny-configuration**, **allow-commands**, or **deny-commands** in a single extended regular expression, enclosing multiple commands in parentheses and separating them using the pipe symbol. For example, you can specify multiple **allow-commands** parameters using: **allow-commands= (cmd1 | cmd2 | cmdn)**. You can specify **user-permissions** as a list of comma-separated values, and not as a regular expression.

To configure authorizations using the **allow/deny-configuration-regexps** or **allow/deny-commands-regexps** attributes, you configure a set of strings in which each string is a regular expression, enclosed in double quotes and separated with a space operator. For example, you can specify multiple parameters for **allow-commands-regexps** using the following syntax: **allow-commands-regexps = ("regex1" "regex2" ...)**.

On a RADIUS or TACACS+ server, you can also use a simplified version for regular expressions where you specify each individual expression on a separate line. The simplified version is valid for **allow-commands**, **deny-commands**, **allow-configuration**, **deny-configuration**, and **permissions** vendor-specific attributes.

For a RADIUS server, specify the individual regular expressions using the following syntax:

```
Juniper-Allow-Commands+= "cmd1"
Juniper-Allow-Commands+= "cmd2"
Juniper-Allow-Commands+= "cmdn"
Juniper-Deny-Commands+= "cmd1"
Juniper-Deny-Commands+= "cmd2"
Juniper-Deny-Commands+= "cmdn"
Juniper-Allow-Configuration+= "regex1"
Juniper-Allow-Configuration+= "regex2"
Juniper-Allow-Configuration+= "regexn"
Juniper-Deny-Configuration+= "regex1"
Juniper-Deny-Configuration+= "regex2"
Juniper-Deny-Configuration+= "regexn"
Juniper-User-Permissions+= "permission-flag1"
Juniper-User-Permissions+= "permission-flag2"
Juniper-User-Permissions+= "permission-flagn"
```

For TACACS+ server, specify the individual regular expressions using the following syntax:

```
allow-commands1="cmd1"
allow-commands2="cmd2"
allow-commandsn="cmdn"
deny-commands1="cmd1"
deny-commands2="cmd2"
deny-commandsn="cmdn"
allow-configuration1="regex1"
allow-configuration2="regex2"
allow-configurationn="regexn"
deny-configuration1="regex1"
deny-configuration2="regex2"
deny-configurationn="regexn"
user-permissions1="permission-flag1"
user-permissions2="permission-flag2"
user-permissionsn="permission-flagn "
```



NOTE:

- Numeric values 1 to n in the syntax (for TACACS+ server) must be unique but need not be sequential. For example, the following syntax is valid:

```
allow-commands1="cmd1"  
allow-commands3="cmd3"  
allow-commands2="cmd2"  
deny-commands3="cmd3"  
deny-commands2="cmd2"  
deny-commands1="cmd1"
```

- The limit on the number of lines of individual regular expressions is imposed by the TACACS+ or RADIUS server.
- When you issue the `show cli authorization` command, the command output displays the regular expression in a single line, even if you specify each individual expression on a separate line.

For more information about Juniper Networks vendor-specific RADIUS and TACACS+ attributes, see [“Juniper Networks Vendor-Specific RADIUS Attributes” on page 219](#) and [“Juniper Networks Vendor-Specific TACACS+ Attributes” on page 240](#).



NOTE: When RADIUS or TACACS+ authentication is configured for a router, regular expressions configured on the RADIUS or TACACS+ server merge with any regular expressions configured on the local router at the [edit system login class] hierarchy level using the `allow-commands`, `deny-commands`, `allow-configuration`, `deny-configuration`, or `permissions` statements. If the final expression has a syntax error, the overall result is an invalid regular expression.

Related Documentation

- [Junos OS Authentication Order for RADIUS, TACACS+, and Password Authentication on page 187](#)

CHAPTER 7

Configuring TACACS+ Authentication

- [Configuring TACACS+ Authentication on page 229](#)
- [Example: Configuring a TACACS+ Server for System Authentication on page 233](#)
- [Configuring Periodic Refresh of the TACACS+ Authorization Profile on page 236](#)
- [Using Regular Expressions on a RADIUS or TACACS+ Server to Allow or Deny Access to Commands on page 238](#)
- [Juniper Networks Vendor-Specific TACACS+ Attributes on page 240](#)
- [Configuring TACACS+ System Accounting on page 242](#)

Configuring TACACS+ Authentication

TACACS+ authentication is a method of authenticating users who attempt to access the router or switch.



NOTE: Starting with Release 13.3, Junos OS supports IPv6 along with the existing IPv4 support for user authentication using TACACS+ servers.

Tasks to configure TACACS+ configuration are:

- [Configuring TACACS+ Server Details on page 229](#)
- [Configuring TACACS+ to Use the Management Instance on page 231](#)
- [Specifying a Source Address for the Junos OS to Access External TACACS+ Servers on page 231](#)
- [Configuring the Same Authentication Service for Multiple TACACS+ Servers on page 232](#)
- [Configuring Juniper Networks Vendor-Specific TACACS+ Attributes on page 232](#)

Configuring TACACS+ Server Details

To use TACACS+ authentication on the router or switch, configure information about one or more TACACS+ servers on the network by including the **tacplus-server** statement at the **[edit system]** hierarchy level:

```
[edit system]
tacplus-server server-address {
```

```
port port-number;  
routing-instance routing-instance;  
secret password;  
single-connection;  
timeout seconds;  
}
```

server-address is the address of the TACACS+ server.

port-number is the TACACS+ server port number.

routing-instance *routing-instance* is the name of the routing instance used to send and receive TACACS+ packets. By default, Junos OS routes authentication, authorization, and accounting packets for TACACS+ through the default routing instance. Starting in Junos OS Release 17.4R1, existing TACACS+ behavior is enhanced to support routing TACACS+ packets through a management interface in a non-default VRF instance named `mgmt_junos`. For more information on this VRF management instance, see [“Configuring TACACS+ to Use the Management Instance” on page 231](#). Starting in Junos OS Release 18.2R1, you can route TACACS+ traffic through any routing instance you configure in authentication.

You must specify a secret (password) that the local router or switch passes to the TACACS+ client by including the **secret** statement. If the password included spaces, enclose the password in quotation marks. The secret used by the local router or switch must match that used by the server.

Optionally, you can specify the length of time that the local router or switch waits to receive a response from a TACACS+ server by including the **timeout** statement. By default, the router or switch waits 3 seconds. You can configure this to be a value in the range from 1 through 90 seconds.

Optionally, you can have the software maintain one open Transmission Control Protocol (TCP) connection to the server for multiple requests, rather than opening a connection for each connection attempt by including the **single-connection** statement.



NOTE: Early versions of the TACACS+ server do not support the **single-connection** option. If you specify this option and the server does not support it, the Junos OS will be unable to communicate with that TACACS+ server.

To configure multiple TACACS+ servers, include multiple **tacplus-server** statements.

On a TX Matrix router, TACACS+ accounting should be configured only under the groups **re0** and **re1**.



NOTE: Accounting should not be configured at the **[edit system]** hierarchy level; on a TX Matrix router, control is done under the switch-card chassis only.

To configure a set of users that share a single account for authorization purposes, you create a template user. To do this, include the **user** statement at the **[edit system login]** hierarchy level, as described in “[Example: Configuring Authentication Order](#)” on page 193.

See Also • *routing-instance (Accounting and Authentication)*

Configuring TACACS+ to Use the Management Instance

By default, Junos OS routes authentication, authorization, and accounting packets for TACACS+ through the default routing instance. Starting in Junos OS Release 17.4R1, existing TACACS+ behavior is enhanced to support a management interface in a non-default VRF instance.

```
[edit system]
tacplus-server server-address {
  routing-instance routing-instance;
}
```

When the **routing-instance mgmt_junos** option is configured in both the **tacplus-server server-address** and the **tacplus server server-ip** statements (see [tacplus](#)), provided the **management-instance** statement is also configured, TACACS+ packets are routed through the management instance **mgmt_junos**.



NOTE: The **routing-instance mgmt_junos** option must be configured in both the **tacplus-server** and the **tacplus server** statements. If not, even if the **management-instance** statement is set, TACACS+ packets will still be sent using the default routing instance only.

For more details on this management instance, see *management-instance*.

Specifying a Source Address for the Junos OS to Access External TACACS+ Servers

You can specify which source address the Junos OS uses when accessing your network to contact an external TACACS+ server for authentication. You can also specify which source address the Junos OS uses when contacting a TACACS+ server for sending accounting information.

To specify a source address for a TACACS+ server for authentication, include the **source-address** statement at the **[edit system tacplus-server server-address]** hierarchy level:

```
[edit system tacplus-server server-address]
source-address source-address;
```

source-address is a valid IP address configured on one of the router or switch interfaces.

To specify a source address for a TACACS+ server for system accounting, include the **source-address** statement at the **[edit system accounting destination tacplus server server-address]** hierarchy level:

```
[edit system accounting destination tacplus server server-address]
source-address source-address;
```

source-address is a valid IP address configured on one of the router or switch interfaces.

Configuring the Same Authentication Service for Multiple TACACS+ Servers

To configure the same authentication service for multiple TACACS+ servers, include statements at the `[edit system tacplus-server]` and `[edit system tacplus-options]` hierarchy levels. For information about how to configure a TACACS+ server at the `[edit system tacplus-server]` hierarchy level, see [“Configuring TACACS+ Authentication” on page 229](#).

To assign the same authentication service to multiple TACACS+ servers, include the `service-name` statement at the `[edit system tacplus-options]` hierarchy level:

```
[edit system tacplus-options]
service-name service-name;
```

service-name is the name of the authentication service. By default, the service name is set to `junos-exec`.

The following example shows how to configure the same authentication service for multiple TACACS+ servers:

```
[edit system]
tacplus-server {
  10.2.2.2 secret "$ABC123"; ## SECRET-DATA
  10.3.3.3 secret "$ABC123"; ## SECRET-DATA
}
tacplus-options {
  service-name bob;
}
```

Configuring Juniper Networks Vendor-Specific TACACS+ Attributes

The Juniper Networks Vendor-Specific TACACS+ Attributes enable you to configure access privileges for users on a TACACS+ server. They are specified in the TACACS+ server configuration file on a per-user basis. The Junos OS retrieves these attributes through an authorization request of the TACACS+ server after authenticating a user. You do not need to configure these attributes to run the Junos OS with TACACS+.

To specify these attributes, include a `service` statement of the following form in the TACACS+ server configuration file:

```
service = junos-exec {
  local-user-name = <username-local-to-router>
  allow-commands = "<allow-commands-regex>"
  allow-configuration-regexps = "<allow-configuration-regex>"
  deny-commands = "<deny-commands-regex>"
  deny-configuration-regexps = "<deny-configuration-regex>"
}
```

This **service** statement can appear in a **user** or **group** statement.

Release History Table

Release	Description
18.2R1	Starting in Junos OS Release 18.2R1, you can route TACACS+ traffic through any routing instance you configure in authentication.
17.4R1	Starting in Junos OS Release 17.4R1, existing TACACS+ behavior is enhanced to support routing TACACS+ packets through a management interface in a non-default VRF instance named mgmt_junos.
17.4R1	Starting in Junos OS Release 17.4R1, existing TACACS+ behavior is enhanced to support a management interface in a non-default VRF instance.

- Related Documentation
- [Example: Configuring a TACACS+ Server for System Authentication on page 233](#)

Example: Configuring a TACACS+ Server for System Authentication

This example shows how to configure a TACACS+ server for system authentication.

- [Requirements on page 233](#)
- [Overview on page 233](#)
- [Configuration on page 233](#)
- [Verification on page 236](#)

Requirements

Before you begin:

- Perform the initial device configuration. See the Getting Started Guide for your device.
- Configure at least one TACACS+ server.

Overview

In this example, you set the IP address to 172.16.98.24 and the shared secret password of the TACACS+ server to Tacacssecret1. The secret password is stored as an encrypted value in the configuration database. You then set the loopback source address as 10.0.0.1

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 system tacplus-server address 172.16.98.24
set system tacplus-server 172.16.98.24 secret Tacacssecret1
```

```
set system tacplus-server 172.16.98.24 source-address 10.0.0.1
```

**GUI Step-by-Step
Procedure**

To configure a TACACS+ server for system authentication:

1. In the J-Web user interface, select **Configure>System Properties>User Management**.
2. Click **Edit**. The Edit User Management dialog box appears.
3. Select the **Authentication Method and Order** tab.
4. In the TACACS section, click **Add**. The Add TACACS Server dialog box appears.
5. In the IP Address box, type the server's 32-bit IP address.
6. In the Password and Confirm Password boxes, type the secret password for the server and verify your entry.
7. In the Server Port box, type the appropriate port.
8. In the Source Address box, type the locally configured interface address, which is used as the source address for TACACS+ packets.



NOTE: The Source Address box can accept either a hostname or an IP address.

9. In the Retry Attempts box, specify the number of times that the server should try to verify the user's credentials.
10. In the Time Out box, specify the amount of time (in seconds) the device should wait for a response from the server.
11. Click **OK** to check your configuration and save it as a candidate configuration.
12. If you are done configuring the device, click **Commit Options>Commit**.

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 *CLI User Guide*.

To configure a TACACS+ server for system authentication:

1. Add a new TACACS+ server and set its IP address.

```
[edit system]
user@host# set tacplus-server address 172.16.98.24
```

2. Specify the shared secret (password) of the TACACS+ server.

```
[edit system]
user@host# set tacplus-server 172.16.98.24 secret Tacacssecret1
```

3. Specify the device's loopback address as the source address.

```
[edit system]
user@host# set tacplus-server 172.16.98.24 source-address 10.0.0.1
```

Results From configuration mode, confirm your configuration by entering the **show system tacplus-server** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show system tacplus-server
tacplus-server 172.16.98.24 {
  secret Tacacssecret1;
  source-address 10.0.0.1;
}
```

If you are done configuring the device, enter **commit** from configuration mode.



NOTE: To completely set up TACACS+ authentication, you must create user template accounts and specify a system authentication order. Do one of the following tasks:

- Configure a system authentication order. See [“Example: Configuring Authentication Order” on page 193](#).
- Configure a user. See [“Example: Configuring New Users” on page 69](#).
- Configure local user template accounts. See [“Example: Creating Template Accounts” on page 77](#).

Verification

Confirm that the configuration is working properly.

Verifying the TACACS+ Server System Authentication Configuration

Purpose Verify that the TACACS+ server has been configured for system authentication.

Action From configuration mode, enter the **show system tacplus-server** command.

- Related Documentation**
- [Junos OS User Authentication Methods on page 185](#)
 - [Junos OS User Accounts Overview on page 65](#)
 - [Junos OS User Authentication Methods on page 185](#)
 - [Configuring Local User Template Accounts for User Authentication on page 75](#)
 - [Example: Configuring a RADIUS Server for System Authentication on page 209](#)

Configuring Periodic Refresh of the TACACS+ Authorization Profile

When you configure a JUNOS device to use a TACACS+ server for authentication, the device prompts users for login information, which is verified by the TACACS+ server. After the user is successfully authenticated, the JUNOS device sends an authorization request to the TACACS+ server to obtain the authorization profile for the user. Authorization profiles specify the access permissions for authenticated users or devices.

The TACACS+ server sends the authorization profile as part of an authorization response message. The remote user configured on the TACACS+ server is mapped to a local user configured on the JUNOS device. The JUNOS device combines the remote authorization profile with the locally-configured authorization profile for the user, which is configured at the `[edit system login class]` hierarchy level.

The exchange of authorization request and response messages occurs only once, after successful authentication, by default. You can configure the JUNOS device to periodically fetch the remote authorization profile from the TACACS+ server and refresh the authorization profile stored locally. This ensures that any change in the authorization parameters are reflected on the local device without the user having to restart the authentication process.

To enable periodic refresh of the authorization profile, you must set the time interval at which the JUNOS device checks the authorization profile configured remotely on the TACACS+ server. If there is a change in the remote authorization profile, the device fetches the authorization profile from the TACACS+ server and the authorization profile configured under the login class hierarchy. The device refreshes the authorization profile stored locally by combining the remote and locally-configured authorization profiles.

The time interval can be configured directly on the TACACS+ server or locally on the JUNOS device using the CLI. The time interval is configured in minutes, in the range of 15 to 1440 minutes.

- To configure periodic refresh of the authorization profile on the local device using the CLI, include the **authorization-time-interval** statement at the **[edit system tacplus-options]** hierarchy level:

```
[edit system tacplus-options]
authorization-time-interval [minutes];
```

- To configure the time interval for periodic refresh on the TACACS+ server, add the time interval as a parameter in the authorization profile using the following syntax:

```
refresh-time-interval=minutes
```

Use the following guidelines to determine which time interval configuration takes precedence:

- If there is no refresh time interval configured on the TACACS server for periodic refresh, the JUNOS device does not receive the time interval value in the authorization response. In this case, the value configured locally on the JUNOS device will take effect.
- If the refresh time interval is configured on the TACACS server and there is no refresh time interval configured locally on the JUNOS device, the value configured on the TACACS server will take effect.
- If refresh time interval is configured on the TACACS server and also on the JUNOS device locally, the value configured on the TACACS server will take precedence.
- If there is no refresh time interval configured on the TACACS server and there is no refresh time interval configured on the JUNOS device, there will be no periodic refresh.
- If the refresh time interval configured on the TACACS server is out of range or invalid, the refresh time interval value configured locally will take effect.
- If the refresh time interval configured on the TACACS server is out of range or invalid and there is no refresh time interval configured locally, there will be no periodic refresh.

After the periodic refresh time interval is set, if the user changes the refresh interval before the authorization request is sent from the JUNOS device, the updated refresh interval takes effect after the next immediate periodic refresh.

Related Documentation

- [Using Regular Expressions on a RADIUS or TACACS+ Server to Allow or Deny Access to Commands on page 226](#)
- [Defining Junos OS Login Classes on page 52](#)
- [authorization-time-interval on page 1200](#)

Using Regular Expressions on a RADIUS or TACACS+ Server to Allow or Deny Access to Commands

Use regular expressions to specify which operational or configuration mode commands are allowed or denied when you use a RADIUS or TACACS+ server for user authentication. You can specify the regular expressions using the appropriate Juniper Networks vendor-specific RADIUS or TACACS+ attributes in your authentication server configuration.

The following attributes are supported for configuring authorizations on RADIUS and TACACS+ servers:

- **user-permissions**
- **allow-configuration**
- **deny-configuration**
- **allow-commands**
- **deny-commands**
- **allow-configuration-regex**
- **deny-configuration-regex**
- (TACACS+ only) **allow-commands-regex**
- (TACACS+ only) **deny-commands-regex**

You can specify **allow-configuration**, **deny-configuration**, **allow-commands**, or **deny-commands** in a single extended regular expression, enclosing multiple commands in parentheses and separating them using the pipe symbol. For example, you can specify multiple **allow-commands** parameters using: **allow-commands= (cmd1 | cmd2 | cmdn)**. You can specify **user-permissions** as a list of comma-separated values, and not as a regular expression.

To configure authorizations using the **allow/deny-configuration-regexps** or **allow/deny-commands-regexps** attributes, you configure a set of strings in which each string is a regular expression, enclosed in double quotes and separated with a space operator. For example, you can specify multiple parameters for **allow-commands-regex** using the following syntax: **allow-commands-regexps = ("regex1" "regex2"...)** .

On a RADIUS or TACACS+ server, you can also use a simplified version for regular expressions where you specify each individual expression on a separate line. The simplified version is valid for **allow-commands**, **deny-commands**, **allow-configuration**, **deny-configuration**, and **permissions** vendor-specific attributes.

For a RADIUS server, specify the individual regular expressions using the following syntax:

```
Juniper-Allow-Commands+= "cmd1"  
Juniper-Allow-Commands+= "cmd2"  
Juniper-Allow-Commands+= "cmdn"  
Juniper-Deny-Commands+= "cmd1"  
Juniper-Deny-Commands+= "cmd2"
```

```

Juniper-Deny-Commands+="cmdn"
Juniper-Allow-Configuration+="regex1"
Juniper-Allow-Configuration+="regex2"
Juniper-Allow-Configuration+="regexn"
Juniper-Deny-Configuration+="regex1"
Juniper-Deny-Configuration+="regex2"
Juniper-Deny-Configuration+="regexn"
Juniper-User-Permissions+="permission-flag1"
Juniper-User-Permissions+="permission-flag2"
Juniper-User-Permissions+="permission-flagn"

```

For TACACS+ server, specify the individual regular expressions using the following syntax:

```

allow-commands1="cmd1"
allow-commands2="cmd2"
allow-commandsn="cmdn"
deny-commands1="cmd1"
deny-commands2="cmd2"
deny-commandsn="cmdn"
allow-configuration1="regex1"
allow-configuration2="regex2"
allow-configurationn="regexn"
deny-configuration1="regex1"
deny-configuration2="regex2"
deny-configurationn="regexn"
user-permissions1="permission-flag1"
user-permissions2="permission-flag2"
user-permissionsn="permission-flagn"

```



NOTE:

- Numeric values 1 to *n* in the syntax (for TACACS+ server) must be unique but need not be sequential. For example, the following syntax is valid:

```

allow-commands1="cmd1"
allow-commands3="cmd3"
allow-commands2="cmd2"
deny-commands3="cmd3"
deny-commands2="cmd2"
deny-commands1="cmd1"

```

- The limit on the number of lines of individual regular expressions is imposed by the TACACS+ or RADIUS server.
- When you issue the `show cli authorization` command, the command output displays the regular expression in a single line, even if you specify each individual expression on a separate line.

For more information about Juniper Networks vendor-specific RADIUS and TACACS+ attributes, see [“Juniper Networks Vendor-Specific RADIUS Attributes” on page 219](#) and [“Juniper Networks Vendor-Specific TACACS+ Attributes” on page 240](#).



NOTE: When RADIUS or TACACS+ authentication is configured for a router, regular expressions configured on the RADIUS or TACACS+ server merge with any regular expressions configured on the local router at the [edit system login class] hierarchy level using the allow-commands, deny-commands, allow-configuration, deny-configuration, or permissions statements. If the final expression has a syntax error, the overall result is an invalid regular expression.

- Related Documentation**
- [Junos OS Authentication Order for RADIUS, TACACS+, and Password Authentication on page 187](#)

Juniper Networks Vendor-Specific TACACS+ Attributes

Junos OS supports the configuration of Juniper Networks TACACS+ vendor-specific attributes (VSAs). These VSAs are encapsulated in a TACACS+ vendor-specific attribute with the vendor ID set to the Juniper Networks ID number, 2636. [Table 15 on page 240](#) lists the Juniper Networks VSAs you can configure.

Table 15: Juniper Networks Vendor-Specific TACACS+ Attributes

Name	Description	Length	String
local-user-name	Indicates the name of the user template used by this user when logging in to a device.	≥3	One or more octets containing printable ASCII characters.
allow-commands	Contains an extended regular expression that enables the user to run operational mode commands in addition to those commands authorized by the user's login class permission bits.	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See “Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies” on page 117.
allow-configuration	Contains an extended regular expression that enables the user to run configuration mode commands in addition to those commands authorized by the user's login class permission bits.	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See “Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies” on page 117.

Table 15: Juniper Networks Vendor-Specific TACACS+ Attributes (continued)

Name	Description	Length	String
deny-commands	Contains an extended regular expression that denies the user permission to run operational mode commands authorized by the user's login class permission bits.	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See "Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies" on page 117.
deny-configuration	Contains an extended regular expression that denies the user permission to run configuration mode commands authorized by the user's login class permission bits.	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See "Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies" on page 117.
user-permissions	<p>Contains information the server uses to specify user permissions.</p> <p>NOTE: When the user-permissions attribute is configured to grant the Junos OS maintenance or all permissions on an IPv4 or IPv6 TACACS+ server, the UNIX wheel group membership is not automatically added to a user's list of group memberships. Some operations such as running the su root command from a local shell require wheel group membership permissions. However, when a user is configured locally with the permissions maintenance or all, the user is automatically granted membership to the UNIX wheel group. Therefore, we recommend that you create a template user account with the required permissions and associate individual user accounts with the template user account.</p>	≥3	One or more octets containing printable ASCII characters. See "Understanding Junos OS Access Privilege Levels" on page 107.
authentication-type	Indicates the authentication method (local database, or TACACS+ server) used to authenticate a user. If the user is authenticated using a local database, the attribute value shows 'local'. If the user is authenticated using TACACS+ server, the attribute value shows 'remote'.	≥5	One or more octets containing printable ASCII characters.
session-port	Indicates the source port number of the established session.	size of integer	Integer

Related Documentation

- [Configuring TACACS+ Authentication on page 229](#)

Configuring TACACS+ System Accounting

You can use TACACS+ to track and log software logins, configuration changes, and interactive commands. To audit these events, include the following statements at the **[edit system accounting]** hierarchy level:

```
[edit system accounting]
events [ events ];
destination {
  tacplus {
    server {
      server-address {
        port port-number;
        routing-instance routing-instance;
        secret password;
        single-connection;
        timeout seconds;
      }
    }
  }
}
```

Tasks for configuring TACACS+ system accounting are:

1. [Specifying TACACS+ Auditing and Accounting Events on page 242](#)
2. [Configuring TACACS+ Server Accounting on page 242](#)
3. [Configuring TACACS+ To Use the Management Instance on page 244](#)
4. [Configuring TACACS+ Accounting on a TX Matrix Router on page 244](#)

Specifying TACACS+ Auditing and Accounting Events

To specify the events you want to audit when using a TACACS+ server for authentication, include the **events** statement at the **[edit system accounting]** hierarchy level:

```
[edit system accounting]
events [ events ];
```

events is one or more of the following:

- **login**—Audit logins
- **change-log**—Audit configuration changes
- **interactive-commands**—Audit interactive commands (any command-line input)

Configuring TACACS+ Server Accounting

To configure TACACS+ server accounting, include the **server** statement at the **[edit system accounting destination tacplus]** hierarchy level:

```
[edit system accounting destination tacplus]
```

```

server {
  server-address {
    port port-number;
    routing-instance routing-instance;
    secret password;
    single-connection;
    timeout seconds;
  }
}

```

server-address specifies the address of the TACACS+ server. To configure multiple TACACS+ servers, include multiple **server** statements.



NOTE: If no TACACS+ servers are configured at the [edit system accounting destination tacplus] statement hierarchy level, the Junos OS uses the TACACS+ servers configured at the [edit system tacplus-server] hierarchy level.

We recommend that you add the following configuration at the [edit system accounting destination tacplus] statement hierarchy level to identify a destination and help avoid generating an error condition:

```

accounting {
  events [ login change-log interactive-commands ];
  destination {
    tacplus;
  }
}

```

port-number specifies the TACACS+ server port number.

routing-instance routing-instance is the name of the routing instance used to send and receive TACACS+ packets. By default, Junos OS routes authentication, authorization, and accounting packets for TACACS+ through the default routing instance. Starting in Junos OS Release 17.4R1, existing TACACS+ behavior is enhanced to support routing TACACS+ packets through a management interface in a non-default VRF instance named `mgmt_junos`. For more information on this VRF management instance, see [“Configuring TACACS+ to Use the Management Instance” on page 231](#). Starting in Junos OS Release 18.2R1, you can route TACACS+ traffic through any routing instance you configure in accounting.

You must specify a secret (password) that the local router or switch passes to the TACACS+ client by including the **secret** statement. If the password contains spaces, enclose the entire password in quotation marks (“ ”). The password used by the local router or switch must match that used by the server.

Optionally, you can specify the length of time that the local router or switch waits to receive a response from a TACACS+ server by including the **timeout** statement. By default, the router or switch waits 3 seconds. You can configure this to be a value in the range from 1 through 90 seconds.

Optionally, you can maintain one open TCP connection to the server for multiple requests, rather than opening a connection for each connection attempt, by including the **single-connection** statement.

To ensure that start and stop requests for accounting of login events are correctly logged in the Accounting file instead of the Administration log file on a TACACS+ server, include either the **no-cmd-attribute-value** statement or the **exclude-cmd-attribute** at the **[edit system tacplus-options]** hierarchy level.

If you use the **no-cmd-attribute-value** statement, the value of the **cmd** attribute is set to a null string in the start and stop requests. If you use the **exclude-cmd-attribute** statement, the **cmd** attribute is totally excluded from the start and stop requests. Both statements support the correct logging of accounting requests in the Accounting file, instead of the Administration file.

```
[edit system tacplus-options]
(no-cmd-attribute-value | exclude-cmd-attribute);
```

Configuring TACACS+ To Use the Management Instance

By default, Junos OS routes authentication, authorization, and accounting packets for TACACS+ through the default routing instance. Starting in Junos OS Release 17.4R1, existing TACACS+ behavior is enhanced to support a management interface in a non-default VRF instance.

```
[edit system accounting destination tacplus]
server {
  server-address {
    routing-instance routing-instance;
  }
}
```

When the **routing-instance mgmt_junos** option is configured in both the **tacplus-server server-address** and the **tacplus server server-ip** statements, provided the **management-instance** statement is also configured, TACACS+ packets are routed through the management instance **mgmt_junos**.



NOTE: The **routing-instance mgmt_junos** option must be configured in both the **tacplus-server** and the **tacplus server** statements. If not, even if the **management-instance** statement is set, TACACS+ packets will still be sent using the default routing instance only.

For more details on this management instance, see *management-instance*.

Configuring TACACS+ Accounting on a TX Matrix Router

On a TX Matrix router, TACACS+ accounting should be configured only under the groups **re0** and **re1**.



NOTE: Accounting should *not* be configured at the [edit system] hierarchy; on a TX Matrix router, control is done under the switch-card chassis only.

Release History Table

Release	Description
18.2R1	Starting in Junos OS Release 18.2R1, you can route TACACS+ traffic through any routing instance you configure in accounting.
17.4R1	Starting in Junos OS Release 17.4R1, existing TACACS+ behavior is enhanced to support routing TACACS+ packets through a management interface in a non-default VRF instance named mgmt_junos.
17.4R1	Starting in Junos OS Release 17.4R1, existing TACACS+ behavior is enhanced to support a management interface in a non-default VRF instance.

CHAPTER 8

Configuring Remote Access to a Device

- [System Services Overview on page 247](#)
- [Configuring Management Access on page 248](#)
- [Configuring Telnet Service for Remote Access to a Router or Switch on page 248](#)
- [Configuring FTP Service for Remote Access to the Router or Switch on page 249](#)
- [Configuring Finger Service for Remote Access to the Router on page 250](#)
- [Configuring SSH Host Keys for Secure Copying of Data on page 251](#)
- [Configuring SSH Service for Remote Access to the Router or Switch on page 253](#)
- [Configuring the SSH Service to Support Legacy Cryptography on page 256](#)
- [Configuring Outbound SSH Service on page 258](#)
- [Configuring DTCP-over-SSH Service for the Flow-Tap Application on page 261](#)
- [Configuring NETCONF-Over-SSH Connections on a Specified TCP Port on page 263](#)
- [Configuring clear-text or SSL Service for Junos XML Protocol Client Applications on page 263](#)
- [Configuring the Junos OS to Work with SRC Software on page 265](#)
- [Configuring Password Retry Limits for Telnet and SSH Access on page 266](#)
- [Example: Controlling Management Access on SRX Series Devices on page 267](#)
- [Example: Configuring a Filter to Block Telnet and SSH Access on page 271](#)
- [The telnet Command on page 276](#)
- [The ssh Command on page 278](#)
- [Configuration Guidelines for Securing Console Port Access on page 279](#)

System Services Overview

For security reasons, remote access to the router is disabled by default. You must configure the router explicitly so that users on remote systems can access it. The router can be accessed from a remote system by means of the DHCP, finger, FTP, rlogin, SSH, and Telnet services. In addition, Junos XML protocol client applications can use Secure Sockets Layer (SSL) or the Junos XML protocol-specific clear-text service, among other services.



NOTE: To protect system resources, you can limit the number of simultaneous connections that a service accepts and the number of processes owned by a single user. If either limit is exceeded, connection attempts fail.

**Related
Documentation**

- [Configuring clear-text or SSL Service for Junos XML Protocol Client Applications on page 263](#)
- [DHCP Access Service Overview on page 570](#)
- [Configuring the Router as an Extended DHCP Local Server on page 590](#)
- [Interaction Among the DHCP Client, Extended DHCP Local Server, and Address-Assignment Pools on page 592](#)
- [Configuring DTCP-over-SSH Service for the Flow-Tap Application on page 261](#)
- [Configuring Finger Service for Remote Access to the Router on page 250](#)
- [Configuring FTP Service for Remote Access to the Router or Switch on page 249](#)
- [Configuring SSH Service for Remote Access to the Router or Switch on page 253](#)
- [Configuring Outbound SSH Service on page 258](#)
- [Configuring NETCONF-Over-SSH Connections on a Specified TCP Port on page 263](#)

Configuring Management Access

To define the management access settings for the routing platform:

1. Next to Allow Telnet Access, select the check box to allow remote Telnet access to the routing platform.
2. Next to Allow SSH Access, selected the check box to allow remote SSH access to the routing platform.
3. Click **Apply** to apply the configuration.

**Related
Documentation**

- [Configuring Junos OS User Accounts on page 67](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)

Configuring Telnet Service for Remote Access to a Router or Switch

To configure the router or switch to accept Telnet as an access service, include the **telnet** statement at the **[edit system services]** hierarchy level:

```
[edit system services]
telnet {
  connection-limit limit;
  rate-limit limit;
}
```

By default, the router or switch supports a limited number of simultaneous Telnet sessions and connection attempts per minute.

Optionally, you can include either or both of the following statements to change the defaults:

- **connection-limit *limit***—Maximum number of simultaneous connections per protocol (IPv4 and IPv6). The range is from 1 through 250. The default is 75. When you configure a connection limit, the limit is applicable to the number of telnet sessions per protocol (IPv4 and IPv6). For example, a connection limit of 10 allows 10 IPv6 telnet sessions and 10 IPv4 telnet sessions.
- **rate-limit *limit***—Maximum number of connection attempts accepted per minute (from 1 through 250). The default is 150. When you configure a rate limit, the limit is applicable to the number of connection attempts per protocol (IPv4 and IPv6). For example, a rate limit of 10 allows 10 IPv6 telnet session connection attempts per minute and 10 IPv4 telnet session connection attempts per minute.

You cannot include the **telnet** statement on devices that run the Junos-FIPS software. We recommend that you do not use Telnet in a Common Criteria environment.

Related Documentation • [telnet on page 1816](#)

Configuring FTP Service for Remote Access to the Router or Switch

To configure the router or switch to accept FTP as an access service, include the **ftp** statement at the **[edit system services]** hierarchy level:

```
[edit system services]
ftp {
  connection-limit limit;
  rate-limit limit;
}
```

By default, the router or switch supports a limited number of simultaneous FTP sessions and connection attempts per minute. You can include either or both of the following statements to change the defaults:

- **connection-limit *limit***—Maximum number of simultaneous connections per protocol (IPv4 and IPv6). The range is a value from 1 through 250. The default is 75. When you configure a connection limit, the limit is applicable to the number of sessions per protocol (IPv4 and IPv6). For example, a connection limit of 10 allows 10 IPv6 FTP sessions and 10 IPv4 FTP sessions.

- **rate-limit *limit***—Maximum number of connection attempts accepted per minute (a value from 1 through 250). The default is 150. When you configure a rate limit, the limit is applicable to the number of connection attempts per protocol (IPv4 and IPv6). For example, a rate limit of 10 allows 10 IPv6 FTP session connection attempts and 10 IPv4 FTP session connection attempts.

You can use passive FTP to access devices that accept only passive FTP services. All commands and statements that use FTP also accept passive FTP. Include the **ftp** statement at the **[edit system services]** hierarchy level to use either active FTP or passive FTP.

To start a passive FTP session, use **pasvftp** (instead of **ftp**) in the standard FTP format (**ftp://destination**). For example:

```
request system software add pasvftp://name.com/jinstall.tgz
```

You cannot include the **ftp** statement on routers or switches that run the Junos-FIPS software. We recommend that you do not use the finger service in a Common Criteria environment.

Configuring Finger Service for Remote Access to the Router

To configure the router to accept finger as an access service, include the **finger** statement at the **[edit system services]** hierarchy level:

```
[edit system services]
finger {
  connection-limit limit;
  rate-limit limit;
}
```

By default, the router supports a limited number of simultaneous finger sessions and connection attempts per minute. Optionally, you can include either or both of the following statements to change the defaults:

- **connection-limit *limit***—Maximum number of simultaneous connections per protocol (IPv4 and IPv6). The range is a value from 1 through 250. The default is 75. When you configure a connection limit, the limit is applicable to the number of sessions per protocol (IPv4 and IPv6). For example, a connection limit of 10 allows 10 IPv6 clear-text service sessions and 10 IPv4 clear-text service sessions
- **rate-limit *limit***—Maximum number of connection attempts accepted per minute (a value from 1 through 250). The default is 150. When you configure a rate limit, the limit is applicable to the number of connection attempts per protocol (IPv4 and IPv6). For example, a rate limit of 10 allows 10 IPv6 session connection attempts per minute and 10 IPv4 session connection attempts per minute.

You cannot include the **finger** statement on routers that run the Junos-FIPS software. We recommend that you do not use the finger service in a Common Criteria environment.

Configuring SSH Host Keys for Secure Copying of Data

Secure Shell (SSH) uses encryption algorithms to generate a host, server, and session key system that ensures secure data transfer. You can configure SSH host keys to support secure copy (SCP) as an alternative to FTP for the background transfer of data such as configuration archives and event logs. To configure SSH support for SCP, you must complete the following tasks:

- Specify SSH known hosts by including hostnames and host key information in the Routing Engine configuration hierarchy.
- Set an SCP URL to specify the host from which to receive data. Setting this attribute automatically retrieves SSH host key information from the SCP server.
- Verify that the host key is authentic.
- Accept the secure connection. Accepting this connection automatically stores host key information in the local host key database. Storing host key information in the configuration hierarchy automates the secure handshake and allows background data transfer using SCP.

Tasks to configure SSH host keys for secure copying of data are:

1. [Configuring SSH Known Hosts on page 251](#)
2. [Configuring Support for SCP File Transfer on page 252](#)
3. [Updating SSH Host Key Information on page 252](#)

Configuring SSH Known Hosts

To configure SSH known hosts, include the **host** statement, and specify hostname and host key options for trusted servers at the **[edit security ssh-known-hosts]** hierarchy level:

```
[edit security ssh-known-hosts]
host corporate-archive-server, ip-address {
  dsa-key key;
}
host archive-server-url {
  rsa-key key;
}
host server-with-ssh-version-1, ip-address {
  rsa1-key key;
}
```

Host keys are one of the following:

- **dsa-key key**—Base64 encoded Digital Signature Algorithm (DSA) key for SSH version 2.
- **ecdsa-sha2-nistp256-key key**—Base64 encoded ECDSA-SHA2-NIST256 key.
- **ecdsa-sha2-nistp384-key key**—Base64 encoded ECDSA-SHA2-NIST384 key.
- **ecdsa-sha2-nistp521-key key**—Base64 encoded ECDSA-SHA2-NIST521 key.

- **ed25519-key key**—Base64 encoded ED25519 key.
- **rsa-key key**—Base64 encoded public key algorithm that supports encryption and digital signatures for SSH version 1 and SSH version 2.
- **rsa1-key key**—Base64 encoded RSA public key algorithm, which supports encryption and digital signatures for SSH version 1.

Starting in Junos OS Release 18.3R1, the **ssh-dss** and **ssh-dsa** hostkey algorithms are deprecated—rather than immediately removed—to provide backward compatibility and a chance to bring your configuration into compliance with the new configuration.

Configuring Support for SCP File Transfer

To configure a known host to support background SCP file transfers, include the **archive-sites** statement at the **[edit system archival configuration]** hierarchy level.

```
[edit system archival configuration]
archive-sites {
  scp://username<:password>@host<:port>/url-path;
}
```



NOTE: When specifying a URL in a Junos OS statement using an IPv6 host address, you must enclose the entire URL in quotation marks (") and enclose the IPv6 host address in brackets ([]). For example, "scp://username<:password>@[host]<:port>/url-path";

Setting the **archive-sites** statement to point to an SCP URL triggers automatic host key retrieval. At this point, Junos OS connects to the SCP host to fetch the SSH public key, displays the host key message digest or fingerprint as output to the console, and terminates the connection to the server.

```
user@host# set system archival configuration archive-sites "<scp-url-path>"
The authenticity of host <my-archive-server (<server-ip-address>)> can't be established.
RSA key fingerprint is <ascii-text key>. Are you sure you want to continue connecting
(yes/no)?
```

To verify that the host key is authentic, compare this fingerprint with a fingerprint that you obtain from the same host using a trusted source. If the fingerprints are identical, accept the host key by entering **yes** at the prompt. The host key information is then stored in the Routing Engine configuration and supports background data transfers using SCP.

Updating SSH Host Key Information

Typically, SSH host key information is automatically retrieved when you set a URL attribute for SCP using the **archival configuration archive-sites** statement at the **[edit system]** hierarchy level. However, if you need to manually update the host key database, use one of the following methods.

1. [Retrieving Host Key Information Manually on page 253](#)
2. [Importing Host Key Information from a File on page 253](#)

Retrieving Host Key Information Manually

To manually retrieve SSH public host key information, use the **fetch-from-server** option with the **set security ssh-known-hosts** command. You must include a hostname attribute with the **set security ssh-known-hosts fetch-from-server** command to specify the host from which to retrieve the SSH public key.

```
user@host# set security ssh-known-hosts fetch-from-server <hostname>
```

Importing Host Key Information from a File

To manually import SSH host key information from the known-hosts file located at **/var/tmp/known-hosts** on the server, include the **load-key-file** option with the **set security ssh-known-hosts** command. You must include the path to the **known-hosts** file with the **set security ssh-known-hosts load-key-file** command to specify the location from which to import host key information.

```
user@host# set security ssh-known-hosts load-key-file /var/tmp/known-hosts
```

See Also • *Importing SSL Certificates for Junos XML Protocol Support*

Configuring SSH Service for Remote Access to the Router or Switch

To configure the router or switch to accept SSH as an access service, include the **ssh** statement at the **[edit system services]** hierarchy level:

```
[edit system services]
ssh {
  authentication-order [method1 method2...];
  ciphers [cipher-1 cipher-2 cipher-3 ...];
  client-alive-count-max seconds;
  client-alive-interval seconds;
  connection-limit limit;
  fingerprint-hash (md5 | sha2-256);
  hostkey-algorithm (algorithm | no-algorithm);
  key-exchange [algorithm1 algorithm2...];
  macs [algorithm1 algorithm2...];
  max-sessions-per-connection <number>;
  no-passwords;
  no-public-keys;
  no-tcp-forwarding;
  protocol-version [v2];
  rate-limit limit;
  root-login (allow | deny | deny-password);
}
}
```

By default, the router or switch supports a limited number of simultaneous SSH sessions and connection attempts per minute. Use the following statements to change the defaults:

- **connection-limit *limit***—Maximum number of simultaneous connections per protocol (IPv4 and IPv6). The range is a value from 1 through 250. The default is 75. When you configure a connection limit, the limit is applicable to the number of SSH sessions per protocol (IPv4 and IPv6). For example, a connection limit of 10 allows 10 IPv6 SSH sessions and 10 IPv4 SSH sessions.
- **max-sessions-per-connection *number***—Include this statement to specify the maximum number of SSH sessions allowed per single SSH connection. This allows you to limit the number of cloned sessions tunneled within a single SSH connection. The default value is 10.
- **rate-limit *limit***—Maximum number of connection attempts accepted per minute (a value from 1 through 250). The default is 150. When you configure a rate limit, the limit is applicable to the number of connection attempts per protocol (IPv4 and IPv6). For example, a rate limit of 10 allows 10 IPv6 SSH session connection attempts per minute and 10 IPv4 SSH session connection attempts per minute.

By default, a user can create an SSH tunnel over a CLI session to a router running Junos OS via SSH. This type of tunnel could be used to forward TCP traffic, bypassing any firewall filters or access control lists allowing access to resources beyond the router. Use the **no-tcp-forwarding** option to prevent a user from creating an SSH tunnel to a router via SSH.

For information about other configuration settings, see the following topics:

- [Configuring the Root Login Through SSH on page 254](#)
- [Configuring the SSH Protocol Version on page 255](#)
- [Configuring the Client Alive Mechanism on page 255](#)
- [Configuring the SSH Fingerprint Hash Algorithm on page 255](#)

Configuring the Root Login Through SSH

By default, users are allowed to log in to the router or switch as **root** through SSH when the authentication method does not require a password. To control user access through SSH, include the **root-login** statement at the **[edit systems services ssh]** hierarchy level:

```
[edit system services ssh]
root-login (allow | deny | deny-password);
```

allow—Allows users to log in to the router or switch as root through SSH.

deny—Disables users from logging in to the router or switch as root through SSH.

deny-password—Allows users to log in to the router or switch as root through SSH when the authentication method (for example, RSA) does not require a password.

The default is **deny-password**.

Configuring the SSH Protocol Version

By default, only version 2 of the SSH protocol is enabled.

To configure the router or switch to use version 2 of the SSH protocol, include the **protocol-version** statement and specify **v2** at the **[edit system services ssh]** hierarchy level:

```
[edit system services ssh]  
protocol-version [ v2 ];
```

Systems in FIPS mode always use SSH protocol version **v2**.

Configuring the Client Alive Mechanism

The client alive mechanism is valuable when the client or server depends on knowing when a connection has become inactive. It differs from the standard keepalive mechanism because the client alive messages are sent through the encrypted channel. The client alive mechanism is not enabled at default. To enable it, configure the **client-alive-count-max** and **client-alive-interval** statements. This option applies to SSH protocol version 2 only.

In the following example, unresponsive SSH clients will be disconnected after approximately 100 seconds (20 x 5).

```
[edit system services ssh]  
client-alive-count-max 5;  
client-alive-interval 20;
```

See Also • [ssh on page 1781](#)

Configuring the SSH Fingerprint Hash Algorithm

To configure the hash algorithm used by the SSH server when it displays key fingerprints, include the **fingerprint-hash** statement and specify **md5** or **sha2-256** at the **[edit system services ssh]** hierarchy level:

```
[edit system services ssh]  
fingerprint-hash (md5 | sha2-256);
```

The **md5** hash algorithm is unavailable on systems in FIPS mode.

See Also • [ssh on page 1781](#)

Configuring the SSH Service to Support Legacy Cryptography

Starting in Junos OS Release 16.1, the SSH server in Junos OS is based on OpenSSH 7 and defaults to a more secure set of ciphers and key-exchange algorithms. OpenSSH 7 omits some legacy cryptography.



NOTE: Lack of support for legacy cryptography in devices causes Junos Space device discovery to fail. To work around this issue, configure the device to support the 3des-cbc or blowfish-cbc cipher, or both, and the dh-group1-sha1 key-exchange method. This issue does not affect devices running Junos OS with upgraded FreeBSD.



NOTE: See the OpenSSH 7 documentation at <https://www.openssh.com/> for more information about these extensions.

Junos OS Release 16.1 supports the following set of ciphers by default:

- chacha20-poly1305@openssh.com
- aes128-ctr
- aes192-ctr
- aes256-ctr
- aes128-gcm@openssh.com
- aes256-gcm@openssh.com

In Junos OS Release 16.1, the following ciphers are not supported by default, but you can configure your device to support them. They are listed from the most secure to the least secure:

- aes256-cbc
- aes192-cbc
- aes128-cbc
- 3des-cbc
- blowfish-cbc
- cast128-cbc
- arcfour256
- arcfour128
- arcfour

Junos OS Release 16.1 supports the following set of key-exchange methods by default:

- `curve25519-sha256`
- `ecdh-sha2-nistp256`
- `ecdh-sha2-nistp384`
- `ecdh-sha2-nistp521`
- `group-exchange-sha2`
- `dh-group14-sha1`

In Junos OS Release 16.1, the following key-exchange methods are not supported by default, but you can configure your device to support them:

- `group-exchange-sha1`
- `dh-group1-sha1`

To configure the SSH service to support legacy cryptography:



NOTE: By configuring an ordered set of ciphers, key-exchange methods, or message authentication codes (MACs), the newly defined set is applied to both server and client commands. Changes to the defaults affect the file copy command when you use Secure Copy Protocol (SCP).

1. Add support for ciphers by using the **set system services ssh ciphers [cipher 1 cipher 2 ...]** command. We recommend that you add the ciphers to the end of the configuration list so that they are among the last options used. In the following example, the **3des-cbc** and **blowfish-cbc** ciphers are added to the default set:

```
[edit system services ssh]
user@device# set ciphers [ chacha20-poly1305@openssh.com aes128-ctr aes192-ctr
aes256-ctr aes128-gcm@openssh.com aes256-gcm@openssh.com 3des-cbc
blowfish-cbc ]
```

2. Add support for key-exchange methods by using the **set system services ssh key-exchange [method 1 method 2 ...]** command. We recommend that you add the key-exchange methods to the end of the configuration list so that they are among the last options used. In the following example, the **dh-group1-sha1** key-exchange method is added to the default set:

```
[edit system services ssh]
user@device# set key-exchange [ curve25519-sha256 ecdh-sha2-nistp256
ecdh-sha2-nistp384 ecdh-sha2-nistp521 group-exchange-sha2 dh-group14-sha1
dh-group1-sha1 ]
```

3. Commit the configuration:

```
[edit]  
user@device# commit
```

- Related Documentation
- [ciphers on page 1224](#)
 - [key-exchange on page 1482](#)
 - [macs on page 1511](#)

Configuring Outbound SSH Service

You can configure a device running the Junos OS to initiate a TCP/IP connection with a client management application that would be blocked if the client attempted to initiate the connection (for example, if the device is behind a firewall). The **outbound-ssh** command instructs the device to create a TCP/IP connection with the client management application and to forward the identity of the device. Once the connection is established, the management application acts as the client and initiates the SSH sequence, and the device acts as the server and authenticates the client.



NOTE: There is no initiation command with outbound SSH. Once outbound SSH is configured and committed, the device begins to initiate an outbound SSH connection based on the committed configuration. The device repeatedly attempts to create this connection until successful. If the connection between the device and the client management application is dropped, the device again attempts to create a new outbound SSH connection until successful. This connection is maintained until the outbound SSH stanza is removed from the configuration.

To configure the device for outbound SSH connections, include the **outbound-ssh** statement at the **[edit system services]** hierarchy level:

```
[edit system services outbound-ssh]
```

The following topics describe the tasks for configuring the outbound SSH service:

- [Configuring the Device Identifier for Outbound SSH Connections on page 259](#)
- [Sending the Public SSH Host Key to the Outbound SSH Client on page 259](#)
- [Configuring Keepalive Messages for Outbound SSH Connections on page 260](#)
- [Configuring a New Outbound SSH Connection on page 260](#)
- [Configuring the Outbound SSH Client to Accept NETCONF as an Available Service on page 261](#)
- [Configuring Outbound SSH Clients on page 261](#)

Configuring the Device Identifier for Outbound SSH Connections

Each time the device establishes an outbound SSH connection, it first sends an initiation sequence to the management client. This sequence identifies the device to the management client. Within this transmission is the value of **device-id**.

To configure the device identifier of the device, include the **device-id** statement at the **[edit system services outbound-ssh client *client-id*]** hierarchy level:

```
[edit system services outbound-ssh client client-id]  
device-id device-id;
```

The initiation sequence when **secret** is not configured:

```
MSG-ID: DEVICE-CONN-INFO\r\n  
MSG-VER: V1\r\n  
DEVICE-ID: <device-id>\r\n
```

Sending the Public SSH Host Key to the Outbound SSH Client

Each time the router or switch establishes an outbound SSH connection, it first sends an initiation sequence to the management client. This sequence identifies the router or switch to the management client. Within this transmission is the value of **device-id**.

To configure the device identifier of the router or switch, include the **device-id** statement at the **[edit system services outbound-ssh client *client-id*]** hierarchy level:

```
[edit system services outbound-ssh client client-id]  
device-id device-id;
```

The initiation sequence when **secret** is not configured:

```
MSG-ID: DEVICE-CONN-INFO\r\n  
MSG-VER: V1\r\n  
DEVICE-ID: <device-id>\r\n
```

During the initialization of an SSH connection, the client authenticates the identity of the device using the public SSH host key of the device. Therefore, before the client can initiate the SSH sequence, it needs the public SSH key of the device. When you configure the **secret** statement, the device passes its public SSH key as part of the outbound SSH connection initiation sequence.

When the **secret** statement is set and the device establishes an outbound SSH connection, the device communicates its device ID, its public SSH key, and an SHA1 hash derived in part from the **secret** statement. The value of the **secret** statement is shared between the device and the management client. The client uses the shared secret to authenticate the public SSH host key it is receiving to determine whether the public key is from the device identified by the **device-id** statement.

Using the **secret** statement to transport the public SSH host key is optional. You can manually transport and install the public key onto the client system.



NOTE: Including the **secret** statement means that the device sends its public SSH host key every time it establishes a connection to the client. It is then up to the client to decide what to do with the SSH host key if it already has one for that device. We recommend that you replace the client's copy with the new key. Host keys can change for various reasons and by replacing the key each time a connection is established, you ensure that the client has the latest key.

To send the router's or switch's public SSH host key when the device connects to the client, include the **secret** statement at the **[edit system services outbound-ssh client *client-id*]** hierarchy level:

```
[edit system services outbound-ssh client client-id]
secret password;
```

The following message is sent by the device when the **secret** attribute is configured:

```
MSG-ID: DEVICE-CONN-INFO\r\n
MSG-VER: V1\r\n
DEVICE-ID: <device-id>\r\n
HOST-KEY: <public-hot-key>\r\n
HMAC:<HMAC(pub-SSH-host-key, <secret>>)>\r\n
```

Configuring Keepalive Messages for Outbound SSH Connections

Once the client application has the router's or switch's public SSH host key, it can then initiate the SSH sequence as if it had created the TCP/IP connection and can authenticate the device using its copy of the router's or switch's public host SSH key as part of that sequence. The device authenticates the client user through the mechanisms supported in the Junos OS (RSA/DSA public string or password authentication).

To enable the device to send SSH protocol keepalive messages to the client application, configure the **keep-alive** statement at the **[edit system services outbound-ssh client *client-id*]** hierarchy level:

```
[edit system services outbound-ssh client client-id]
keep-alive {
  retry number;
  timeout seconds;
}
```

Configuring a New Outbound SSH Connection

When disconnected, the device begins to initiate a new outbound SSH connection. To specify how the device reconnects to the server after a connection is dropped, include the **reconnect-strategy** statement at the **[edit system services outbound-ssh client *client-id*]** hierarchy level:

```
[edit system services outbound-ssh client-id]
```



```
reconnect-strategy (sticky | in-order);
```

You can also specify the number of retry attempts and set the amount of time before the reconnection attempts stop. See “[Configuring Keepalive Messages for Outbound SSH Connections](#)” on page 260.

Configuring the Outbound SSH Client to Accept NETCONF as an Available Service

To configure the application to accept NETCONF as an available service, include the **services netconf** statement at the **[edit system services outbound-ssh client *client-id*]** hierarchy level:

```
[edit system services outbound-ssh client client-id]
services {
  netconf;
}
```

Configuring Outbound SSH Clients

To configure the clients available for this outbound SSH connection, list each client with a separate address statement at the **[edit system services outbound-ssh client *client-id*]** hierarchy level:

```
[edit system services outbound-ssh client client-id]
address address {
  retry number;
  timeout seconds;
  port port-number;
}
```



NOTE: Outbound SSH connections support IPv4 and IPv6 address formats.

Configuring DTCP-over-SSH Service for the Flow-Tap Application

The active monitoring flow-tap application uses Dynamic Tasking Control Protocol (DTCP) when you configure the flow-tap DTCP-over-SSH service. Flow-tap enables you to intercept IPv4 packets transiting an active monitoring router and send a copy of matching packets to one or more content destinations, for use in flexible trend analysis of security threats and in lawful intercept of data.



NOTE: The flow-tap feature is not supported on outbound, or egress, traffic. Only inbound, or ingress, traffic is supported.

To enable the flow-tap DTCP-over-SSH service, include the following statements at the **[edit system services]** hierarchy level:

```
flow-tap-dtcp {
```

```
ssh {
  connection-limit limit;
  rate-limit limit;
}
```

By default, the router supports a limited number of simultaneous flow-tap DTCP-over-SSH sessions and connection attempts per minute. Optionally, you can include either or both of the following statements to change the defaults:

- **connection-limit *limit***—Maximum number of simultaneous connections per protocol (IPv4 and IPv6). The range is a value from 1 through 250. The default is 75. When you configure a connection limit, the limit is applicable to the number of sessions per protocol (IPv4 and IPv6). For example, a connection limit of 10 allows 10 IPv6 cleartext service sessions and 10 IPv4 cleartext service sessions.
- **rate-limit *limit***—Maximum number of connection attempts accepted per minute per protocol (IPv4 and IPv6). The range is a value from 1 through 250. The default is 150. When you configure a rate limit, the limit is applicable to the number of connection attempts per protocol (IPv4 and IPv6). For example, a rate limit of 10 allows 10 IPv6 session connection attempts per minute and 10 IPv4 session connection attempts per minute.

You must also define user permissions that enable flow-tap users to configure flow-tap services. Specify a login class and access privileges for flow-tap users at the **[edit system login class *class-name* permissions]** hierarchy level:

```
[edit system login class class-name permissions]
(flow-tap | flow-tap-control | flow-tap-operation);
```

The permission bit for a flow-tap login class can be one of the following:

- **flow-tap**—Can view the flow-tap configuration in configuration mode.
- **flow-tap-control**—Can view the flow-tap configuration in configuration mode and configure flow-tap configuration information at the **[edit services flow-tap]** hierarchy level.
- **flow-tap-operation**—Can make flow-tap requests to the router from a remote location using a DTCP client.



NOTE: Only users with a configured access privilege of **flow-tap-operation** can initiate flow-tap requests.

You can also specify user permissions through the Juniper-User-Permissions RADIUS attribute.

To enable the flow-tap DTCP-over-SSH service for service interfaces, you must also include statements at the **[edit interfaces]** hierarchy level to specify an Adaptive Services PIC that runs the flow-tap service and conveys flow-tap filters from the mediation device

to the router. In addition, you must include the **flow-tap** statement at the **[edit services]** hierarchy level.

FlowTapLite is the flow-tap service configured on tunnel interfaces on MX Series routers. The flow-tap service **[edit services flow-tap]** and the RADIUS flow-tap service **[edit services radius-flow-tap]** cannot run simultaneously on the router. Consequently, you cannot run both FlowTapLite and subscriber secure policy mirroring at the same time on the same router. However, starting in Junos OS Release 17.3R1, flow tap and subscriber secure policy mirroring are supported to run concurrently on the same router.

Release History Table

Release	Description
17.3R1	However, starting in Junos OS Release 17.3R1, flow tap and subscriber secure policy mirroring are supported to run concurrently on the same router.

Configuring NETCONF-Over-SSH Connections on a Specified TCP Port

The Junos OS enables you to restrict incoming NETCONF connections to a specified TCP port without configuring a firewall. To configure the TCP port used for NETCONF-over-SSH connections, include the **port** statement at the **[edit system services netconf ssh]** hierarchy level. The configured port accepts only NETCONF-over-SSH sessions. Regular SSH session requests for this port are rejected.

You can either configure the default port 830 for NETCONF connections over SSH, as specified in RFC 4742, *Using the NETCONF Configuration Protocol over Secure Shell (SSH)*, or configure any port from 1 through 65535.



NOTE:

- The default SSH port (22) continues to accept NETCONF sessions even with a configured NETCONF server port. To disable the SSH port from accepting NETCONF sessions, specify this in the login event script.
- We do not recommend configuring the default ports for FTP (21) and Telnet (23) services for configuring NETCONF-over-SSH connections.

Related Documentation

- [port \(NETCONF\) on page 1622](#)

Configuring clear-text or SSL Service for Junos XML Protocol Client Applications

A Junos XML protocol client application can use one of four protocols to connect to the Junos XML protocol server on a router: clear-text (a Junos XML protocol-specific protocol for sending unencrypted text over a TCP connection), SSH, SSL, or Telnet. For clients to

use the clear-text or SSL protocol, you must include Junos XML protocol-specific statements in the router configuration.

For more information, see the following topics:

1. [Configuring clear-text Service for Junos XML Protocol Client Applications on page 264](#)
2. [Configuring SSL Service for Junos XML Protocol Client Applications on page 264](#)

Configuring clear-text Service for Junos XML Protocol Client Applications

To configure the router to accept clear-text connections from Junos XML protocol client applications on port 3221, include the **xnm-clear-text** statement at the **[edit system services]** hierarchy level:

```
[edit system services]
xnm-clear-text {
  connection-limit limit;
  rate-limit limit;
}
```

By default, the Junos XML protocol server supports a limited number of simultaneous clear-text sessions and connection attempts per minute. Optionally, you can include either or both of the following statements to change the defaults:

- **connection-limit *limit***—Maximum number of simultaneous connections per protocol (IPv4 and IPv6) (a value from 1 through 250). The default is 75. When you configure a connection limit, the limit is applicable to the number of sessions per protocol (IPv4 and IPv6). For example, a connection limit of 10 allows 10 IPv6 clear-text service sessions and 10 IPv4 clear-text service sessions.
- **rate-limit *limit***—Maximum number of connection attempts accepted per minute per protocol (IPv4 and IPv6). The range is a value from 1 through 250. The default is 150. When you configure a rate limit, the limit is applicable to the number of connection attempts per protocol (IPv4 and IPv6). For example, a rate limit of 10 allows 10 IPv6 session connection attempts per minute and 10 IPv4 session connection attempts per minute.

You cannot include the **xnm-clear-text** statement on routers that run the Junos-FIPS software. We recommend that you do not use the clear-text protocol in a Common Criteria environment.

Configuring SSL Service for Junos XML Protocol Client Applications

To configure the router to accept SSL connections from Junos XML protocol client applications on port 3220, include the **xnm-ssl** statement at the **[edit system services]** hierarchy level:

```
[edit system services]
xnm-ssl {
  local-certificate name;
  connection-limit limit;
  rate-limit limit;
```

```
}
```

local-certificate is the name of the X.509 authentication certificate used to establish an SSL connection. You must obtain the certificate and copy it to the router before referencing it.

By default, the Junos XML protocol server supports a limited number of simultaneous SSL sessions and connection attempts per minute. Optionally, you can include either or both of the following statements to change the defaults:

- **connection-limit *limit***—Maximum number of simultaneous connections per protocol (IPv4 and IPv6). The range is a value from 1 through 250. The default is 75. When you configure a connection limit, the limit is applicable to the number of sessions per protocol (IPv4 and IPv6). For example, a connection limit of 10 allows 10 IPv6 SSL sessions and 10 IPv4 SSL sessions.
- **rate-limit *limit***—Maximum number of connection attempts accepted per protocol per minute. The range is a value from 1 through 250. The default is 150. When you configure a rate limit, the limit is applicable to the number of connection attempts per protocol (IPv4 and IPv6). For example, a rate limit of 10 allows 10 IPv6 SSL session connection attempts per minute and 10 IPv4 SSL session connection attempts per minute.

Configuring the Junos OS to Work with SRC Software

You can enable Junos OS to work with the Session and Resource Control (SRC) software. The SRC software supports dynamic service activation engine (SAE) functionality on routers and switches running under Junos OS. To do this, include the following statements at the **[edit system services service-deployment]** hierarchy level:

```
[edit system services service-deployment]
servers server-address {
  port port-number;
}
source-address source-address;
```

server-address is the IPv4 address of the SRC server.

By default, *port-number* is set to 3333 and is a TCP port number.

source-address is optional and is the local IP version 4 (IPv4) address to be used as the source address for traffic to the SRC server.



NOTE: By default, when a connection between SRC and a Juniper Networks router or switch is established, the SRC process (sdxd) starts a Junos XML protocol session as user *root*. You have the option of configuring user *sdx* with a different classification at the **[edit system login]** hierarchy level.

For more information about SRC software, see the SRC documentation set.

Related Documentation

- [Configuring Finger Service for Remote Access to the Router on page 250](#)
- [Configuring FTP Service for Remote Access to the Router or Switch on page 249](#)
- [Configuring SSH Service for Remote Access to the Router or Switch on page 253](#)
- [Configuring Outbound SSH Service on page 258](#)
- [Configuring NETCONF-Over-SSH Connections on a Specified TCP Port on page 263](#)
- [Configuring Telnet Service for Remote Access to a Router or Switch on page 248](#)
- [Configuring clear-text or SSL Service for Junos XML Protocol Client Applications on page 263](#)

Configuring Password Retry Limits for Telnet and SSH Access

To prevent brute force and dictionary attacks, the device performs the following actions for Telnet or SSH sessions by default:

- Disconnects a session after a maximum of 10 consecutive password retries.
- After the second password retry, introduces a delay in multiples of 5 seconds between subsequent password retries.

For example, the device introduces a delay of 5 seconds between the third and fourth password retry, a delay of 10 seconds between the fourth and fifth password retry, and so on.

- Enforces a minimum session time of 20 seconds during which a session cannot be disconnected. Configuring the minimum session time prevents malicious users from disconnecting sessions before the password retry delay goes into effect, and attempting brute force and dictionary attacks with multiple logins.

You can configure the password retry limits for Telnet and SSH access. In this example, you configure the device to take the following actions for Telnet and SSH sessions:

- Allow a maximum of four consecutive password retries before disconnecting a session.
- Introduce a delay in multiples of 5 seconds between password retries that occur after the second password retry.
- Enforce a minimum session time of 40 seconds during which a session cannot be disconnected.

To configure password retry limits for Telnet and SSH access:

1. Set the maximum number of consecutive password retries before a Telnet or SSH or telnet session is disconnected. The default number is 10, but you can set a number from 1 through 10.

```
[edit system login retry-options]  
user@host# set tries-before-disconnect 4
```

2. Set the threshold number of password retries after which a delay is introduced between two consecutive password retries. The default number is 2, but you can specify a value from 1 through 3.

```
[edit system login retry-options]
user@host# set backoff-threshold 2
```

3. Set the delay (in seconds) between consecutive password retries after the threshold number of password retries. The default delay is in multiples of 5 seconds, but you can specify a value from 5 through 10 seconds.

```
[edit system login retry-options]
user@host# set backoff-factor 5
```

4. Set the minimum length of time (in seconds) during which a Telnet or SSH session cannot be disconnected. The default is 20 seconds, but you can specify an interval from 20 through 60 seconds.

```
[edit system login retry-options]
user@host# set minimum-time 40
```

5. If you are done configuring the device, enter **commit** from configuration mode.

Related Documentation

- [The telnet Command on page 276](#)
- [The ssh Command on page 278](#)
- [Configuring Reverse Telnet and Reverse SSH](#)

Example: Controlling Management Access on SRX Series Devices

This example shows how to control management access on SRX Series devices.

- [Requirements on page 267](#)
- [Overview on page 267](#)
- [Configuration on page 268](#)
- [Verification on page 270](#)

Requirements

No special configuration beyond device initialization is required before configuring this feature.

Overview

By default, any host on the trusted interface can manage a security device. To limit the IP addresses that can manage a device, you can configure a firewall filter to deny all, with the exception of the IP address or addresses to which you want to grant management

access. This example shows how to limit management access to a specific IP addresses to allow it to manage SRX Series devices.

Configuration

- [Configuring an IP Address List to Restrict Management Access to a Device on page 268](#)

Configuring an IP Address List to Restrict Management Access to a Device

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 policy-options prefix-list manager-ip 192.168.4.254/32
set policy-options prefix-list manager-ip 10.0.0.0/8
set firewall filter manager-ip term block_non_manager from source-address 0.0.0.0/0
set firewall filter manager-ip term block_non_manager from source-prefix-list manager-ip
except
set firewall filter manager-ip term block_non_manager from protocol tcp
set firewall filter manager-ip term block_non_manager from destination-port ssh
set firewall filter manager-ip term block_non_manager from destination-port https
set firewall filter manager-ip term block_non_manager from destination-port telnet
set firewall filter manager-ip term block_non_manager from destination-port http
set firewall filter manager-ip term block_non_manager then discard
set firewall filter manager-ip term accept_everything_else then accept
set interfaces lo0 unit 0 family inet filter input manager-ip
```

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 *CLI User Guide*.

1. Define a set of host addresses, called "manager-ip", that are allowed to manage the device.

```
[edit policy-options]
user@host# set prefix-list manager-ip 192.168.4.254/32
user@host# set prefix-list manager-ip 10.0.0.0/8
```



NOTE: The configured list is referenced in the actual filter, where you can change your defined set of addresses.

2. Configure a firewall filter to deny traffic from all IP addresses except the IP addresses defined in the "manager-ip" list. Management traffic that uses any of the listed destination ports is rejected when the traffic comes from an address in the list.

```
[edit firewall filter]
user@host# set manager-ip term block_non_manager from source-address 0.0.0.0/0
```



```

user@host# set manager-ip term block_non_manager from source-prefix-list
manager-ip except
user@host# set manager-ip term block_non_manager from protocol tcp
user@host# set manager-ip term block_non_manager from destination-port ssh
user@host# set manager-ip term block_non_manager from destination-port https
user@host# set manager-ip term block_non_manager from destination-port telnet
user@host# set manager-ip term block_non_manager from destination-port http
user@host# set manager-ip term block_non_manager then discard
user@host# set manager-ip term accept_everything_else then accept

```

3. Apply stateless firewall filters to the loopback interface to filter the packets originating from the hosts to which you are granting management access.

```

[edit interfaces lo0 unit 0 ]
user@host# set family inet filter input manager-ip

```



NOTE: This configuration applies to traffic that terminates at the device. For traffic that terminates at the device interface (such as IPsec, OSPF, RIP, or BGP), you must also include the management IP addresses in the manager-ip prefix-list.

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

```

user@host# show configuration policy-options
prefix-list manager-ip {
  10.0.0.0/8;
  192.168.4.254/32;
}

```

```

user@host# show configuration firewall
filter manager-ip {
  term block_non_manager {
    from {
      source-address {
        0.0.0.0/0;
      }
      source-prefix-list {
        manager-ip except;
      }
    }
    protocol tcp;
    destination-port [ ssh https telnet http ];
  }
  then {
    discard;
  }
}

```

```
}  
term accept_everything_else {  
  then accept;  
}  
}
```

```
user@host# show configuration interfaces  
lo0 {  
  unit 0 {  
    family inet {  
      filter {  
        input manager-ip;  
      }  
    }  
  }  
}
```

```
user@host# show configuration interfaces lo0  
unit 0 {  
  family inet {  
    filter {  
      input manager-ip;  
    }  
  }  
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

Verifying Interfaces

Purpose Verify if the interfaces are configured correctly.

Action From operational mode, enter the following commands:

- show policy-options
- show firewall
- show interfaces

Related Documentation

- [Configuration Guidelines for Securing Console Port Access on page 279](#)

Example: Configuring a Filter to Block Telnet and SSH Access

- [Requirements on page 271](#)
- [Overview on page 271](#)
- [Configuration on page 271](#)
- [Verification on page 274](#)

Requirements

You must have access to a remote host that has network connectivity with this device.

Overview

In this example, you create an IPv4 stateless firewall filter that logs and rejects Telnet or SSH access packets unless the packet is destined for or originates from the 192.168.1.0/24 subnet.

- To match packets destined for or originating from the **address 192.168.1.0/24** subnet, you use the **source-address 192.168.1.0/24** IPv4 match condition.
- To match packets destined for or originating from a TCP port, Telnet port, or SSH port, you use the **protocol tcp**, **port telnet**, and **telnet ssh** IPv4 match conditions.

Configuration

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

To configure this example, perform the following tasks:

- [Configure the Stateless Firewall Filter on page 272](#)
- [Apply the Firewall Filter to the Loopback Interface on page 272](#)
- [Confirm and Commit Your Candidate Configuration on page 273](#)

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 family inet filter local_acl term terminal_access from source-address
  192.168.1.0/24
set firewall family inet filter local_acl term terminal_access from protocol tcp
set firewall family inet filter local_acl term terminal_access from port ssh
set firewall family inet filter local_acl term terminal_access from port telnet
set firewall family inet filter local_acl term terminal_access then accept
set firewall family inet filter local_acl term terminal_access_denied from protocol tcp
set firewall family inet filter local_acl term terminal_access_denied from port ssh
set firewall family inet filter local_acl term terminal_access_denied from port telnet
set firewall family inet filter local_acl term terminal_access_denied then log
```

```
set firewall family inet filter local_acl term terminal_access_denied then reject
set firewall family inet filter local_acl term default-term then accept
set interfaces lo0 unit 0 family inet filter input local_acl
set interfaces lo0 unit 0 family inet address 127.0.0.1/32
```

Configure the Stateless Firewall Filter

Step-by-Step Procedure To configure the stateless firewall filter that selectively blocks Telnet and SSH access:

1. Create the stateless firewall filter **local_acl**.

```
[edit]
user@myhost# edit firewall family inet filter local_acl
```

2. Define the filter term **terminal_access**.

```
[edit firewall family inet filter local_acl]
user@myhost# set term terminal_access from source-address 192.168.1.0/24
user@myhost# set term terminal_access from protocol tcp
user@myhost# set term terminal_access from port ssh
user@myhost# set term terminal_access from port telnet
user@myhost# set term terminal_access then accept
```

3. Define the filter term **terminal_access_denied**.

```
[edit firewall family inet filter local_acl]
user@myhost# set term terminal_access_denied from protocol tcp
user@myhost# set term terminal_access_denied from port ssh
user@myhost# set term terminal_access_denied from port telnet
user@myhost# set term terminal_access_denied then log
user@myhost# set term terminal_access_denied then reject
user@myhost# set term default-term then accept
```

Apply the Firewall Filter to the Loopback Interface

Step-by-Step Procedure • To apply the firewall filter to the loopback interface:

```
[edit]
user@myhost# set interfaces lo0 unit 0 family inet filter input local_acl
user@myhost# set interfaces lo0 unit 0 family inet address 127.0.0.1/32
```

Confirm and Commit Your Candidate Configuration

Step-by-Step Procedure

To confirm and then commit your candidate configuration:

1. Confirm the configuration of the stateless firewall filter by entering the **show firewall** configuration mode command. If the command output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
[edit]
user@myhost# show firewall
family inet {
  filter local_acl {
    term terminal_access {
      from {
        source-address {
          192.168.1.0/24;
        }
        protocol tcp;
        port [ssh telnet];
      }
      then accept;
    }
    term terminal_access_denied {
      from {
        protocol tcp;
        port [ssh telnet];
      }
      then {
        log;
        reject;
      }
    }
    term default-term {
      then accept;
    }
  }
}
```

2. Confirm the configuration of the interface by entering the **show interfaces** configuration mode command. If the command output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
[edit]
user@myhost# show interfaces
lo0 {
  unit 0 {
    family inet {
      filter {
        input local_acl;
      }
      source-address 127.0.0.1/32;
    }
  }
}
```

```
}
```

3. If you are done configuring the device, commit your candidate configuration.

```
[edit]  
user@myhost# commit
```

Verification

Confirm that the configuration is working properly.

- [Verifying Accepted Packets on page 274](#)
- [Verifying Logged and Rejected Packets on page 275](#)

Verifying Accepted Packets

Purpose Verify that the actions of the firewall filter terms are taken.

- Action** 1. Clear the firewall log on your router or switch.

```
user@myhost> clear firewall log
```

2. From a host at an IP address *within* the 192.168.1.0/24 subnet, use the **ssh *hostname*** command to verify that you can log in to the device using only SSH. This packet should be accepted, and the packet header information for this packet should not be logged in the firewall filter log buffer in the Packet Forwarding Engine.

```
user@host-A> ssh myhost  
user@myhosts's password:  
--- JUNOS 11.1-20101102.0 built 2010-11-02 04:48:46 UTC
```

```
% cli
```

```
user@myhost>
```

3. From a host at an IP address *within* the 192.168.1.0/24 subnet, use the **telnet *hostname*** command to verify that you can log in to your router or switch using only Telnet. This packet should be accepted, and the packet header information for this packet should not be logged in the firewall filter log buffer in the Packet Forwarding Engine.

```
user@host-A> telnet myhost  
Trying 192.168.249.71...  
Connected to myhost-fxp0.example.net.  
Escape character is '^['.
```

```
host (ttyp0)
```

```
login: user
```

```
Password:
```

```
--- JUNOS 11.1-20101102.0 built 2010-11-02 04:48:46 UTC
```

```
% cli
```

```
user@myhost>
```

4. Use the **show firewall log** command to verify that the routing table on the device does not contain any entries with a source address in the 192.168.1.0/24 subnet.

```
user@myhost> show firewall log
```

Verifying Logged and Rejected Packets

Purpose Verify that the actions of the firewall filter terms are taken.

- Action** 1. Clear the firewall log on your router or switch.

```
user@myhost> clear firewall log
```

2. From a host at an IP address *outside of* the 192.168.1.0/24 subnet, use the **ssh hostname** command to verify that you cannot log in to the device using only SSH. This packet should be rejected, and the packet header information for this packet should be logged in the firewall filter log buffer in the Packet Forwarding Engine.

```
user@host-B ssh myhost
```

```
ssh: connect to host sugar port 22: Connection refused
--- JUNOS 11.1-20101102.0 built 2010-11-02 04:48:46 UTC
%
```

3. From a host at an IP address *outside of* the 192.168.1.0/24 subnet, use the **telnet hostname** command to verify that you can log in to the device using only Telnet. This packet should be rejected, and the packet header information for this packet should be logged in the firewall filter log buffer in the PFE.

```
user@host-B> telnet myhost
```

```
Trying 192.168.249.71...
telnet: connect to address 192.168.187.3: Connection refused
telnet: Unable to connect to remote host
%
```

4. Use the **show firewall log** command to verify that the routing table on the device does not contain any entries with a source address in the 192.168.1.0/24 subnet.

```
user@myhost> show firewall log
```

Time	Filter	Action	Interface	Protocol	Src Addr	Dest Addr
18:41:25	local_acl	R	fxp0.0	TCP	192.168.187.5	192.168.187.1
18:41:25	local_acl	R	fxp0.0	TCP	192.168.187.5	192.168.187.1
18:41:25	local_acl	R	fxp0.0	TCP	192.168.187.5	192.168.187.1
...						
18:43:06	local_acl	R	fxp0.0	TCP	192.168.187.5	192.168.187.1
18:43:06	local_acl	R	fxp0.0	TCP	192.168.187.5	192.168.187.1
18:43:06	local_acl	R	fxp0.0	TCP	192.168.187.5	192.168.187.1
...						

The telnet Command

You can use the CLI **telnet** command to open a Telnet session to a remote device:

```
user@host> telnet host <8bit> <bypass-routing> <inet> <interface interface-name>
<no-resolve> <port port> <routing-instance routing-instance-name> <source address>
```




NOTE: On SRX100, SRX210, SRX220, SRX240, SRX300, SRX320, SRX340, SRX345, and SRX1500 devices, the maximum number of concurrent Telnet sessions is indicated in the following table. Platform support depends on the Junos OS release in your installation.

SRX100	SRX210 SRX220	SRX240	SRX300 SRX320 SRX340	SRX345	SRX1500
3	3	5	3	5	5

To exit the Telnet session and return to the Telnet command prompt, press Ctrl-].

To exit the Telnet session and return to the CLI command prompt, enter **quit**.

Table 16 on page 277 describes the **telnet** command options.

Table 16: CLI telnet Command Options

Option	Description
8bit	Use an 8-bit data path.
bypass-routing	Bypass the routing tables and open a Telnet session only to hosts on directly attached interfaces. If the host is not on a directly attached interface, an error message is returned.
host	Open a Telnet session to the specified hostname or IP address.
inet	Force the Telnet session to an IPv4 destination.
interface <i>source-interface</i>	Open a Telnet session to a host on the specified interface. If you do not include this option, all interfaces are used.
no-resolve	Suppress the display of symbolic names.
port <i>port</i>	Specify the port number or service name on the host.
routing-instance <i>routing-instance-name</i>	Use the specified routing instance for the Telnet session.
source address	Use the specified source address for the Telnet session.

**Related
Documentation**

- [The ssh Command on page 278](#)
- [Configuring Password Retry Limits for Telnet and SSH Access on page 266](#)
- [Configuring Reverse Telnet and Reverse SSH](#)

The ssh Command

You can use the CLI **ssh** command to use the secure shell (SSH) program to open a connection to a remote device:

```
user@host> ssh host <bypass-routing> <inet> <interface interface-name>
<routing-instance routing-instance-name> <source address> <v1> <v2>
```



NOTE: On SRX100, SRX210, SRX220, SRX240, SRX300, SRX320, SRX340, SRX345, and SRX1500 devices, the maximum number of concurrent SSH sessions is indicated in the following table. Platform support depends on the Junos OS release in your installation.

SRX100	SRX210 SRX220	SRX240	SRX300 SRX320 SRX340	SRX345	SRX1500
3	3	5	3	5	5

Table 17 on page 278 describes the **ssh** command options.

Table 17: CLI ssh Command Options

Option	Description
bypass-routing	Bypass the routing tables and open an SSH connection only to hosts on directly attached interfaces. If the host is not on a directly attached interface, an error message is returned.
host	Open an SSH connection to the specified hostname or IP address.
inet	Force the SSH connection to an IPv4 destination.
interface source-interface	Open an SSH connection to a host on the specified interface. If you do not include this option, all interfaces are used.
routing-instance routing-instance-name	Use the specified routing instance for the SSH connection.
source address	Use the specified source address for the SSH connection.
v1	Force SSH to use version 1 for the connection.
v2	Force SSH to use version 2 for the connection.

Related Documentation

- [The telnet Command on page 276](#)
- [Configuring Password Retry Limits for Telnet and SSH Access on page 266](#)
- [Configuring Reverse Telnet and Reverse SSH](#)

Configuration Guidelines for Securing Console Port Access

You can use the console port on the device to connect to the device through an RJ-45 serial cable. From the console port, you can use the CLI to configure the device. By default, the console port is enabled. To secure the console port, you can configure the device to take the following actions:

- Log out of the console session when you unplug the serial cable connected to the console port.
- Disable root login connections to the console. This action prevents a non-root user from performing password recovery operation using the console.
- Disable the console port. We recommend disabling the console port to prevent unauthorized access to the device, especially when the device is used as customer premises equipment (CPE) and is forwarding sensitive traffic.



NOTE: It is not always possible to disable the console port, because console access is important during operations such as software upgrades.



WARNING: On SRX SRX300, SRX320, SRX340, and SRX345 devices, if both set system ports console insecure and set chassis routing-engine bios uninterrupt options are configured, there is no alternative recovery method available incase Junos OS fails to boot and the device might become unusable.

To secure the console port:

1. Do one of the following:

- Disable the console port. Enter

```
[edit system ports console]
user@host# set disable
```

- Disable root login connections to the console. Enter

```
[edit system ports console]
user@host# set insecure
```



NOTE: After configuring the console port as insecure, if a user tries to perform password recovery operation by booting in single-user mode, the device will prompt for the root password. This way, the user will be unable to log in to single-user mode for password recovery unless the root password is known.

- Log out the console session when the serial cable connected to the console port is unplugged. Enter

```
[edit system ports console]  
user@host# set log-out-on-disconnect
```



NOTE: The log-out-on-disconnect statement is not operational on SRX1500, SRX4100, SRX4200, and SRX4600 devices; on these devices, you must manually log out from the console with the `request system logout` command.

2. If you are done configuring the device, enter **commit** from configuration mode.

**Related
Documentation**

- [The telnet Command on page 276](#)
- [The ssh Command on page 278](#)
- [Configuring Password Retry Limits for Telnet and SSH Access on page 266](#)
- [Configuring Reverse Telnet and Reverse SSH](#)

CHAPTER 9

Configuring Authentication for Routing Protocols

- [Junos OS Authentication Methods for Routing Protocols on page 281](#)
- [Example: Configuring the Authentication Key for BGP and IS-IS Routing Protocols on page 282](#)
- [Configuring the Authentication Key Update Mechanism for BGP and LDP Routing Protocols on page 284](#)

Junos OS Authentication Methods for Routing Protocols

Some interior gateway protocols (IGPs)—Intermediate System-to-Intermediate System (IS-IS), Open Shortest Path First (OSPF), and Routing Information Protocol (RIP)—and Resource Reservation Protocol (RSVP) allow you to configure an authentication method and password. Neighboring routers use the password to verify the authenticity of packets sent by the protocol from the router or from a router interface. The following authentication methods are supported:

- Simple authentication (IS-IS, OSPF, and RIP)—Uses a simple text password. The receiving router uses an authentication key (password) to verify the packet. Because the password is included in the transmitted packet, this method of authentication is relatively insecure. We recommend that you not use this authentication method.
- MD5 and HMAC-MD5 (IS-IS, OSPF, RIP, and RSVP)—Message Digest 5 (MD5) creates an encoded checksum that is included in the transmitted packet. HMAC-MD5, which combines HMAC authentication with MD5, adds the use of an iterated cryptographic hash function. With both types of authentication, the receiving router uses an authentication key (password) to verify the packet. HMAC-MD5 authentication is defined in RFC 2104, *HMAC: Keyed-Hashing for Message Authentication*.

In general, authentication passwords are text strings consisting of a maximum of 16 or 255 letters and digits. Characters can include any ASCII strings. If you include spaces in a password, enclose all characters in quotation marks (" ").

Junos-FIPS has special password requirements. FIPS passwords must be between 10 and 20 characters in length. Passwords must use at least three of the five defined character sets (uppercase letters, lowercase letters, digits, punctuation marks, and other

special characters). If Junos-FIPS is installed on the router, you cannot configure passwords unless they meet this standard.

- Related Documentation**
- [Example: Configuring the Authentication Key for BGP and IS-IS Routing Protocols on page 282](#)

Example: Configuring the Authentication Key for BGP and IS-IS Routing Protocols

The main task of a router is to use its routing and forwarding tables to forward user traffic to its intended destination. Attackers can send forged routing protocol packets to a router with the intent of changing or corrupting the contents of its routing table or other databases, which in turn can degrade the functionality of the router and the network. To prevent such attacks, routers must ensure that they form routing protocol relationships (peering or neighboring relationships) to trusted peers. One way of doing this is by authenticating routing protocol messages. We strongly recommend using authentication when configuring routing protocols. The Junos OS supports HMAC-MD5 authentication for BGP, Intermediate System-to-Intermediate System (IS-IS), Open Shortest Path First (OSPF), Routing Information Protocol (RIP), and Resource Reservation Protocol (RSVP). HMAC-MD5 uses a secret key that is combined with the data being transmitted to compute a hash. The computed hash is transmitted along with the data. The receiver uses the matching key to recompute and validate the message hash. If an attacker has forged or modified the message, the hash will not match and the data will be discarded.

In the following examples, we configure BGP as the exterior gateway protocol (EGP) and IS-IS as the interior gateway protocol (IGP). If you use OSPF, configure it similarly to the IS-IS configuration shown.

Configuring BGP

The following example shows the configuration of a single authentication key for the BGP peer group internal peers. You can also configure BGP authentication at the neighbor or routing instance levels, or for all BGP sessions. As with any security configuration, there is a trade-off between the degree of granularity (and to some extent the degree of security) and the amount of management necessary to maintain the system. This example also configures a number of tracing options for routing protocol events and errors, which can be good indicators of attacks against routing protocols. These events include protocol authentication failures, which might point to an attacker that is sending spoofed or otherwise malformed routing packets to the router in an attempt to elicit a particular behavior.

```
[edit]
protocols {
  bgp {
    group ibgp {
      type internal;
      traceoptions {
        file bgp-trace size 1m files 10;
        flag state;
        flag general;
```

```

    }
    local-address 10.10.5.1;
    log-updown;
    neighbor 10.2.1.1;
    authentication-key "$9$aH1j8gqQ1gJyJghgJgIiiii";
  }
  group ebgp {
    type external;
    traceoptions {
      file ebgp-trace size 10m files 10;
      flag state;
      flag general;
    }
    local-address 10.10.5.1;
    log-updown;
    peer-as 2;
    neighbor 10.2.1.2;
    authentication-key "$9$aH1j8gqQ1gJyJghgJgIiiii";
  }
}
}

```

Configuring IS-IS

Although all IGP supported by the Junos OS support authentication, some are inherently more secure than others. Most service providers use OSPF or IS-IS to allow fast internal convergence and scalability and to use traffic engineering capabilities with Multiprotocol Label Switching (MPLS). Because IS-IS does not operate at the network layer, it is more difficult to spoof than OSPF, which is encapsulated in IP and is therefore subject to remote spoofing and DoS attacks.

The following example also shows how to configure a number of tracing options for routing protocol events and errors, which can be good indicators of attacks against routing protocols. These events include protocol authentication failures, which might point to an attacker that is sending spoofed or otherwise malformed routing packets to the router in an attempt to elicit a particular behavior.

```

[edit]
protocols {
  isis {
    authentication-key "$9$aH1j8gqQ1gJyJghgJgIiiii"; # SECRET-DATA
    authentication-type md5;
    traceoptions {
      file isis-trace size 10m files 10;
      flag normal;
      flag error;
    }
    interface at-0/0/0.131 {
      lsp-interval 50;
      level 2 disable;
      level 1 {
        metric 3;
        hello-interval 5;
      }
    }
  }
}

```

```
        hold-time 60;
    }
}
interface lo0.0 {
    passive;
}
}
```

- Related Documentation**
- [Configuring the Authentication Key Update Mechanism for BGP and LDP Routing Protocols on page 284](#)

Configuring the Authentication Key Update Mechanism for BGP and LDP Routing Protocols

You can configure an authentication key update mechanism for the Border Gateway Protocol (BGP) and Label Distribution Protocol (LDP) routing protocols. This mechanism allows you to update authentication keys without interrupting associated routing and signaling protocols such as Open Shortest Path First (OSPF) and Resource Reservation Setup Protocol (RSVP).

To configure this feature, include the **authentication-key-chains** statement at the **[edit security]** level, and include the **authentication-algorithm *algorithm*** and **authentication-key-chain** statements for the BGP or LDP routing protocols at the **[edit protocols]** level .

The following topics provide more details about configuring authentication key updates for BGP and LDP Routing Protocols:

- [Configuring Authentication Key Updates on page 284](#)
- [Configuring BGP and LDP for Authentication Key Updates on page 285](#)

Configuring Authentication Key Updates

To configure the authentication key update mechanism, include the **key-chain** statement at the **[edit security authentication-key-chains]** hierarchy level, and specify the **key** option to create a keychain consisting of several authentication keys.

```
[edit security authentication-key-chains]
key-chain key-chain-name {
    key key {
        secret secret-data;
        start-time yyyy-mm-dd.hh:mm:ss;
    }
}
```

key-chain—Assigns a name to the keychain mechanism. This name is also configured at the **[edit protocols bgp]** or the **[edit protocols ldp]** hierarchy levels to associate unique **authentication key-chain** attributes as specified using the following options:

- **key**—Each key within a keychain is identified by a unique integer value. The range is from 0 through 63.
- **secret**—Each key must specify a secret in encrypted text or plain text format. Even if you enter the secret data in plain-text format, the secret always appears in encrypted format.
- **start-time**—Start times for authentication key updates are specified in UTC (Coordinated Universal Time), and must be unique within the keychain.

Configuring BGP and LDP for Authentication Key Updates

To configure the authentication key update mechanism for the BGP and LDP routing protocols, include the **authentication-key-chain** statement at the **[edit protocols (bgp | ldp)]** hierarchy level to associate each routing protocol with the **[edit security authentication-key-chains]** authentication keys. You must also configure the **authentication-algorithm *algorithm*** statement at the **[edit protocols (bgp | ldp)]** hierarchy level.

```
[edit protocols (bgp | ldp)]
group group-name {
  neighbor address {
    authentication-algorithm algorithm;
    authentication-key-chain key-chain-name;
  }
}
```



NOTE: When configuring the authentication key update mechanism for BGP, you cannot commit the 0.0.0.0/allow statement with authentication keys or key chains. The CLI issues a warning and fails to commit such configurations.

For information about the BGP protocol, see the *Junos OS Routing Protocols Library*.

Related Documentation

- [Example: Configuring the Authentication Key for BGP and IS-IS Routing Protocols on page 282](#)
- [Example: Configuring Router Authentication for BGP](#)
- [authentication-algorithm](#)
- [authentication-key-chain](#) (Protocols BGP and BMP)
- [authentication-key-chain](#) (Protocol LDP)

Preventing Unauthorized Access to EX Series Switches Using Unattended Mode for U-Boot

- [Understanding Unattended Mode for U-Boot on EX Series Switches on page 287](#)
- [Using Unattended Mode for U-Boot to Prevent Unauthorized Access on page 288](#)

Understanding Unattended Mode for U-Boot on EX Series Switches

Unattended mode for U-Boot can be configured to prevent unauthorized access to the switch that can occur during the boot process. After the CPU has been reset, there are several known methods of accessing the system before the JUNOS OS login prompt appears that do not require the user to enter authorization credentials. By gaining unauthorized access, the user can view, modify, or corrupt the switch configuration, or make the switch unavailable on the network.

When unattended mode is configured, the user can access the CLI during the boot process only by pressing <Ctrl+c> and entering the correct password, which is known as the boot-loader password. The boot-loader password must have been previously configured on the switch. Entering the correct boot-loader password will place the user in the U-Boot CLI. If the password is incorrect, or if no password is entered within one minute, access to the U-Boot CLI is blocked and the boot process continues automatically.

Access to the bootstrap loader command prompt (**loader>**) is blocked in unattended mode, which prevents the use of the following recovery mechanisms: root password recovery by using single-user mode, and booting the switch by using a software package stored on a USB flash drive.



NOTE: If the root password is lost while the switch is in unattended mode, the switch must be reset to the factory default configuration using the LCD panel. For more information see *Reverting to the Default Factory Configuration for the EX Series Switch*.

If unattended mode is not configured, but a boot-loader password has been configured, the user must enter the correct password to access the U-Boot CLI. If a boot-loader

password has not been configured, the user can access the U-Boot CLI without entering a password. In either case, the user can access the bootstrap loader command prompt, which enables root password recovery by using single-user mode as well as booting from a USB flash drive.

Unattended mode is not enabled by default. When configured, unattended mode is turned on and will block unauthorized access to the switch. [Table 18 on page 288](#) summarizes the behaviors for U-Boot mode.

Table 18: Unattended Mode Behavior

Unattended Mode	Boot-loader password	Behavior
On	Set	<ul style="list-style-type: none"> Access to U-Boot CLI is allowed only after entering correct password. Access to loader command prompt is blocked. Booting from USB is blocked. Root password recovery by using single-user mode is blocked.
On	Not Set	<ul style="list-style-type: none"> Access to U-Boot CLI is blocked. Access to loader command prompt is blocked. Booting from USB is blocked. Root password recovery by using single-user mode is blocked.
Off	Set	<ul style="list-style-type: none"> Access to U-Boot CLI is allowed only after entering correct password. Access to loader command prompt is allowed. Booting from USB is allowed. Root password recovery by using single-user mode is allowed.
Off	Not Set	<ul style="list-style-type: none"> Access to U-Boot CLI is allowed. Access to loader command prompt is allowed. Booting from USB is allowed. Root password recovery by using single-user mode is allowed.

- Related Documentation**
- [Using Unattended Mode for U-Boot to Prevent Unauthorized Access on page 288](#)
 - [Troubleshooting Loss of the Root Password on page 61](#)

Using Unattended Mode for U-Boot to Prevent Unauthorized Access

Unattended mode for U-Boot can be used to prevent unauthorized access to the switch that can occur during the boot process. When unattended mode is configured, the user can access the CLI during the boot process only by entering the correct password, which is known as the boot-loader password. The boot-loader password must have been previously configured on the switch.

When unattended mode is configured, access to the bootstrap loader command prompt (**loader>**) is blocked, which prevents the use of the following recovery mechanisms: root password recovery by using single-user mode, and booting the switch by using a software package stored on a USB flash drive.



WARNING: On EX2200 switches, if both the root and unattended mode password are lost while the switch is in unattended mode, there is no alternative recovery method available. The switch must be returned to Juniper Networks. For more information, see *Returning an EX2200 Switch or Component for Repair or Replacement*.

To use unattended mode, follow the following procedures:

- [Configuring the Boot Loader Password on page 289](#)
- [Configuring Unattended Mode for U-Boot on page 290](#)
- [Accessing the U-Boot CLI on page 290](#)

Configuring the Boot Loader Password

To configure the boot loader password, you can use either a plain-text password that the system encrypts for you, or a password that has already been encrypted. If you use a plain-text password, Junos OS displays the password as an encrypted string so that users viewing the configuration cannot see it. As you enter the password in plain text, Junos OS encrypts it immediately. You do not have to configure Junos OS to encrypt the password. Plain-text passwords are hidden and marked as ## SECRET-DATA in the configuration.

To configure the boot-loader password:

1. Enter either a plain-text password or an encrypted password by using the **set system boot-loader authentication** command.

- To enter a plain-text password, use the **plain-text-password** option, and re-enter the password when prompted:

```
[edit]
root@# set system boot-loader-authentication plain-text-password
New Password: type password here
Retype new password: retype password here
```

- To enter a password that is already encrypted, use the **encrypted-password** option:

```
[edit]
root@# set system boot-loader-authentication encrypted-password password
```

2. Commit the changes.

```
[edit]
root@# commit
```

3. To view the encrypted password entries, use the configuration mode **show** command. For example:

```
[edit]
```

```
root@# show system boot-loader-authentication
encrypted-password "$ABC123"; ## SECRET-DATA
```

Configuring Unattended Mode for U-Boot

Before enabling unattended mode for U-Boot, you must download and install the jloader firmware package

`/volume/build/junos/13.2/service/13.2X51-D20.2/ship/jloader-ex-2200-13.2X51-D20.2-signed.tgz`, as described in [TSB16425](#).

Unattended mode for U-Boot is not enabled by default. Use the following procedure to configure unattended mode:

1. Configure unattended mode.

```
[edit]
root@# set system unattended-boot
```

2. Commit the changes.

```
[edit]
root@# commit
```

Accessing the U-Boot CLI

When unattended mode for U-Boot is configured and the boot-loader password has been set, you can access the U-Boot CLI during the boot process by pressing <Ctrl+c> and entering the password at the prompt:

```
Press Ctrl-C in next 1 seconds to enter u-boot prompt...
Enter password:
password correct...
=>
```

The correct password must be entered within one minute after the prompt appears. If the password is not entered within one minute, or if the password is incorrect or has not been configured, access to the U-Boot CLI will be blocked, and the boot process will continue. For more information about unattended mode behavior, see [“Understanding Unattended Mode for U-Boot on EX Series Switches” on page 287](#).

Related Documentation

- [Understanding Unattended Mode for U-Boot on EX Series Switches on page 287](#)
- [unattended-boot on page 1870](#)
- [boot-loader-authentication on page 1209](#)

CHAPTER 11

Configuring DNS on Security Devices

- [DNS Overview on page 291](#)
- [Example: Configuring the TTL Value for DNS Server Caching on page 292](#)
- [DNSSEC Overview on page 293](#)
- [Example: Configuring DNSSEC on page 293](#)
- [Example: Configuring Keys for DNSSEC on page 294](#)
- [Example: Configuring Secure Domains and Trusted Keys for DNSSEC on page 294](#)
- [DNS Proxy Overview on page 296](#)
- [Configuring the Device as a DNS Proxy on page 301](#)

DNS Overview

A Domain Name System (DNS) is a distributed hierarchical system that converts hostnames to IP addresses. The DNS is divided into sections called zones. Each zone has name servers that respond to the queries belonging to their zones.

This topic includes the following sections:

- [DNS Components on page 291](#)
- [DNS Server Caching on page 292](#)

DNS Components

DNS includes three main components:

- **DNS resolver** — Resides on the client side of the DNS. When a user sends a hostname request, the resolver sends a DNS query request to the name servers to request the hostname's IP address.
- **Name servers** — Processes the DNS query requests received from the DNS resolver and returns the IP address to the resolver.
- **Resource records** — Data elements that define the basic structure and content of the DNS.

DNS Server Caching

DNS name servers are responsible for providing the hostname IP address to users. The TTL field in the resource record defines the period for which DNS query results are cached. When the TTL value expires, the name server sends a fresh DNS query and updates the cache.

Related Documentation

- [Example: Configuring the TTL Value for DNS Server Caching on page 292](#)

Example: Configuring the TTL Value for DNS Server Caching

This example shows how to configure the TTL value for a DNS server cache to define the period for which DNS query results are cached.

- [Requirements on page 292](#)
- [Overview on page 292](#)
- [Configuration on page 292](#)
- [Verification on page 293](#)

Requirements

No special configuration beyond device initialization is required before performing this task.

Overview

The DNS name server stores DNS query responses in its cache for the TTL period specified in the TTL field of the resource record. When the TTL value expires, the name server sends a fresh DNS query and updates the cache. You can configure the TTL value from 0 to 604,800 seconds. You can also configure the TTL value for cached negative responses. Negative caching is the storing of the record that a value does not exist. In this example, you set the maximum TTL value for cached (and negative cached) responses to 86,400 seconds.

Configuration

Step-by-Step Procedure

To configure the TTL value for a DNS server cache:

1. Specify the maximum TTL value for cached responses, in seconds.

```
[edit]  
user@host# set system services dns max-cache-ttl 86400
```

2. Specify the maximum TTL value for negative cached responses, in seconds.

```
[edit]  
user@host# set system services dns max-ncache-ttl 86400
```


3. If you are done configuring the device, commit the configuration.

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

Verification

To verify the configuration is working properly, enter the **show system services** command.

Related Documentation

- [DNS Overview](#)

DNSSEC Overview

Junos OS devices support the domain name service security extensions (DNSSEC) standard. DNSSEC is an extension of DNS that provides authentication and integrity verification of data by using public-key based signatures.

In DNSSEC, all the resource records in a DNS are signed with the private key of the zone owner. The DNS resolver uses the public key of the owner to validate the signature. The zone owner generates a private key to encrypt the hash of a set of resource records. The private key is stored in RRSIG record. The corresponding public key is stored in the DNSKEY record. The resolver uses the public key to decrypt the RRSIG and compares the result with the hash of the resource record to verify that it has not been altered.

Similarly, the hash of the public DNSKEY is stored in a DS record in a parent zone. The zone owner generates a private key to encrypt the hash of the public key. The private key is stored in the RRSIG record. The resolver retrieves the DS record and its corresponding RRSIG record and public key. Using the public key, the resolver decrypts the RRSIG record and compares the result with the hash of the public DNSKEY to verify that it has not been altered. This establishes a chain of trust between the resolver and the name servers.

Related Documentation

- [DNS Overview](#)
- [Example: Configuring Keys for DNSSEC on page 294](#)
- [Example: Configuring Secure Domains and Trusted Keys for DNSSEC on page 294](#)

Example: Configuring DNSSEC

DNS-enabled devices run a DNS resolver (proxy) that listens on loopback address 127.0.0.1 or ::1. The DNS resolver performs a hostname resolution for DNSSEC. Users need to set name server IP address to 127.0.0.1 or ::1 so the DNS resolver forwards all DNS queries to DNSSEC instead of to DNS. If the name server IP address is not set, DNS will handle all queries instead of to DNSSEC.

The following example shows how to set the server IP address to 127.0.0.1:

```
[edit]
user@host# set system name-server 127.0.0.1
```

The DNSSEC feature is enabled by default. You can disable DNSSEC in the server by using the following CLI command:

```
[edit]
set system services dns dnssec disable
```

Related Documentation

- [DNSSEC Overview on page 293](#)

Example: Configuring Keys for DNSSEC

You can load a public key from a file or you can copy and paste the key file from a terminal. In both cases, you must save the keys to the configuration instead of to a file. The following example shows how to load a key from a file:

```
[edit system services dns dnssec trusted-keys]
#load-key filename
```

The following example explains how to load the key from a terminal:

```
[edit system services dns dnssec trusted-keys]
# set key "...pasted-text..."
```

If you are done loading the keys from the file or terminal, click **commit** in the CLI editor.

Related Documentation

- [DNSSEC Overview on page 293](#)
- [Example: Configuring Secure Domains and Trusted Keys for DNSSEC on page 294](#)

Example: Configuring Secure Domains and Trusted Keys for DNSSEC

This example shows how to configure secure domains and trusted keys for DNSSEC.

- [Requirements on page 294](#)
- [Overview on page 294](#)
- [Configuration on page 295](#)

Requirements

Set the name server IP address so the DNS resolver forwards all DNS queries to DNSSEC instead of DNS. See "[Example: Configuring DNSSEC](#)" on page 293 for more information.

Overview

You can configure secure domains and assign trusted keys to the domains. Both signed and unsigned responses can be validated when DNSSEC is enabled.

When you configure a domain as a secure domain and if DNSSEC is enabled, all unsigned responses to that domain are ignored and the server returns a SERVFAIL error code to the client for the unsigned responses. If the domain is not configured as a secure domain, unsigned responses will be accepted.

When the server receives a signed response, it checks if the DNSKEY in the response matches any of the trusted keys that are configured. If it finds a match, the server accepts the signed response.

You can also attach a DNS root zone as a trusted anchor to a secure domain to validate the signed responses. When the server receives a signed response, it queries the DNS root zone for a DS record. When it receives the DS record, it checks if the DNSKEY in the DS record matches the DNSKEY in the signed response. If it finds a match, the server accepts the signed response.

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 system services dns dnssec secure-domains domain1.net
set system services dns dnssec secure-domains domain2.net
set system services dns dnssec trusted-keys key domain1.net.ABC123ABCh
set system services dns dnssec dlv domain domain2.net trusted-anchor dlv.isc.org
```

Step-by-Step Procedure To configure secure domains and trusted keys for DNSSEC:

1. Configure domain1.net and domain2.net as secure domains.

```
[edit]
user@host# set system services dns dnssec secure-domains domain1.net
user@host# set system services dns dnssec secure-domains domain2.net
```

2. Configure trusted keys to domain1.net.

```
[edit]
user@host# set system services dns dnssec trusted-keys key
"domain1.net.ABC123ABCh"
```

3. Attach a root zone div.isc.org as a trusted anchor to a secure domain.

```
[edit]
user@host# set system services dns dnssec dlv domain domain2.net trusted-anchor
dlv.isc.org
```

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

```
dns {
  dnssec {
    trusted-keys {
      key domain1.net.ABC123ABCh; ## SECRET-DATA
    }
    dlv {
      domain domain2.net trusted-anchor dlv.isc.org;
    }
    secure-domains {
      domain1.net;
      domain2.net;
    }
  }
}
```

If you are done configuring the device, enter **commit** from configuration mode.

- Related Documentation**
- [DNSSEC Overview on page 293](#)
 - [Example: Configuring Keys for DNSSEC on page 294](#)

DNS Proxy Overview

A dynamic name system (DNS) proxy allows clients to use an SRX300, SRX320, SRX340, SRX345, SRX550M, or SRX1500 device as a DNS proxy server. A DNS proxy improves domain lookup performance by caching previous lookups. A typical DNS proxy processes DNS queries by issuing a new DNS resolution query to each name server that it has detected until the hostname is resolved.

- [DNS Proxy Cache on page 296](#)
- [DNS Proxy with Split DNS on page 297](#)
- [Dynamic Domain Name System Client on page 299](#)

DNS Proxy Cache

When a DNS query is resolved by a DNS proxy, the result is stored in the device's DNS cache. This stored cache helps the device to resolve subsequent queries from the same domain and avoid network latency delay.



NOTE: If the proxy cache is not available, the device sends the query to the configured DNS server, which results in network latency delays.

DNS proxy maintains a cache entry for each resolved DNS query. These entries have a time-to-live (TTL) timer so the device purges each entry from the cache as it reaches its

TTL and expires. You can clear a cache by using the **clear cache** command, or the cache will automatically expire along with TTL when it goes to zero.

DNS Proxy with Split DNS

The split DNS proxy feature allows you to configure your proxy server to split the DNS query based on both the interface and the domain name. You can also configure a set of name servers and associate them with a given domain name. When you query that domain name, the device sends the DNS queries to only those name servers that are configured for that domain name to ensure localization of DNS queries.

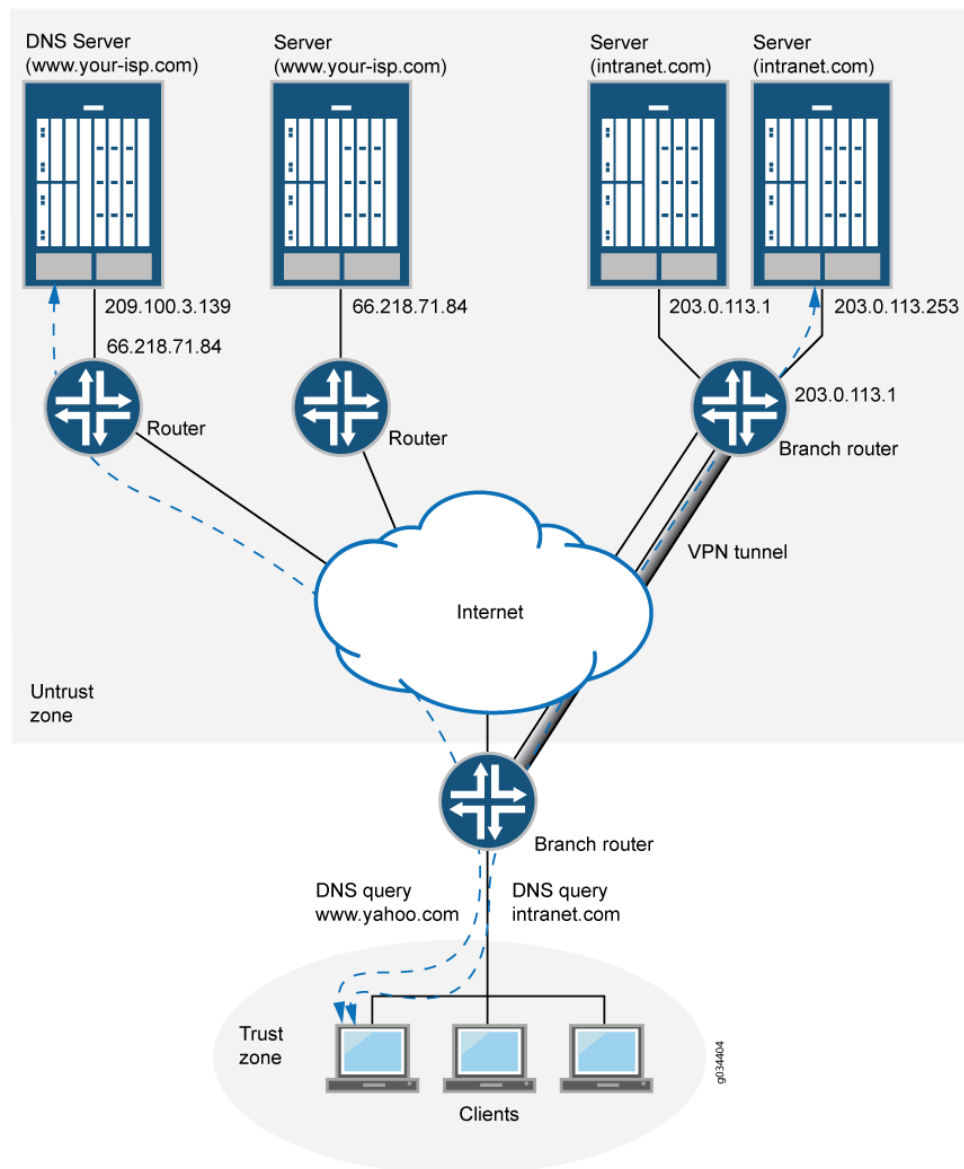
You can configure the transport method used to resolve a given domain name—for example, when the device connects to the corporate network through an IPsec VPN or any other secure tunnel. When you configure a secure VPN tunnel to transport the domain names belonging to the corporate network, the DNS resolution queries are not leaked to the ISP DNS server and are contained within the corporate network.

You can also configure a set of default domain (*) and name servers under the default domain to resolve the DNS queries for a domain for which a name server is not configured.

Each DNS proxy must be associated with an interface. If an interface has no DNS proxy configuration, all the DNS queries received on that interface are dropped.

[Figure 5 on page 298](#) shows how the split DNS proxy works in a corporate network.

Figure 5: DNS Proxy with Split DNS



In the corporate network shown in [Figure 5 on page 298](#), a PC client that points to the SRX Series device as its DNS server makes two queries—to `www.your-isp.com` and to `www.intranet.com`. The DNS proxy redirects the `www.intranet.com` query to the `www.intranet.com` DNS server (203.0.113.253), while the `www.your-isp.com` query is redirected to the ISP DNS server (209.100.3.130). Although the query for `www.your-isp.com` is sent to the ISP DNS server as a regular DNS query using clear text protocols (TCP/UDP), the query for the `www.intranet.com` domain goes to the intranet's DNS servers over a secure VPN tunnel.

A split DNS proxy has the following advantages:

- Domain lookups are usually more efficient. For example, DNS queries meant for a corporate domain (such as acme.com) can go to the corporate DNS server exclusively, while all others go to the ISP DNS server. Splitting DNS lookups reduces the load on the corporate server and can also prevent corporate domain information from leaking onto the Internet.
- A DNS proxy allows you to transmit selected DNS queries through a tunnel interface, which prevents malicious users from learning about the internal configuration of a network. For example, DNS queries bound for the corporate server can pass through a tunnel interface to use security features such as authentication and encryption.

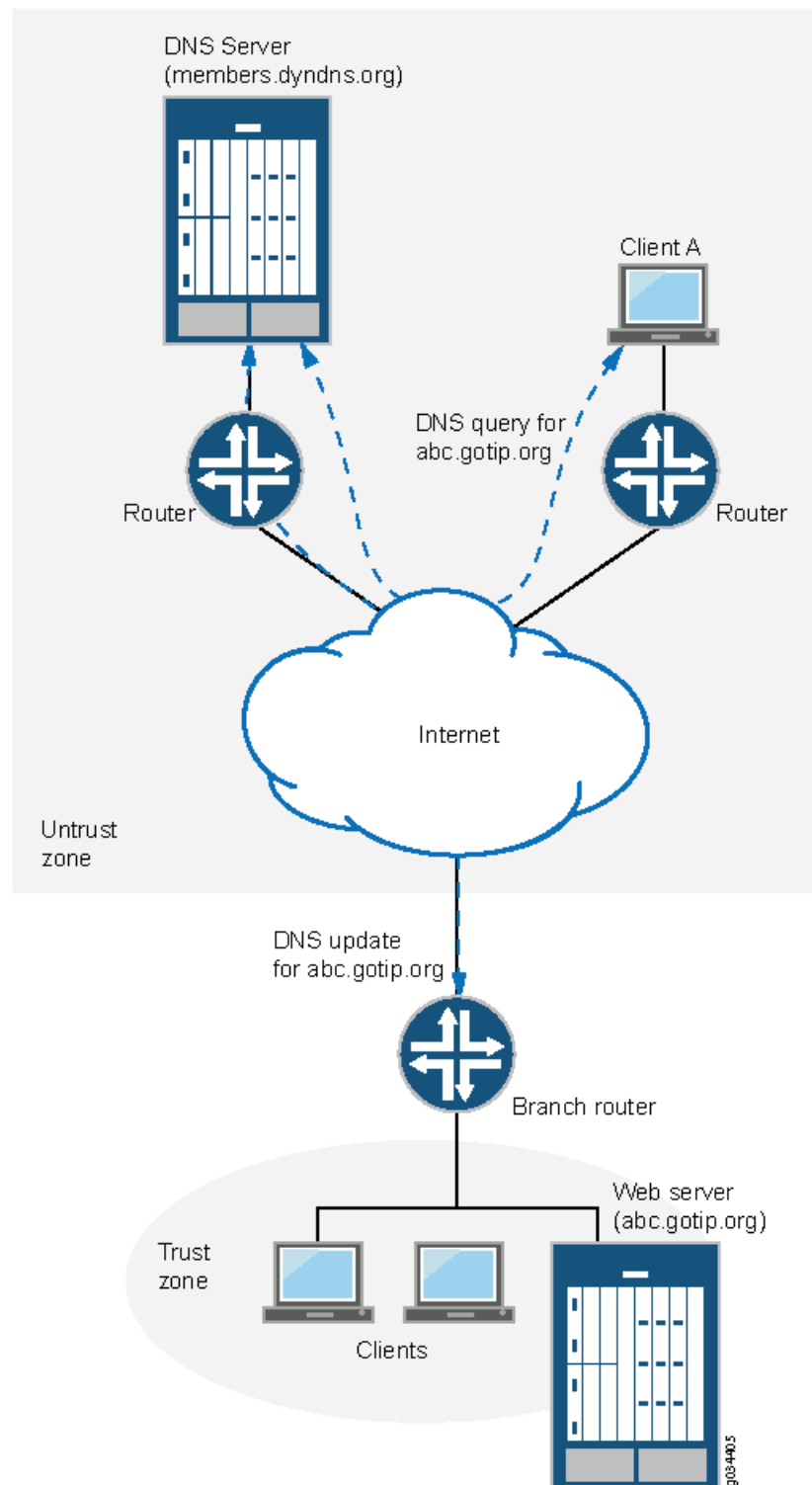
Dynamic Domain Name System Client

Dynamic DNS (DDNS) allows clients to dynamically update IP addresses for registered domain names. This feature is useful when an ISP uses Point-to-Point Protocol (PPP), Dynamic Host Configuration Protocol (DHCP), or external authentication (XAuth) to dynamically change the IP address for a customer premises equipment (CPE) router (such as a security device) that protects a Web server. Internet clients can reach the Web server by using a domain name even if the IP address of the security device has previously changed dynamically.

A DDNS server maintains a list of the dynamically changed addresses and their associated domain names. The device updates these DDNS servers with this information periodically or in response to IP address changes. The Junos OS DDNS client supports popular DDNS servers such as dyndns.org and ddo.jp

[Figure 6 on page 300](#) illustrates how the DDNS client works.

Figure 6: Dynamic DNS



The IP address of the internal Web server is translated by Network Address Translation (NAT) to the IP address of the untrust zone interface on the device. The hostname

abc-host.com is registered with the DDNS server and is associated with the IP address of the device's untrust zone interface, which is monitored by the DDNS client on the device. When the IP address of abc-host.com is changed, the DDNS server is informed of the new address.

If a client in the network shown in [Figure 6 on page 300](#) needs to access abc-host.com, the client queries the DNS servers on the Internet. When the query reaches the DDNS server, it resolves the request and provides the client with the latest IP address of abc-host.com.

Related Documentation

- [Configuring the Device as a DNS Proxy on page 301](#)

Configuring the Device as a DNS Proxy

The Junos operating system (Junos OS) incorporates domain name system (DNS) support, which allows you to use domain names as well as IP addresses for identifying locations. A DNS server keeps a table of the IP addresses associated with domain names. Using DNS enables an SRX300, SRX320, SRX340, SRX345, SRX550M, or SRX1500 device to reference locations by domain name (such as www.example.net) in addition to using the routable IP address.

DNS features include:

- **DNS proxy cache**—The device proxies hostname resolution requests on behalf of the clients behind the SRX Series device. DNS proxy improves domain lookup performance by using caching.
- **Split DNS**—The device redirects DNS queries over a secure connection to a specified DNS server in the private network. Split DNS prevents malicious users from learning the network configuration, and thus also prevents domain information leaks. Once configured, split DNS operates transparently.
- **Dynamic DNS (DDNS) client**—Servers protected by the device remain accessible despite dynamic IP address changes. For example, a protected Web server continues to be accessible with the same hostname, even after the dynamic IP address is changed because of address reassignment by the Dynamic Host Configuration Protocol (DHCP) or Point-to-Point Protocol (PPP) by Internet service provider (ISP).

To configure the device as a DNS proxy, you enable DNS on a logical interface and configure DNS proxy servers. Configuring a static cache enables branch office and corporate devices to use hostnames to communicate. Configuring dynamic DNS (DDNS) clients allows IP address changes.

Perform the following procedure to configure the device as a DNS proxy server by enabling DNS proxy on a logical interface—for example, ge-2/0/0.0—and configuring a set of name servers that are to be used for resolving the specified domain names. You can specify a default domain name by using an asterisk (*) and then configure a set of name servers for resolution. Use this approach when you need global name servers to resolve domain name entries that do not have a specific name server configured.

1. DNS proxy with split dns configuration

- Enable DNS proxy on a logical interface.

```
[edit system services]
user@host# set dns dns-proxy interface ge-2/0/0.0
```

- Configure view for split DNS, specify the internal IP interface to handle the DNS query and view the logical subnet address.

```
[edit system services]
user@host# system services dns dns-proxy view internal match-clients 1.1.1.0/24
```

- Set a default internal domain name, and specify IP server for forwarding the DNS query according to their IP addresses.

```
[edit system services]
user@host# set system services dns dns-proxy view internal domain aa.internal.com
forwarders 1.1.1.1
user@host# set system services dns dns-proxy view internal domain bb.internal.com
forwarders 2.2.2.2
```

- Configure view for split DNS, specify the external IP interface to handle the DNS query and view the logical subnet address.

```
[edit system services]
user@host# system services dns dns-proxy view external match-clients 11.1.1.0/24
```

- Set a default external domain name, and specify IP server for forwarding the DNS query according to their IP addresses.

```
[edit system services]
user@host# system services dns dns-proxy view external domain aa.external.com
forwarders 3.3.3.3
user@host# system services dns dns-proxy view external domain bb.external.com
forwarders 4.4.4.4
```

- If you are done configuring the device, commit the configuration.

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

To verify if the configuration is working properly, execute the show command.

```
user@host> show system services dns dns-proxy
```

2. DNS proxy cache configuration

- Configure the dns proxy static cache entries to specify the host's IPv4 address.

```
[edit system services]
user@host# set system services dns dns-proxy cache aa.example.net inet 10.10.10.10
user@host# set system services dns dns-proxy cache bb.example.net inet
20.20.20.20
```

- If you are done configuring the device, commit the configuration.

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

To verify if the configuration is working properly, execute the show command.

```
user@host> show system services dns dns-proxy
```

3. Dynamic DNS proxy configuration

- Enable client.

```
[edit system services]
user@host# set dynamic-dns client abc.com agent juniper interface ge-2/0/0.0
username test password test123
```

- If you are done configuring the device, commit the configuration.

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

To verify if the configuration is working properly

```
user@host> show system services dynamic-dns
```

Related Documentation

- [Configuring the Device as a DNS Proxy on page 301](#)

Encryption for Configuration Secrets

- [Hardening Shared Secrets in Junos OS on page 305](#)
- [Using Trusted Platform Module to Bind Secrets on SRX Series Devices on page 307](#)

Hardening Shared Secrets in Junos OS

- [Understanding Hardening Shared Secrets on page 305](#)

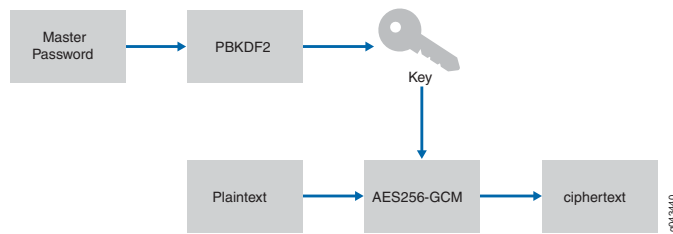
Understanding Hardening Shared Secrets

Existing shared secrets (\$9\$ format) in Junos OS currently use an obfuscation algorithm, which is not a very strong encryption for configuration secrets. If you want a strong encryption for your configuration secrets, you can configure a master password. The master password is used to derive an encryption key that is used with AES256-GCM to encrypt configuration secrets. This new encryption method uses the \$8\$ formatted strings.

Starting with Junos OS Release 15.1X49-D50, new CLI commands are introduced to configure a system master password to provide stronger encryption for configuration secrets. The master password encrypts secrets like the RADIUS password, IKE preshared keys, and other shared secrets in the Junos OS management process (mgd) configuration. The master password itself is not saved as part of the configuration. The password quality is evaluated for strength, and the device gives feedback if weak passwords are used.

The master password is used as input to the password based key derivation function (PBKDF2) to generate an encryption key. the key is used as input to the Advanced Encryption Standard in Galois/Counter Mode (AES256-GCM). The plain text that the user enters is processed by the encryption algorithm (with key) to produce the encrypted text (cipher text). See [Figure 7 on page 306](#)

Figure 7: Master Password Encryption



The \$8\$ configuration secrets can only be shared between devices using the same master password.

The \$8\$-encrypted passwords have the following format:

\$8\$crypt-algo\$hash-algo\$iterations\$salt\$iv\$tag\$encrypted. See [Table 19 on page 306](#) for the master password format details.

Table 19: \$8\$-encrypted Password Format

Format	Description
crypt-algo	Encryption/decryption algorithm to be used. Currently only AES256-GCM is supported.
hash-algo	Hash (prf) algorithm to be used for the PBKDF2 key derivation.
iterations	The number of iterations to use for the PBKDF2 hash function. Current iteration-count default is 100. The iteration count slows the hashing count, thus slowing attacker guesses.
salt	Sequence of ASCII64-encoded pseudorandom bytes generated during encryption that are to be used to <i>salt</i> (a random, but known string) the password and input to the PBKDF2 key derivation.
iv	A sequence of ASCII64-encoded pseudorandom bytes generated during encryption that are to be used as initialization vector for the AES256-GCM encryption function.
tag	ASCII64-encoded representation of the tag.
encrypted	ASCII64-encoded representation of the encrypted password.

The ASCII64 encoding is Base64 (RFC 4648) compatible, except no padding (character “=”) is used to keep the strings short. For example:

\$8\$aes256-gcm\$sha2-256\$100\$y/4YMC4YDLU\$FzYDI4jjiN6YCyQsYLsaf8A\$llu4jLcZarD9YnyD/Hejww\$okhBlc0cGakSqYxKww

Chassis Cluster Considerations

When defining a chassis cluster on SRX Series devices, be aware of the following restrictions:

- For SRX Series devices, first configure the master password on each node, and then build the cluster. The same master password should be configured on each node.
- In chassis cluster mode, the master password cannot be deleted.



NOTE: A change in the master password would mean disruption in chassis clustering; therefore you must change the password on both nodes independently.

Release History Table

Release	Description
15.1X49-D50	Starting with Junos OS Release 15.1X49-D50, new CLI commands are introduced to configure a system master password to provide stronger encryption for configuration secrets.

Using Trusted Platform Module to Bind Secrets on SRX Series Devices

By enabling the Trusted Platform Module (TPM) on the SRX Series devices, the software layer leverages the use of the underlying TPM chip. TPM is a specialized chip that protects certain secrets at rest such as private keys, system master passwords, and other sensitive data by storing it in an AES256 encrypted format (instead of storing sensitive data in a clear text format). The device also generates a new SHA256 hash of the configuration each time the administrator commits the configuration. This hash is verified each time the system boots up. If the configuration has been tampered with, the verification fails and the device will not continue to boot. Both the encrypted data and the hash of the configuration is protected by the TPM module using the master encryption password.



NOTE: Hash validation is performed during any commit operation by performing a validation check of the configuration file against the saved hash from previous commits. In a chassis cluster system, hash is independently generated on the backup system as part of the commit process. A commit from any mode, that is, `batch-config`, `dynamic-config`, `exclusive-config`, or `private config` generates the integrity hash.



NOTE: Hash is saved only for the current configuration and not for any rollback configurations. Hash is not generated during reboot or shutdown of the device.

The TPM encrypts the following secrets:

- SHA256 hash of the configuration
- device master-password
- all key-pairs on the device

The TPM chip is available on the SRX300, SRX320, SRX340, and SRX345 devices. TPM is not enabled by default. To enable TPM, see [“Enabling the TPM” on page 308](#).

- [Limitations on page 308](#)
- [Enabling the TPM on page 308](#)
- [Verifying the Status of the TPM on page 309](#)
- [Changing the Master Encryption Password on page 309](#)

Limitations

The following limitations and exceptions apply to the configuration file integrity feature using TPM:

- This feature is supported only on the SRX300, SRX320, SRX340 and SRX345 devices.
- If the master encryption password is not set, data is stored unencrypted.
- If the master encryption password and the multiple index backup files are deleted, data cannot be decrypted.
- If you set up the master encryption password, downgrading to older releases that do not implement TPM is not supported. You must delete the master encryption password and reenter all sensitive data before downgrading.
- If the master encryption password was deleted before the daemons had a chance to re-encrypt the data, then the data becomes unusable.
- The file integrity feature is not supported along with the configuration file encryption feature that uses keys saved in EEPROM. You can enable only one function at a time.

Enabling the TPM



.....

NOTE: Before enabling TPM, ensure that you have configured “**set system master-password plain-text-password**” otherwise, certain sensitive data will not be protected by the TPM.

.....

You can enable the TPM by setting the master encryption password using the following CLI command:

request security tpm master-encryption-password set plain-text-password

You will be prompted to enter the master encryption password twice, to make sure that these passwords match. The master encryption password is validated for required password strength.

After master encryption password is set, the system proceeds to encrypt the sensitive data with the master encryption password which is encrypted by the Master Binding Key that is owned and protected by the TPM chip.



NOTE: If there is any issue with setting the master encryption password, a critical ERROR message is logged on the console and the process is aborted.

Verifying the Status of the TPM

You can use the **show security tpm status** command to verify the status of the TPM. The following information is displayed:

- TPM enabled/disabled
- TPM ownership
- TPM's Master Binding Key status (created or not created)
- master encryption password status (set or not set)

Starting with Junos OS Release 15.1X49-D120 and Junos OS Release 17.4R1, Trusted Platform Module (TPM) firmware has been updated. The upgraded firmware version provides additional secure cryptography and improves security. Updated TPM firmware is available along with the Junos OS package. For updating TPM Firmware, see [Upgrading TPM Firmware on SRX-Devices](#). To confirm the TPM firmware version, use the **show security tpm status** command. **TPM Family** and **TPM Firmware version** output fields are introduced.

Changing the Master Encryption Password

Changing the master encryption password is done using the CLI.

To change the master encryption password, enter the following command from operational mode:

```
request security tpm master-encryption-password set plain-text-password
```



NOTE: It is recommended that no configuration changes are made while you are changing the master encryption password.

The system checks if the master encryption password is already configured. If master encryption password is configured, then you are prompted to enter the current master encryption password.

The entered master encryption password is validated against the current master encryption password to make sure these master encryption passwords match. If the validation succeeds, you will be prompted to enter the new master encryption password as plain text. You will be asked to enter the key twice to validate the password.

The system then proceeds to re-encrypt the sensitive data with the new master encryption password. You must wait for this process of re-encryption to complete before attempting to change the master encryption password again.

If for some reason, the encrypted master encryption password file is lost or corrupted, the system will not be able to decrypt the sensitive data. The system can only be recovered by re-importing the sensitive data in clear text, and re-encrypting them.

If the system is compromised, the administrator can recover the system using of the following method:

- Clear the TPM ownership in u-boot and then install the image in boot loader using TFTP or USB (if USB port is not restricted).



NOTE: If the installed software version is older than Junos OS Release 15.1X49-D110 and the master encryption password is enabled, then installation of Junos OS Release 15.1X49-D110 will fail. You must backup the configuration, certificates, key-pairs, and other secrets and use the TFTP/USB installation procedure.

Release History Table

Release	Description
17.4R1	Starting with Junos OS Release 15.1X49-D120 and Junos OS Release 17.4R1, Trusted Platform Module (TPM) firmware has been updated. The upgraded firmware version provides additional secure cryptography and improves security. Updated TPM firmware is available along with the Junos OS package. For updating TPM Firmware, see Upgrading TPM Firmware on SRX-Devices . To confirm the TPM firmware version, use the show security tpm status command. TPM Family and TPM Firmware version output fields are introduced.

**Related
Documentation**

- [Hardening Shared Secrets in Junos OS on page 305](#)

Setting up USB Modems for Remote Management of Security Devices

- [USB Modem Interface Overview on page 311](#)
- [USB Modem Configuration Overview on page 314](#)
- [Example: Configuring a USB Modem Interface on page 316](#)
- [Example: Configuring a Dialer Interface on page 319](#)
- [Example: Configuring a Dialer Interface for USB Modem Dial-In on page 323](#)
- [Configuring a Dial-Up Modem Connection Remotely on page 325](#)
- [Connecting to the Device Remotely on page 326](#)
- [Modifying USB Modem Initialization Commands on page 326](#)
- [Resetting USB Modems on page 327](#)

USB Modem Interface Overview

Juniper Networks SRX Series devices support the use of USB modems for remote management. You can use Telnet or SSH to connect to the device from a remote location through two modems over a telephone network. The USB modem is connected to the USB port on the device, and a second modem is connected to a remote management device such as a PC or laptop computer.



NOTE: USB modems are no longer supported for dial backup on SRX300, SRX320, SRX340, SRX345, SRX550HM devices.

You can configure your device to fail over to a USB modem connection when the primary Internet connection experiences interruption.

A USB modem connects to a device through modem interfaces that you configure. The device applies its own modem AT commands to initialize the attached modem. Modem setup requires that you connect and configure the USB modem at the device and the modem at the user end of the network.

You use either the J-Web configuration editor or CLI configuration editor to configure the USB modem and its supporting dialer interfaces.



NOTE: Low-latency traffic such as VoIP traffic is not supported over USB modem connections.



NOTE: We recommend using a US Robotics USB 56k V.92 Modem, model number USR Model 5637.

USB Modem Interfaces

You configure two types of interfaces for USB modem connectivity:

- A physical interface which uses the naming convention **umdn**. The device creates this interface when a USB modem is connected to the USB port.
- A logical interface called the dialer interface. You use the dialer interface, **dln**, to configure dialing properties for USB modem connections. The dialer interface can be configured using Point-to-Point Protocol (PPP) encapsulation. You can also configure the dialer interface to support authentication protocols—PPP Challenge Handshake (CHAP) or Password Authentication Protocol (PAP). You can configure multiple dialer interfaces for different functions on the device. After configuring the dialer interface, you must configure a backup method such as a dialer backup, a dialer filter, or a dialer watch.

The USB modem provides a dial-in remote management interface, and supports dialer interface features by sharing the same dial pool as a dialer interface. The dial pool allows the logical dialer interface and the physical interface to be bound together dynamically on a per-call basis. You can configure the USB modem to operate either as a dial-in console for management or as a dial-in WAN backup interface. Dialer pool priority has a range from 1 to 255, with 1 designating the lowest priority interfaces and 255 designating the highest priority interfaces.

Dialer Interface Rules

The following rules apply when you configure dialer interfaces for USB modem connections:

- The dialer interface must be configured to use PPP encapsulation. You cannot configure Cisco High-Level Data Link Control (HDLC) or Multilink PPP (MLPPP) encapsulation on dialer interfaces.
- The dialer interface cannot be configured as a constituent link in a multilink bundle.
- The dialer interface can perform backup, dialer filter, and dialer watch functions, but these operations are mutually exclusive. You can configure a single dialer interface to operate in only one of the following ways:
 - As a backup interface—for one primary interface
 - As a dialer filter
 - As a dialer watch interface

The backup dialer interfaces are activated only when the primary interface fails. USB modem backup connectivity is supported on all interfaces except `lsq-0/0/0`.

The dial-on-demand routing backup method allows a USB modem connection to be activated only when network traffic configured as an “interesting packet” arrives on the network. Once the network traffic is sent, an inactivity timer is triggered and the connection is closed. You define an interesting packet using the dialer filter feature of the device. To configure dial-on-demand routing backup using a dialer filter, you first configure the dialer filter and then apply the filter to the dialer interface.

Dialer watch is a backup method that integrates backup dialing with routing capabilities and provides reliable connectivity without relying on a dialer filter to trigger outgoing USB modem connections. With dialer watch, the device monitors the existence of a specified route. If the route disappears, the dialer interface initiates the USB modem connection as a backup connection.

How the Device Initializes USB Modems

When you connect the USB modem to the USB port on the device, the device applies the modem AT commands configured in the **init-command-string** command to the initialization commands on the modem.

If you do not configure modem AT commands for the **init-command-string** command, the device applies the following default sequence of initialization commands to the modem: **AT S7=45 S0=0 V1 X4 &C1 E0 Q0 &Q8 %C0**. [Table 20 on page 313](#) describes the commands. For more information about these commands, see the documentation for your modem.

Table 20: Default Modem Initialization Commands

Modem Command	Description
AT	Attention. Informs the modem that a command follows.
S7=45	Instructs the modem to wait 45 seconds for a telecommunications service provider (carrier) signal before terminating the call.
S0=0	Disables the auto answer feature, whereby the modem automatically answers calls.
V1	Displays result codes as words.
&C1	Disables reset of the modem when it loses the carrier signal.
E0	Disables the display on the local terminal of commands issued to the modem from the local terminal.
Q0	Enables the display of result codes.
&Q8	Enables Microcom Networking Protocol (MNP) error control mode.
%C0	Disables data compression.

When the device applies the modem AT commands in the **init-command-string** command or the default sequence of initialization commands to the modem, it compares them to the initialization commands already configured on the modem and makes the following changes:

- If the commands are the same, the device overrides existing modem values that do not match. For example, if the initialization commands on the modem include **S0=0** and the device's **init-command-string** command includes **S0=2**, the device applies **S0=2**.
- If the initialization commands on the modem do not include a command in the device's **init-command-string** command, the device adds it. For example, if the **init-command-string** command includes the command **L2**, but the modem commands do not include it, the device adds **L2** to the initialization commands configured on the modem.



NOTE: On SRX210 devices, the USB modem interface can handle bidirectional traffic of up to 19 Kbps. On oversubscription of this amount (that is, bidirectional traffic of 20 Kbps or above), keepalives do not get exchanged, and the interface goes down. (Platform support depends on the Junos OS release in your installation.)

Related Documentation

- [USB Modem Configuration Overview on page 314](#)
- [Example: Configuring a USB Modem Interface on page 316](#)
- [Example: Configuring a Dialer Interface for USB Modem Dial-In on page 323](#)

USB Modem Configuration Overview



NOTE: USB modems are no longer supported for dial backup on SRX300, SRX320, SRX340, and SRX345 devices.

Before you begin:

1. Install device hardware. For more information, see the Getting Started Guide for your device.
2. Establish basic connectivity. For more information, see the Getting Started Guide for your device.
3. Order a US Robotics USB 56k V.92 Modem, model number USR Model 5637 (<http://www.usr.com/>).

4. Order a public switched telephone network (PSTN) line from your telecommunications service provider. Contact your service provider for more information.
5. Connect the USB modem to the device's USB port.



NOTE: When you connect the USB modem to the USB port on the device, the USB modem is initialized with the modem initialization string configured for the USB modem interface on the device.

- a. Plug the modem into the USB port.
- b. Connect the modem to your telephone network.

Suppose you have a branch office router and a head office router each with a USB modem interface and a dialer interface. This example shows you how to establish a backup connection between the branch office and head office routers. See [Table 21 on page 315](#) for a summarized description of the procedure.

Table 21: Configuring Branch Office and Head Office Routers for USB Modem Backup Connectivity

Router Location	Configuration Requirement	Procedure
Branch Office	Configure the logical dialer interface on the branch office router for USB modem dial backup.	To configure the logical dialer interface, see "Example: Configuring a USB Modem Interface" on page 316 .
	Configure the dialer interface dl0 on the branch office router using one of the following backup methods: <ul style="list-style-type: none"> Configure the dialer interface dl0 as the backup interface on the branch office router's primary T1 interface t1-1/0/0. Configure a dialer filter on the branch office router's dialer interface. Configure a dialer watch on the branch office router's dialer interface. 	Configure the dialer interface using one of the following backup methods: <ul style="list-style-type: none"> To configure dl0 as a backup for t1-1/0/0 see Example: Configuring Dialer Interfaces and Backup Methods for USB Modem Dial Backup. To configure a dialer filter on dl0, see Example: Configuring Dialer Interfaces and Backup Methods for USB Modem Dial Backup. To configure a dialer watch on dl0, see Example: Configuring Dialer Interfaces and Backup Methods for USB Modem Dial Backup.
Head Office	Configure dial-in on the dialer interface dl0 on the head office router.	To configure dial-in on the head office router, see "Example: Configuring a Dialer Interface for USB Modem Dial-In" on page 323 .

If the dialer interface is configured to accept only calls from a specific caller ID, the device matches the incoming call's caller ID against the caller IDs configured on its dialer interfaces. If an exact match is not found and the incoming call's caller ID has more digits

than the configured caller IDs, the device performs a right-to-left match of the incoming call's caller ID with the configured caller IDs and accepts the incoming call if a match is found. For example, if the incoming call's caller ID is 4085321091 and the caller ID configured on a dialer interface is 5321091, the incoming call is accepted. Each dialer interface accepts calls from only callers whose caller IDs are configured on it.

See [Table 22 on page 316](#) for a list of available incoming map options.

Table 22: Incoming Map Options

Option	Description
accept-all	<p>Dialer interface accepts all incoming calls.</p> <p>You can configure the accept-all option for only one of the dialer interfaces associated with a USB modem physical interface. The dialer interface with the accept-all option configured is used only if the incoming call's caller ID does not match the caller IDs configured on other dialer interfaces.</p>
caller	<p>Dialer interface accepts calls from a specific caller ID. You can configure a maximum of 15 caller IDs per dialer interface.</p> <p>The same caller ID must not be configured on different dialer interfaces. However, you can configure caller IDs with more or fewer digits on different dialer interfaces. For example, you can configure the caller IDs 14085551515, 4085551515, and 5551515 on different dialer interfaces.</p>

You configure dialer interfaces to support PAP. PAP allows a simple method for a peer to establish its identity using a two-way handshake during initial link establishment. After the link is established, an ID and password pair are repeatedly sent by the peer to the authenticator until authentication is acknowledged or the connection is terminated.

- Related Documentation**
- [USB Modem Interface Overview on page 311](#)
 - [Example: Configuring a USB Modem Interface on page 316](#)

Example: Configuring a USB Modem Interface

This example shows how to configure a USB modem interface for dial backup.



NOTE: USB modems are no longer supported for dial backup on SRX300, SRX320, SRX340, and SRX345 devices.

- [Requirements on page 317](#)
- [Overview on page 317](#)
- [Configuration on page 317](#)
- [Verification on page 318](#)

Requirements

No special configuration beyond device initialization is required before configuring this feature.

Overview

In this example, you create an interface called as `umd0` for USB modem connectivity and set the dialer pool priority to 25. You also configure a modem initialization string to autoanswer after a specified number of rings. The default modem initialization string is **AT S7=45 S0=0 V1 X4 &C1 E0 Q0 &Q8 %C0**. The modem command **S0=0** disables the modem from autoanswering the calls. Finally, you set the modem to act as a dial-in WAN backup interface.

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following command, paste it into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the command into the CLI at the **[edit]** hierarchy level, and then enter **commit** from configuration mode.

```
set interfaces umd0 dialer-options pool usb-modem-dialer-pool priority 25
set modem-options init-command-string "ATS0=2 \n" dialin routable
```

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 *CLI User Guide*.

To configure a USB modem interface for dial backup:

1. Create an interface.

```
[edit]
user@host# edit interfaces umd0
```

2. Set the dialer options and priority.

```
[edit interfaces umd0]
user@host# set dialer-options pool usb-modem-dialer-pool priority 25
```

3. Specify the modem options.

```
[edit interfaces umd0]
user@host# set modem-options init-command-string "ATS0=2 \n"
```

4. Set the modem to act as a dial-in WAN backup interface.

```
[edit interfaces umd0]
```

```
user@host# set modem-options dialin routable
```

Results From configuration mode, confirm your configuration by entering the **show interface umd0** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show interface umd0
modem-options {
  init-command-string "ATSO=2 \n";
  dialin routable;
}
dialer-options {
  pool usb-modem-dialer-pool priority 25;
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

Verifying the Configuration

Purpose Verify a USB modem interface for dial backup.

Action From configuration mode, enter the **show interfaces umd0 extensive** command. The output shows a summary of interface information and displays the modem status.

```
Physical interface:  umd0, Enabled, Physical link is Up
Interface index:     64, SNMP ifIndex: 33, Generation: 1
  Type: Async-Serial, Link-level type: PPP-Subordinate, MTU: 1504,
Clocking: Unspecified, Speed: MODEM
Device flags       : Present Running
Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
Link flags         : None
Hold-times        : Up 0 ms, Down 0 ms
Last flapped      : Never
Statistics last cleared: Never
Traffic statistics:
  Input bytes      :                21672
  Output bytes     :                22558
  Input packets    :                 1782
  Output packets   :                 1832
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
0,
Resource errors: 0
Output errors:
  Carrier transitions: 63, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
0
```

```

MODEM status:
  Modem type                : LT V.92 1.0 MT5634ZBA-USB-V92 Data/Fax Modem
(Dual Config) Version 2.27m
  Initialization command string : ATSO=2
  Initialization status         : Ok
  Call status                   : Connected to 4085551515
  Call duration                 : 13429 seconds
  Call direction                : Dialin
  Baud rate                     : 33600 bps
  Most recent error code        : NO CARRIER

Logical interface umd0.0 (Index 2) (SNMP ifIndex 34) (Generation 1)
Flags: Point-To-Point SNMP-Traps Encapsulation: PPP-Subordinate

```

- Related Documentation**
- [USB Modem Configuration Overview on page 314](#)
 - [USB Modem Interface Overview on page 311](#)
 - [Example: Configuring a Dialer Interface for USB Modem Dial-In on page 323](#)

Example: Configuring a Dialer Interface

This example shows how to configure a logical dialer interface for an SRX300, SRX320, SRX340, or SRX345 device.

- [Requirements on page 319](#)
- [Overview on page 319](#)
- [Configuration on page 320](#)
- [Verification on page 321](#)

Requirements

Before you begin:

- Install device hardware and establish basic connectivity. See the Getting Started Guide for your device.
- Order a US Robotics USB 56k V.92 Modem, model number USR Model 5637, from US Robotics (<http://www.usr.com/>).
- Order a dial-up modem for the PC or laptop computer at the remote location from where you want to connect to the device.
- Order a PSTN line from your telecommunications service provider. Contact your service provider.

Overview

In this example, you configure a logical dialer interface called dl0 to establish USB connectivity. You can configure multiple dialer interfaces for different functions on the

device. You add a description to differentiate among different dialer interfaces. For example, this modem is called USB-modem-remote-management. Configure PPP encapsulation and set the logical unit as 0. You then specify the name of the dialer pool as usb-modem-dialer-pool and set the source and destination IP addresses as 172.20.10.2, and 172.20.10.1, respectively.



NOTE: You cannot configure Cisco High-Level Data Link Control (HDLC) or Multilink PPP (MLPPP) encapsulation on dialer interfaces used in USB modem connections.



NOTE: If you configure multiple dialer interfaces, ensure that the same IP subnet address is not configured on different dialer interfaces. Configuring the same IP subnet address on multiple dialer interfaces can result in inconsistency in the route and packet loss. The device might route packets through another dialer interface with the IP subnet address instead of through the dialer interface to which the USB modem call is mapped.

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 interfaces dl0 description USB-modem-remote-management encapsulation ppp
set interfaces dl0 unit 0 dialer-options pool usb-modem-dialer-pool
set interfaces dl0 unit 0 family inet address 172.20.10.2 destination 172.20.10.1
```

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 *CLI User Guide*.

To configure a logical dialer interface for the device:

1. Create an interface.

```
[edit]
user@host# set interfaces dl0
```

2. Add a description and configure PPP encapsulation.

```
[edit interfaces dl0]
user@host# set description USB-modem-remote-management
user@host# set encapsulation ppp
```

3. Create the logical unit.



NOTE: The logical unit number must be 0.

```
[edit interfaces dl0]
user@host# set unit 0
```

4. Configure the name of the dialer pool to use for USB modem connectivity.

```
[edit interfaces dl0 unit 0]
user@host# set dialer-options pool usb-modem-dialer-pool
```

5. Configure source and destination IP addresses for the dialer interface.

```
[edit interfaces dl0 unit 0]
user@host# set family inet address 172.20.10.2 destination 172.20.10.1
```

Results From configuration mode, confirm your configuration by entering the **show interfaces dl0** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show interfaces dl0
description USB-modem-remote-management;
encapsulation ppp;
unit 0 {
  family inet {
    address 172.20.10.2/32 {
      destination 172.20.10.1;
    }
  }
  dialer-options {
    pool usb-modem-dialer-pool;
  }
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

Verifying a Dialer Interface

Purpose Verify that the dialer interface has been configured.

Action From configuration mode, enter the **show interfaces d10 extensive** command. The output shows a summary of dialer interface information.

```
Physical interface: d10, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 24, Generation: 129
  Type: 27, Link-level type: PPP, MTU: 1504, Clocking: Unspecified, Speed:
Unspecified
  Device flags      : Present Running
  Interface flags:  SNMP-Traps
  Link type        : Full-Duplex
  Link flags       : Keepalives
  Physical info    : Unspecified
  Hold-times       : Up 0 ms, Down 0 ms
  Current address:  Unspecified, Hardware address: Unspecified
  Alternate link address: Unspecified
  Last flapped     : Never
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes  :                13859                0 bps
    Output bytes :                 0                0 bps
    Input packets:                 317                0 pps
    Output packets:                 0                0 pps
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runt: 0, Giants: 0, Policed discards:
0,
Resource errors: 0
  Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
0

Logical interface d10.0 (Index 70) (SNMP ifIndex 75) (Generation 146)
  Description: USB-modem-remote-management
  Flags: Point-To-Point SNMP-Traps 0x4000 LinkAddress 23-0 Encapsulation: PPP
  Dialer:
    State: Active, Dial pool: usb-modem-dialer-pool
    Dial strings: 220
    Subordinate interfaces: umd0 (Index 64)
    Activation delay: 0, Deactivation delay: 0
    Initial route check delay: 120
    Redial delay: 3
    Callback wait period: 5
    Load threshold: 0, Load interval: 60
  Bandwidth: 115200
  Traffic statistics:
    Input bytes  :                24839
    Output bytes :               17792
    Input packets:                 489
    Output packets:                 340
  Local statistics:
    Input bytes  :                10980
    Output bytes :               17792
    Input packets:                 172
    Output packets:                 340
  Transit statistics:
    Input bytes  :                13859                0 bps
    Output bytes :                 0                0 bps
    Input packets:                 317                0 pps
    Output packets:                 0                0 pps
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured,
```

```

mpls: Not-configured
CHAP state: Success
  Protocol inet, MTU: 1500, Generation: 136, Route table: 0
  Flags: None
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 172.20.10.1, Local: 172.20.10.2, Broadcast: Unspecified,
    Generation: 134

```

Related Documentation

- [USB Modem Interface Overview on page 311](#)
- [USB Modem Configuration Overview on page 314](#)
- [Example: Configuring a USB Modem Interface on page 316](#)
- [Example: Configuring a Dialer Interface for USB Modem Dial-In on page 323](#)

Example: Configuring a Dialer Interface for USB Modem Dial-In

This example shows how to configure a dialer interface for USB modem dial-in.



NOTE: USB modems are no longer supported for dial-in to a dialer interface on SRX300, SRX320, SRX340, and SRX345 devices.

- [Requirements on page 323](#)
- [Overview on page 323](#)
- [Configuration on page 324](#)
- [Verification on page 324](#)

Requirements

No special configuration beyond device initialization is required before configuring this feature.

Overview

To enable connections to the USB modem from a remote location, you must configure the dialer interfaces set up for USB modem use to accept incoming calls. You can configure a dialer interface to accept all incoming calls or accept only calls from one or more caller IDs.

If the dialer interface is configured to accept only calls from a specific caller ID, the system matches the incoming call's caller ID against the caller IDs configured on its dialer interfaces. If an exact match is not found and the incoming call's caller ID has more digits than the configured caller IDs, the system performs a right-to-left match of the incoming call's caller ID with the configured caller IDs and accepts the incoming call if a match is found. For example, if the incoming call's caller ID is 4085550115 and the caller ID configured on a dialer interface is 5550115, the incoming call is accepted. Each dialer interface accepts calls from only callers whose caller IDs are configured on it.

You can configure the following incoming map options for the dialer interface:

- **accept-all**—Dialer interface accepts all incoming calls.

You can configure the **accept-all** option for only one of the dialer interfaces associated with a USB modem physical interface. The device uses the dialer interface with the **accept-all** option configured only if the incoming call's caller ID does not match the caller IDs configured on other dialer interfaces.

- **caller**—Dialer interface accepts calls from a specific caller ID— for example, **4085550115**. You can configure a maximum of 15 caller IDs per dialer interface.

The same caller ID must not be configured on different dialer interfaces. However, you can configure caller IDs with more or fewer digits on different dialer interfaces. For example, you can configure the caller IDs 14085550115, 4085550115, and 5550115 on different dialer interfaces.

In this example, you configure the incoming map option as caller 4085550115 for dialer interface d10.

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following command, paste it into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the command into the CLI at the **[edit]** hierarchy level, and then enter **commit** from configuration mode.

```
set interfaces d10 unit 0 dialer-options incoming-map caller 4085550115
```

Step-by-Step Procedure

To configure a dialer interface for USB modem dial-in:

1. Select a dialer interface.

```
[edit]  
user@host# edit interfaces d10
```

2. Configure the incoming map options.

```
[edit]  
user@host# edit unit 0 dialer-options incoming-map caller 4085551515
```

3. If you are done configuring the device, commit the configuration.

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

Verification

To verify the configuration is working properly, enter the **show interface d10** command.

- Related Documentation**
- [USB Modem Configuration Overview on page 314](#)
 - [Example: Configuring a USB Modem Interface on page 316](#)

Configuring a Dial-Up Modem Connection Remotely

To remotely connect to the USB modem connected to the USB port on the device, you must configure a dial-up modem connection on the PC or laptop computer at your remote location. Configure the dial-up modem connection properties to disable IP header compression.

To configure a dial-up modem connection remotely:

1. At your remote location, connect a modem to a management device such as a PC or laptop computer.
2. Connect the modem to your telephone network.
3. On the PC or laptop computer, select **Start>Settings>Control Panel>Network Connections**. The Network Connections page appears.
4. Click **Create a new connection**. The New Connection Wizard appears.
5. Click **Next**. The New Connection Wizard: Network Connection Type page appears.
6. Select **Connect to the network at my workplace**, and then click **Next**.
The New Connection Wizard: Network Connection page appears.
7. Select **Dial-up connection**, and then click **Next**. The New Connection Wizard: Connection Name page appears.
8. In the Company Name box, type the dial-up connection name, for example **USB-modem-connect**. Then, click **Next**. The New Connection Wizard: Phone Number to Dial page appears.
9. In the Phone number box, type the telephone number of the PSTN line connected to the USB modem at the device end.
10. Click **Next** twice, and then click **Finish**. The Connect USB-modem-connect page appears.
11. If CHAP is configured on the dialer interface used for the USB modem interface at the device end, type the username and password configured in the CHAP configuration in the User name and Password boxes.

12. Click **Properties**. The USB-modem-connect Properties page appears.
13. In the Networking tab, select **Internet Protocol (TCP/IP)**, and then click **Properties**. The Internet Protocol (TCP/IP) Properties page appears.
14. Click **Advanced**. The Advanced TCP/IP Settings page appears.
15. Clear the **Use IP header compression** check box.

Related Documentation

- [USB Modem Interface Overview on page 311](#)
- [USB Modem Configuration Overview on page 314](#)
- [Connecting to the Device Remotely on page 326](#)

Connecting to the Device Remotely

To remotely connect to the device through a USB modem connected to the USB port on the device:

1. On the PC or laptop computer at your remote location, select **Start>Settings>Control Panel>Network Connections**. The Network Connections page appears.
2. Double-click the **USB-modem-connect** dial-up connection. The Connect USB-modem-connect page appears.
3. Click **Dial** to connect to the Juniper Networks device.

When the connection is complete, you can use Telnet or SSH to connect to the device.

Related Documentation

- [USB Modem Interface Overview on page 311](#)
- [USB Modem Configuration Overview on page 314](#)
- [Configuring a Dial-Up Modem Connection Remotely on page 325](#)

Modifying USB Modem Initialization Commands



NOTE: These instructions use Hayes-compatible modem commands to configure the modem. If your modem is not Hayes-compatible, see the documentation for your modem and enter equivalent modem commands. Applies to SRX300, SRX320, SRX340, SRX345 devices.

You can use the CLI configuration editor to override the value of an initialization command configured on the USB modem or configure additional commands for initializing USB modems.



NOTE: If you modify modem initialization commands when a call is in progress, the new initialization sequence is applied on the modem only when the call ends.

You can configure the following modem AT commands to initialize the USB modem:

- The command **S0=2** configures the modem to automatically answer calls on the second ring.
- The command **L2** configures medium speaker volume on the modem.

You can insert spaces between commands.

When you configure modem commands in the CLI configuration editor, you must follow these conventions:

- Use the newline character `\n` to indicate the end of a command sequence.
- Enclose the command string in double quotation marks.

You can override the value of the **S0=0** command in the initialization sequence configured on the modem and add the **L2** command.

To modify the initialization commands on a USB modem:

1. Configure the modem AT commands to initialize the USB modem.

```
[edit interfaces umd0]
user@host# set modem-options init-command-string "AT S0=2 L2 \n"
```

2. If you are done configuring the device, enter **commit** from configuration mode.

Related Documentation

- [USB Modem Interface Overview on page 311](#)
- [USB Modem Configuration Overview on page 314](#)
- [Resetting USB Modems on page 327](#)

Resetting USB Modems

For SRX300, SRX320, SRX340, and SRX345 devices, if the USB modem does not respond, you can reset the modem.



.....

CAUTION: If you reset the modem when a call is in progress, the call is terminated.

.....

To reset the USB modem, in operational mode, enter the following command:

```
user@host> request interface modem reset umd0
```

**Related
Documentation**

- [USB Modem Interface Overview on page 311](#)
- [USB Modem Configuration Overview on page 314](#)
- [Modifying USB Modem Initialization Commands on page 326](#)

CHAPTER 14

Configuring Secure Web Access

- [Secure Web Access Overview on page 329](#)
- [Generating SSL Certificates for Secure Web Access \(SRX Series Devices\) on page 330](#)
- [Generating SSL Certificates to Be Used for Secure Web Access \(EX Series Switch\) on page 331](#)
- [Generating a Self-Signed SSL Certificate Automatically on page 331](#)
- [Manually Generating Self-Signed SSL Certificates on page 332](#)
- [Deleting Self-Signed Certificates \(CLI Procedure\) on page 333](#)
- [Adding, Editing, and Deleting Certificates on the Device on page 333](#)
- [Understanding Self-Signed Certificates on EX Series Switches on page 334](#)
- [Manually Generating Self-Signed Certificates on Switches \(CLI Procedure\) on page 335](#)
- [Configuring Device Addresses \(IPv4 and Loopback Addresses\) on page 336](#)
- [Enabling Remote Access on page 337](#)
- [Example: Configuring Secure Web Access on page 338](#)
- [Understanding Public Key Cryptography on Switches on page 341](#)
- [Enabling HTTPS and XNM-SSL Services on Switches Using Self-Signed Certificates \(CLI Procedure\) on page 342](#)

Secure Web Access Overview

You can manage a Juniper Networks device remotely through the J-Web interface. To communicate with the device, the J-Web interface uses the Hypertext Transfer Protocol (HTTP). HTTP allows easy Web access but no encryption. The data that is transmitted between the Web browser and the device by means of HTTP is vulnerable to interception and attack. To enable secure Web access, the Juniper Networks devices support HTTP over Secure Sockets Layer (HTTPS). You can enable HTTP or HTTPS access on specific interfaces and ports as needed.

The Juniper Networks device uses the Secure Sockets Layer (SSL) protocol to provide secure device management through the Web interface. SSL uses public-private key technology that requires a paired private key and an authentication certificate for providing the SSL service. SSL encrypts communication between your device and the Web browser with a session key negotiated by the SSL server certificate.

An SSL certificate includes identifying information such as a public key and a signature made by a certificate authority (CA). When you access the device through HTTPS, an SSL handshake authenticates the server and the client and begins a secure session. If the information does not match or the certificate has expired, you cannot access the device through HTTPS.

Without SSL encryption, communication between your device and the browser is sent in the open and can be intercepted. We recommend that you enable HTTPS access on your WAN interfaces.

HTTP access is enabled by default on the built-in management interfaces. By default, HTTPS access is supported on any interface with an SSL server certificate.

**Related
Documentation**

- [Generating SSL Certificates for Secure Web Access \(SRX Series Devices\) on page 330](#)
- [Generating a Self-Signed SSL Certificate Automatically on page 331](#)
- [Configuring Device Addresses \(IPv4 and Loopback Addresses\) on page 336](#)
- [Example: Configuring Secure Web Access on page 338](#)

Generating SSL Certificates for Secure Web Access (SRX Series Devices)

To generate an SSL certificate using the **openssl** command:

1. Enter **openssl** in the CLI. The **openssl** command generates a self-signed SSL certificate in privacy-enhanced mail (PEM) format. It writes the certificate and an unencrypted 1024-bit RSA private key to the specified file.



NOTE: Run this command on a LINUX or UNIX device because Juniper Networks Services Gateways do not support the **openssl** command.

```
% openssl req -x509 -nodes -newkey rsa:1024 -keyout filename.pem -out  
filename.pem
```

Replace **filename** with the name of a file in which you want the SSL certificate to be written—for example, **new.pem**.

2. When prompted, type the appropriate information in the identification form. For example, type **US** for the country name.
3. Display the contents of the file **new.pem**.

```
cat new.pem
```

Copy the contents of this file for installing the SSL certificate.

**Related
Documentation**

- [Secure Web Access Overview on page 329](#)

Generating SSL Certificates to Be Used for Secure Web Access (EX Series Switch)

You can set up secure Web access for an EX Series switch. To enable secure Web access, you must generate a digital Secure Sockets Layer (SSL) certificate and then enable HTTPS access on the switch.

To generate an SSL certificate:

1. Enter the following **openssl** command in your SSH command-line interface on a BSD or Linux system on which **openssl** is installed. The **openssl** command generates a self-signed SSL certificate in the privacy-enhanced mail (PEM) format. It writes the certificate and an unencrypted 1024-bit RSA private key to the specified file.

```
% openssl req -x509 -nodes -newkey rsa:1024 -keyout filename.pem -out filename.pem
```

where **filename** is the name of a file in which you want the SSL certificate to be written—for example, **my-certificate**.

2. When prompted, type the appropriate information in the identification form. For example, type **US** for the country name.
3. Display the contents of the file that you created.

```
cat my-certificate.pem
```

You can use the J-Web Configuration page to install the SSL certificate on the switch. To do this, copy the file containing the certificate from the BSD or Linux system to the switch. Then open the file, copy its contents, and paste them into the Certificate box on the J-Web Secure Access Configuration page.

You can also use the following CLI statement to install the SSL certificate on the switch:

```
[edit]
user@switch# set security certificates local my-signed-cert load-key-file my-certificate.pem
```

Related Documentation

- *Configuring Management Access for the EX Series Switch (J-Web Procedure)*
- *Port Security Features Overview*

Generating a Self-Signed SSL Certificate Automatically

To generate a self-signed SSL certificate on Juniper Networks devices:

1. Establish basic connectivity.
2. Reboot the system. The self-signed certificate is automatically generated at bootup time.

```
user@host> request system reboot
```

```
Reboot the system ? [yes,no] yes
```

3. Specify **system-generated-certificate** under HTTPS Web management.

```
[edit]
user@host# show system services web-management https
system-generated-certificate
```

Related Documentation

- [Generating SSL Certificates for Secure Web Access \(SRX Series Devices\) on page 330](#)

Manually Generating Self-Signed SSL Certificates

To manually generate a self-signed SSL certificate on Juniper Networks devices:

1. Establish basic connectivity.
2. If you have root login access, you can manually generate the self-signed certificate by using the following commands:

```
root@host> request security pki generate-key-pair size 512 certificate-id certname
```

```
Generated key pair sslcert, key size 512 bits
```

```
root@host> request security pki local-certificate generate-self-signed certificate-id
cert-name email email domain-name domain name ip-address IP address subject
"DC= Domain name, CN= Common-Name, OU= Organizational-Unit-name, O=
Organization-Name, ST= state, C= Country"
```

```
Self-signed certificate generated and loaded successfully
```



NOTE: When generating the certificate, you must specify the subject, e-mail address, and either domain-name or ip-address.

3. To verify that the certificate was generated and loaded properly, enter the **show security pki local-certificate** operational command and specify **local-certificate** under HTTPS Web management.

```
[edit]
root@host# show system services web-management https local-certificate certname
```


- Related Documentation**
- [Generating a Self-Signed SSL Certificate Automatically on page 331](#)

Deleting Self-Signed Certificates (CLI Procedure)

You can delete a self-signed certificate that is automatically or manually generated from the EX Series switch. When you delete the automatically generated self-signed certificate, the switch generates a new self-signed certificate and stores it in the file system.

- To delete the automatically generated certificate and its associated key pair from the switch:

```
user@switch> clear security pki local-certificate system-generated
```

- To delete a manually generated certificate and its associated key pair from the switch:

```
user@switch> clear security pki local-certificate certificate-id certificate-id-name
```

- To delete all manually generated certificates and their associated key pairs from the switch:

```
user@switch> clear security pki local-certificate all
```

- Related Documentation**
- [Manually Generating Self-Signed Certificates on Switches \(CLI Procedure\) on page 335](#)
 - [Understanding Self-Signed Certificates on EX Series Switches on page 334](#)

Adding, Editing, and Deleting Certificates on the Device

You can use the Certificates tab to upload SSL certificates to the device, edit existing certificates on the device, or delete certificates from the device. You can use the certificates to secure HTTPS and Junos XML protocol sessions.

To add, edit, or delete a certificate:

1. In the J-Web user interface, select **Configure>System Properties>Management Access**.
2. Click **Edit**. The Edit Management Access dialog box appears.
3. Select the **Certificates** tab.
4. Choose one of the following options:
 - If you want to add a new certificate, click **Add**. The Add Certificate section is expanded.
 - If you want to edit the information for an existing certificate, select it and click **Edit**. The Edit Certificate section is expanded.

- If you want to delete an existing certificate, select it and click **Delete**. (You can skip the remaining steps in this section.)
- 5. In the **Certificate Name** box, type a name—for example, **new**.
- 6. In the **Certificate content** box, paste the generated certificate and RSA private key.
- 7. Click **Save**.
- 8. Click **OK** to save the configuration or **Cancel** to clear it.

**Related
Documentation**

- [Generating SSL Certificates for Secure Web Access \(SRX Series Devices\) on page 330](#)

Understanding Self-Signed Certificates on EX Series Switches

When you initialize a Juniper Networks EX Series Ethernet Switch with the factory default configuration, the switch generates a self-signed certificate, allowing secure access to the switch through the Secure Sockets Layer (SSL) protocol. Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS) and XML Network Management over Secure Sockets Layer (XNM-SSL) are the two services that can make use of the self-signed certificates.



NOTE: Self-signed certificates do not provide additional security as do those generated by Certificate Authorities (CAs). This is because a client cannot verify that the server he or she has connected to is the one advertised in the certificate.

The switches provide two methods for generating a self-signed certificate:

- Automatic generation

In this case, the creator of the certificate is the switch. An automatically generated (also called “system-generated”) self-signed certificate is configured on the switch by default.

After the switch is initialized, it checks for the presence of an automatically generated self-signed certificate. If it does not find one, the switch generates one and saves it in the file system.

A self-signed certificate that is automatically generated by the switch is similar to an SSH host key. It is stored in the file system, not as part of the configuration. It persists when the switch is rebooted, and it is preserved when a **request system snapshot** command is issued.

The switch uses the following distinguished name for the automatically generated certificate:

“CN=<device serial number>, CN=system generated, CN=self-signed”

If you delete the system-generated self-signed certificate on the switch, the switch generates a self-signed certificate automatically.

- Manual generation

In this case, you create the self-signed certificate for the switch. At any time, you can use the CLI to generate a self-signed certificate. Manually generated self-signed certificates are stored in the file system, not as part of the configuration.

Self-signed certificates are valid for five years from the time they are generated. When the validity of an automatically generated self-signed certificate expires, you can delete it from the switch so that the switch generates a new self-signed certificate.

System-generated self-signed certificates and manually generated self-signed certificates can coexist on the switch.

Related Documentation

- [Understanding Public Key Cryptography on Switches on page 341](#)
- [Manually Generating Self-Signed Certificates on Switches \(CLI Procedure\) on page 335](#)

Manually Generating Self-Signed Certificates on Switches (CLI Procedure)

EX Series switches allow you to generate custom self-signed certificates and store them in the file system. The certificate you generate manually can coexist with the automatically generated self-signed certificate on the switch. To enable secure access to the switch over SSL, you can use either the system-generated self-signed certificate or a certificate you have generated manually.

To generate self-signed certificates manually, you must complete the following tasks:

- [Generating a Public-Private Key Pair on Switches on page 335](#)
- [Generating Self-Signed Certificates on Switches on page 336](#)

Generating a Public-Private Key Pair on Switches

A digital certificate has an associated cryptographic key pair that is used to sign the certificate digitally. The cryptographic key pair comprises a public key and a private key. When you generate a self-signed certificate, you must provide a public-private key pair that can be used to sign the self-signed certificate. Therefore, you must generate a public-private key pair before you can generate a self-signed certificate.

To generate a public-private key pair:

```
user@switch> request security pki generate-key-pair certificate-id certificate-id-name
```



NOTE: Optionally, you can specify the encryption algorithm and the size of the encryption key. If you do not specify the encryption algorithm and encryption key size, default values are used. The default encryption algorithm is RSA, and the default encryption key size is 1024 bits.

After the public-private key pair is generated, the switch displays the following:

```
generated key pair certificate-id-name, key size 1024 bits
```

Generating Self-Signed Certificates on Switches

To generate the self-signed certificate manually, include the certificate ID name, the subject of the distinguished name (DN), the domain name, the IP address of the switch, and the e-mail address of the certificate holder:

```
user@switch> request security pki local-certificate generate-self-signed certificate-id  
certificate-id-name domain-name domain-name email email-address ip-address switch-ip-address  
subject subject-of-distinguished-name
```

The certificate you have generated is stored in the switch's file system. The certificate ID you have specified while generating the certificate is a unique identifier that you can use to enable the HTTPS or XNM-SSL services.

To verify that the certificate was generated and loaded properly, enter the **show security pki local-certificate** operational command.

Related Documentation

- [Enabling HTTPS and XNM-SSL Services on Switches Using Self-Signed Certificates \(CLI Procedure\) on page 342](#)
- [Understanding Self-Signed Certificates on EX Series Switches on page 334](#)

Configuring Device Addresses (IPv4 and Loopback Addresses)

You can use the Management tab to configure IPv4 and loopback addresses on the device.

To configure IPv4 and loopback addresses:

1. In the J-Web user interface, select **Configure>System Properties>Management Access**.
2. Click **Edit**. The Edit Management Access dialog box appears.
3. Select the **Management** tab.
4. If you want to enable a loopback address for the device, enter an address and corresponding subnet mask in the **Loopback address** section.
5. If you want to enable an IPv4 address for the device, select **IPv4 address** and enter a corresponding management port, subnet mask, and default gateway.
6. Click **OK** to save the configuration or **Cancel** to clear it.

Related Documentation

- [Enabling Remote Access on page 337](#)

Enabling Remote Access

You can use the Services tab to specify the type of connections that users can make to the device. For instance, you can enable secure HTTPS sessions to the device or enable access to the Junos XML protocol XML scripting API.

To enable access services:

1. In the J-Web user interface, select **Configure>System Properties>Management Access**.
2. Click **Edit**. The Edit Management Access dialog box appears.
3. Select the **Services** tab.
4. If you want to enable users to create secure Telnet or secure SSH connections to the device, select **Enable Telnet** or **Enable SSH**.
5. If you want to enable access to the Junos XML protocol XML scripting API, select **Enable Junos XML protocol over clear text** or **Enable Junos XML protocol over SSL**. If you enable Junos XML protocol over SSL, select the certificate you want to use for encryption from the **Junos XML protocol certificate** drop-down list.
6. Select **Enable HTTP** if you want users to connect to device interfaces over an HTTP connection. Then specify the interfaces that should use the HTTP connection:
 - **Enable on all interfaces**—Select this option if you want to enable HTTP on all device interfaces.
 - **Selected interfaces**—Use the arrow buttons to populate this list with individual interfaces if you want to enable HTTP on only some of the device interfaces.
7. If you want users to connect to device interfaces over a secure HTTPS connection, select **Enable HTTPS**. Then select which certificate you want to use to secure the connection from the **HTTPS certificates** list and specify the interfaces that should use the HTTPS connection:
 - **Enable on all interfaces**—Select this option if you want to enable HTTPS on all device interfaces.
 - **Selected interfaces**—Use the arrow buttons to populate this list with individual interfaces if you want to enable HTTPS on only some of the device interfaces.
8. Click **OK** to save the configuration or **Cancel** to clear it.

To verify that Web access is enabled correctly, connect to the device using one of the following methods:

- For HTTP access—In your Web browser, type **http://URL** or **http://IP address**.
- For HTTPS access—In your Web browser, type **https://URL** or **https://IP address**.
- For SSL Junos XML protocol access—A Junos XML protocol client such as Junos Scope is required.

**Related
Documentation**

- [Configuring Device Addresses \(IPv4 and Loopback Addresses\) on page 336](#)

Example: Configuring Secure Web Access

This example shows how to configure secure Web access on your device.

- [Requirements on page 338](#)
- [Overview on page 338](#)
- [Configuration on page 338](#)
- [Verification on page 339](#)

Requirements

No special configuration beyond device initialization is required before configuring this feature.



NOTE: You can enable HTTPS access on specified interfaces. If you enable HTTPS without specifying an interface, HTTPS is enabled on all interfaces.

Overview

In this example, you import the SSL certificate that you have generated as a new and private key in PEM format. You then enable HTTPS access and specify the SSL certificate to be used for authentication. Finally, you specify the port as 8443 on which HTTPS access is to be enabled.

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 certificates local new load-key-file /var/tmp/new.pem
set system services web-management https local-certificate new port 8443
```

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 *CLI User Guide*.

To configure secure Web access on your device:

1. Import the SSL certificate and private key.

```
[edit security]
user@host# set certificates local new load-key-file /var/tmp/new.pem
```

2. Enable HTTPS access and specify the SSL certificate and port.

```
[edit system]
user@host# set services web-management https local-certificate new port 8443
```

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

```
[edit]
user@host# show security
certificates {
  local {
    new {
      "-----BEGIN RSA PRIVATE KEY-----\nMIICXQIBAAKBgQC/C5UI4frNqbi
      qPwbTiOkJvqoDw2YgYse0Z5zzVJyErgSg954T\nEuHM67Ck8hAOrCnb0YO+SY
      Y5rCXLf4+2s8k9EypLtYRw/Ts66DZoXI4viqE7HSsK\n5sQw/UDBlw7/MJ+OpA
      ... KYiFf4CbBBbjlMQJ0HFudW6lSVBslONkzX+FT\ni95ddka6ilRnArEb4VFCRh+
      eIQBdpIUjziYf7NuzDx4Z\n -----END RSA PRIVATE KEY-----\n-----BEGIN
      CERTIFICATE----- \nMIIDjDCCAvWgAwIBAgIBADANBgkqhkiG9w0BAQQQ ...
      FADCBkTElMAkGAIUEBhMCdXMx\nCzAJBgNVBAGTAzAmNhMRlweAYDVQQHEWlzdW5ue
      HBIYnMxDTALBgNVBAMTBGpuchlxDAlBgkqhkiG9w0wOBCQEFWF5iaGFyZ2F2YUB
      fLUYAnBYmsYWOH\n -----END CERTIFICATE-----\n"; ## SECRET-DATA
    }
  }
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

- [Verifying an SSL Certificate Configuration on page 339](#)
- [Verifying a Secure Access Configuration on page 340](#)

Verifying an SSL Certificate Configuration

Purpose Verify the SSL certificate configuration.

Action From operational mode, enter the **show security** command.

Verifying a Secure Access Configuration

Purpose Verify the secure access configuration.

Action From operational mode, enter the **show system services** command. The following sample output displays the sample values for secure Web access:

```
[edit]
user@host# show system services
web-management {
  http;
  https {
    port 8443;
    local-certificate new;
  }
}
```

- Related Documentation**
- [Secure Web Access Overview on page 329](#)
 - [Generating SSL Certificates for Secure Web Access \(SRX Series Devices\) on page 330](#)
 - [Generating a Self-Signed SSL Certificate Automatically on page 331](#)
 - [Configuring Device Addresses \(IPv4 and Loopback Addresses\) on page 336](#)

Understanding Public Key Cryptography on Switches

Cryptography describes the techniques related to the following aspects of information security:

- Privacy or confidentiality
- Integrity of data
- Authentication
- Nonrepudiation or nonrepudiation of origin—Nonrepudiation of origin means that signers cannot claim that they did not sign a message while claiming that their private key remains secret. In some nonrepudiation schemes used in digital signatures, a timestamp is attached to the digital signature, so that even if the private key is exposed, the signature remains valid. Public and private keys are described in the following text.

In practice, cryptographic methods protect the data transferred from one system to another over public networks by encrypting the data using an encryption key. Public key cryptography (PKC), which is used on Juniper Networks EX Series Ethernet Switches, uses a pair of encryption keys: a public key and a private key. The public and private keys are created simultaneously using the same encryption algorithm. The private key is held by a user secretly and the public key is published. Data encrypted with a public key can be decrypted only with the corresponding private key and vice versa. When you generate a public/private key pair, the switch automatically saves the key pair in a file in the certificate store, from which it is subsequently used in certificate request commands. The generated key pair is saved as *certificate-id.priv*.



NOTE: The default RSA and DSA key size is 1024 bits. If you are using the Simple Certificate Enrollment Protocol (SCEP), Juniper Networks Junos operating system (Junos OS) supports RSA only.

- [Public Key Infrastructure \(PKI\) and Digital Certificates on page 341](#)

Public Key Infrastructure (PKI) and Digital Certificates

Public key infrastructure (PKI) allows the distribution and use of the public keys in public key cryptography with security and integrity. PKI manages the public keys by using digital certificates. A digital certificate provides an electronic means of verifying the identity of an individual, an organization, or a directory service that can store digital certificates.

A PKI typically consists of a Registration Authority (RA) that verifies the identities of entities, authorizes their certificate requests, and generates unique asymmetric key pairs (unless the users' certificate requests already contain public keys); and a Certificate Authority (CA) that issues corresponding digital certificates for the requesting entities. Optionally, you can use a Certificate Repository that stores and distributes certificates and a certificate revocation list (CRL) identifying the certificates that are no longer valid. Each entity possessing the authentic public key of a CA can verify the certificates issued by that CA.

Digital signatures exploit the public key cryptographic system as follows:

1. A sender digitally signs data by applying a cryptographic operation, involving its private key, on a digest of the data.
2. The resulting signature is attached to the data and sent to the receiver.
3. The receiver obtains the digital certificate of the sender, which provides the sender's public key and confirmation of the link between its identity and the public key. The sender's certificate is often attached to the signed data.
4. The receiver either trusts this certificate or attempts to verify it. The receiver verifies the signature on the data by using the public key contained in the certificate. This verification ensures the authenticity and integrity of the received data.

As an alternative to using a PKI, an entity can distribute its public key directly to all potential signature verifiers, so long as the key's integrity is protected. The switch does it by using a self-signed certificate as a container for the public key and the corresponding entity's identity.

Related Documentation • [Understanding Self-Signed Certificates on EX Series Switches on page 334](#)

Enabling HTTPS and XNM-SSL Services on Switches Using Self-Signed Certificates (CLI Procedure)

You can use the system-generated self-signed certificate or a manually generated self-signed certificate to enable Web management HTTPS and XNM-SSL services.

- To enable HTTPS services using the automatically generated self-signed certificate:

```
[edit]
user@switch# set system services web-management https system-generated-certificate
```

- To enable HTTPS services using a manually generated self-signed certificate:

```
[edit]
user@switch# set system services web-management https pki-local-certificate
certificate-id-name
```



NOTE: The value of the *certificate-id-name* must match the name you specified when you generated the self-signed certificate manually.

- To enable XNM-SSL services using a manually generated self-signed certificate:

```
[edit]
user@switch# set system services xnm-ssl local-certificate certificate-id-name
```



NOTE: The value of the *certificate-id-name* must match the name you specified when you generated the self-signed certificate manually.

- Related Documentation**
- [Manually Generating Self-Signed Certificates on Switches \(CLI Procedure\) on page 335](#)
 - [Understanding Self-Signed Certificates on EX Series Switches on page 334](#)

CHAPTER 15

Configuring 802.1X Authentication to Control Network Access on Switches

- [Understanding Access Control on Switches on page 346](#)
- [Understanding Authentication on Switches on page 348](#)
- [802.1X for Switches Overview on page 354](#)
- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)
- [Configuring 802.1X Authentication \(J-Web Procedure\) on page 358](#)
- [Example: Setting Up 802.1X in Conference Rooms to Provide Internet Access to Corporate Visitors on an EX Series Switch on page 361](#)
- [Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch on page 367](#)
- [Understanding Dynamic Filters Based on RADIUS Attributes on page 373](#)
- [Understanding Dynamic VLAN Assignment Using RADIUS Attributes on page 374](#)
- [Understanding Guest VLANs for 802.1X on Switches on page 375](#)
- [Understanding 802.1X and RADIUS Accounting on Switches on page 375](#)
- [Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378](#)
- [Understanding RADIUS-Initiated Changes to an Authorized User Session on page 382](#)
- [Configuring 802.1X RADIUS Accounting \(CLI Procedure\) on page 386](#)
- [Filtering 802.1X Supplicants by Using RADIUS Server Attributes on page 388](#)
- [Example: Applying a Firewall Filter to 802.1X-Authenticated Supplicants by Using RADIUS Server Attributes on an EX Series Switch on page 392](#)
- [Example: Applying Firewall Filters to Multiple Supplicants on Interfaces Enabled for 802.1X or MAC RADIUS Authentication on page 399](#)
- [Example: Applying Firewall Filters to Multiple Supplicants on Interfaces Enabled for 802.1X or MAC RADIUS Authentication on EX Series Switches with ELS Support on page 405](#)
- [Example: Configuring Fallback Options on EX Series Switches for EAP-TTLS Authentication and Odyssey Access Clients on page 410](#)
- [Example: Configuring Centralized Access Control to Network Resources, with an EX Series Switch Connected to Junos Pulse Access Control Service on page 415](#)

- [Example: Configuring 802.1X Authentication Options When the RADIUS Server Is Unavailable to an EX Series Switch on page 430](#)
- [Understanding Server Fail Fallback and Authentication on Switches on page 436](#)
- [Configuring RADIUS Server Fail Fallback \(CLI Procedure\) on page 437](#)
- [Monitoring 802.1X Authentication on page 439](#)
- [Verifying 802.1X Authentication on page 440](#)
- [Troubleshooting Authentication of End Devices on EX Series Switches on page 442](#)
- [Juniper-Switching-Filter VSA Match Conditions and Actions on page 443](#)
- [Juniper Networks Vendor-Specific RADIUS Attributes on page 445](#)
- [Juniper Networks Vendor-Specific TACACS+ Attributes on page 448](#)

Understanding Access Control on Switches

You can control access to your network through a switch by using several different authentication methods—including 802.1X, MAC RADIUS, or captive portal.

[Figure 8 on page 347](#) illustrates the authentication process:

Related Documentation • [Understanding Authentication on Switches on page 348](#)



- [Understanding Server Fail Fallback and Authentication on Switches on page 436](#)
- [Understanding Guest VLANs for 802.1X on Switches on page 375](#)
- [Understanding Dynamic VLAN Assignment Using RADIUS Attributes on page 374](#)
- [Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527](#)

Understanding Authentication on Switches

You can control access to your network through a Juniper Networks EX Series Ethernet Switch by using authentication methods such as 802.1X, MAC RADIUS, or captive portal. Authentication prevents unauthenticated devices and users from gaining access to your LAN. For 802.1X and MAC RADIUS authentication, end devices must be authenticated before they receive an IP address from a Dynamic Host Configuration Protocol (DHCP) server. For captive portal authentication, the switch allows the end devices to acquire an IP address in order to redirect them to a login page for authentication.

This topic covers:

- [Sample Authentication Topology on page 348](#)
- [802.1X Authentication on page 349](#)
- [MAC RADIUS Authentication on page 351](#)
- [Captive Portal Authentication on page 351](#)
- [Static MAC Bypass of Authentication on page 352](#)
- [Fallback of Authentication Methods on page 353](#)

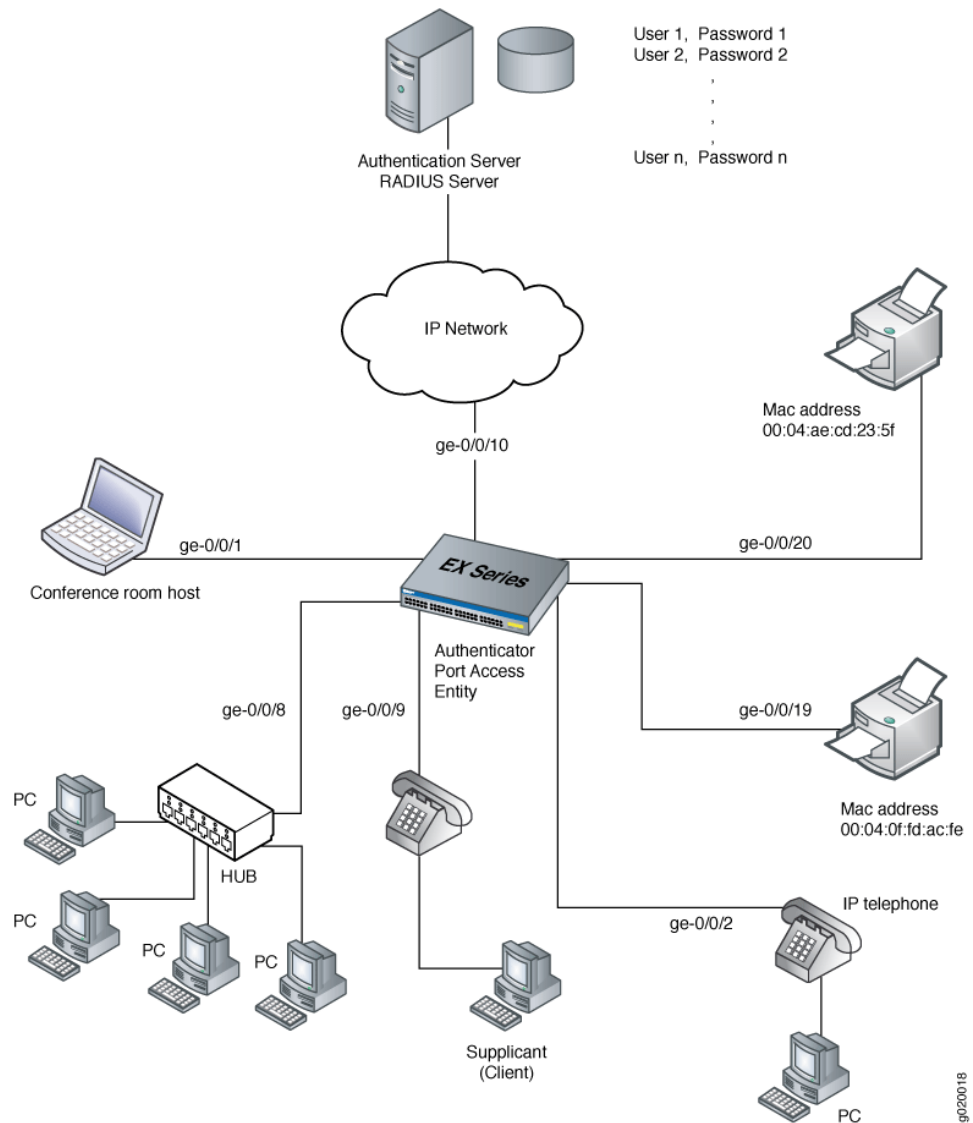
Sample Authentication Topology

[Figure 9 on page 349](#) illustrates a basic deployment topology for authentication on an EX Series switch:



NOTE: For illustration purposes, we have used an EX Series switch, but a QFX5100 switch can be used in the same way.

Figure 9: Example Authentication Topology



The topology contains an EX Series access switch connected to the authentication server on port ge-0/0/10. Interface ge-0/0/1 connects to the conference room host. Interface ge-0/0/8 is connected to four desktop PCs through a hub. Interfaces ge-0/0/9 and ge-0/0/2 are connected to IP phones with an integrated hub to connect the phone and desktop PC to a single port. Interfaces ge-0/0/19 and ge-0/0/20 are connected to printers.

802.1X Authentication

802.1X is an IEEE standard for port-based network access control (PNAC). It provides an authentication mechanism for devices seeking to access a LAN. The 802.1X authentication feature on an EX Series switch is based upon the IEEE 802.1X standard *Port-Based Network Access Control*.

The communication protocol between the end device and the switch is Extensible Authentication Protocol over LAN (EAPoL). EAPoL is a version of EAP designed to work with Ethernet networks. The communication protocol between the authentication server and the switch is RADIUS.

During the authentication process, the switch completes multiple message exchanges between the end device and the authentication server. While 802.1X authentication is in process, only 802.1X traffic and control traffic can transit the network. Other traffic, such as DHCP traffic and HTTP traffic, is blocked at the data link layer.



NOTE: You can configure both the maximum number of times an EAPoL request packet is retransmitted and the timeout period between attempts. For information, see [“Configuring 802.1X Interface Settings \(CLI Procedure\)” on page 357](#).

An 802.1X authentication configuration for a LAN contains three basic components:

- *Supplicant* (also called end device)—Supplicant is the IEEE term for an end device that requests to join the network. The end device can be responsive or nonresponsive. A responsive end device is 802.1X-enabled and provides authentication credentials using EAP. The credentials required depend on the version of EAP being used—specifically, a username and password for EAP MD5 or a username and client certificates for Extensible Authentication Protocol-Transport Layer Security (EAP-TLS), EAP-Tunneled Transport Layer Security (EAP-TTLS), and Protected EAP (PEAP).

You can configure a server-reject VLAN to provide limited LAN access for responsive 802.1X-enabled end devices that sent incorrect credentials. A server-reject VLAN can provide a remedial connection, typically only to the Internet, for these devices. See [“Example: Configuring Fallback Options on EX Series Switches for EAP-TTLS Authentication and Odyssey Access Clients” on page 410](#) for additional information.



NOTE: If the end device that is authenticated using the server-reject VLAN is an IP phone, voice traffic is dropped.

A nonresponsive end device is one that is not 802.1X-enabled. It can be authenticated through MAC RADIUS authentication.

- *Authenticator port access entity*—The IEEE term for the authenticator. The switch is the authenticator, and it controls access by blocking all traffic to and from end devices until they are authenticated.
- *Authentication server*—The authentication server contains the backend database that makes authentication decisions. It contains credential information for each end device that is authenticated to connect to the network. The authenticator forwards credentials supplied by the end device to the authentication server. If the credentials forwarded by the authenticator match the credentials in the authentication server database, access is granted. If the credentials forwarded do not match, access is denied. The EX Series switches support RADIUS authentication servers.



NOTE: You cannot configure 802.1X authentication on redundant trunk groups (RTGs). For more information about RTGs, see *Understanding Redundant Trunk Links (Legacy RTG Configuration)*.

MAC RADIUS Authentication

The 802.1X authentication method only works if the end device is 802.1X-enabled, but many single-purpose network devices such as printers and IP phones do not support the 802.1X protocol. You can configure MAC RADIUS authentication on interfaces that are connected to network devices that do not support 802.1X and for which you want to allow to access the LAN. When an end device that is not 802.1X-enabled is detected on the interface, the switch transmits the MAC address of the device to the authentication server. The server then tries to match the MAC address with a list of MAC addresses in its database. If the MAC address matches an address in the list, the end device is authenticated.

You can configure both 802.1X and MAC RADIUS authentication methods on the interface. In this case, the switch first attempts to authenticate the end device by using 802.1X, and if that method fails, it attempts to authenticate the end device by using MAC RADIUS authentication. If you know that only non-responsive supplicants connect on that interface, you can eliminate the delay that occurs for the switch to determine that the end device is not 802.1X-enabled by configuring the **mac-radius restrict** option. When this option is configured, the switch does not attempt to authenticate the end device through 802.1X authentication but instead immediately sends a request to the RADIUS server for authentication of the MAC address of the end device. If the MAC address of that end device is configured as a valid MAC address on the RADIUS server, the switch opens LAN access to the end device on the interface to which it is connected.

The **mac-radius-restrict** option is useful when no other 802.1X authentication methods, such as guest VLAN, are needed on the interface. If you configure **mac-radius-restrict** on an interface, the switch drops all 802.1X packets.

The authentication protocols supported for MAC RADIUS authentication are EAP-MD5, which is the default, Protected EAP (EAP-PEAP), and Password Authentication Protocol (PAP). You can specify the authentication protocol to be used for MAC RADIUS authentication using the **authentication-protocol** statement.

Captive Portal Authentication

Captive portal authentication (hereafter referred to as captive portal) enables you to authenticate users on EX Series switches by redirecting Web browser requests to a login page that requires users to input a valid username and password before they can access the network. Captive portal controls network access by requiring users to provide information that is authenticated against a RADIUS server database by using EAP-MD5. You can also use captive portal to display an acceptable-use policy to users before they access your network.

Juniper Networks Junos operating system (Junos OS) for EX Series switches provides a template that enables you to easily design and modify the look of the captive portal login

page. You enable specific interfaces for captive portal. The first time an end device connected to a captive portal interface attempts to access a webpage, the switch presents the captive portal login page. After the device is successfully authenticated, it is allowed access to the network and to continue to the original page requested.



NOTE: If HTTPS is enabled, HTTP requests are redirected to an HTTPS connection for the captive portal authentication process. After authentication, the end device is returned to the HTTP connection.

If there are end devices that are not HTTP-enabled connected to the captive portal interface, you can allow them to bypass captive portal authentication by adding their MAC addresses to an authentication whitelist.

When a user is authenticated by the RADIUS server, any per-user policies (attributes) associated with that user are also sent to the switch.

Captive portal on switches has the following limitations:

- Captive portal does not support dynamic assignment of VLANs downloaded from the RADIUS server.
- If the user remains idle for more than about 5 minutes and there is no traffic passed, the user must log back in to the captive portal.

Static MAC Bypass of Authentication

You can allow end devices to access the LAN without authentication on a RADIUS server by including their MAC addresses in the static MAC bypass list (also known as the exclusion list).

You might choose to include a device in the bypass list to:

- Allow non-802.1X-enabled devices access to the LAN.
- Eliminate the delay that occurs for the switch to determine that a connected device is a non-802.1X-enabled host.

When you configure static MAC on the switch, the MAC address of the end device is first checked in a local database (a user-configured list of MAC addresses). If a match is found, the end device is successfully authenticated and the interface is opened up for it. No further authentication is done for that end device. If a match is not found and 802.1X authentication is enabled on the switch, the switch attempts to authenticate the end device through the RADIUS server.

For each MAC address, you can also configure the VLAN to which the end device is moved or the interfaces on which the host connects.



CAUTION: When you clear the learned MAC addresses from an interface, using the `clear dot1x interface` command, all MAC addresses are cleared, including those in the static MAC bypass list.

Fallback of Authentication Methods

You can configure 802.1X, MAC RADIUS, and captive portal authentication on a single interface to enable fallback to another method if authentication by one method fails. The authentication methods can be configured in any combination, except that you cannot configure both MAC RADIUS and captive portal on an interface without also configuring 802.1X. By default, an EX Series switch uses the following order of authentication methods:

1. 802.1X authentication—If 802.1X is configured on the interface, the switch sends EAPoL requests to the end device and attempts to authenticate the end device through 802.1X authentication. If the end device does not respond to the EAP requests, the switch checks whether MAC RADIUS authentication is configured on the interface.
2. MAC RADIUS authentication—If MAC RADIUS authentication is configured on the interface, the switch sends the MAC RADIUS address of the end device to the authentication server. If MAC RADIUS authentication is not configured, the switch checks whether captive portal is configured on the interface.
3. Captive portal authentication—If captive portal is configured on the interface, the switch attempts to authenticate the end device by using this method after the other authentication methods configured on the interface have failed.

For an illustration of the default process flow when multiple authentication methods are configured on an interface, see [“Understanding Access Control on Switches” on page 346](#).

You can override the default order for fallback of authentication methods by configuring the **authentication-order** statement to specify that the switch use either 802.1X authentication or MAC RADIUS authentication first. Captive portal must always be last in the order of authentication methods. For more information, see [“Configuring Flexible Authentication Order” on page 514](#).



NOTE: Starting with Junos OS Release 15.1R3, if an interface is configured in multiple-suplicant mode, end devices connecting through the interface can be authenticated using different methods in parallel. Therefore, if an end device on the interface was authenticated after fall back to captive portal, then additional end devices can still be authenticated using 802.1X or MAC RADIUS authentication.

Related Documentation

- [802.1X for Switches Overview on page 354](#)

- [Understanding Access Control on Switches on page 346](#)
- [Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch on page 367](#)
- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)
- [Configuring MAC RADIUS Authentication \(CLI Procedure\) on page 501](#)
- [Configuring Captive Portal Authentication \(CLI Procedure\) on page 532](#)
- [Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication \(CLI Procedure\) on page 508](#)
- [Controlling Authentication Session Timeouts \(CLI Procedure\) on page 517](#)

802.1X for Switches Overview

How 802.1X Authentication Works

802.1X authentication works by using an authenticator port access entity (the switch) to block ingress traffic from a supplicant (end device) at the port until the supplicant's credentials are presented and match on the authentication server (a RADIUS server). When authenticated, the switch stops blocking traffic and opens the port to the supplicant.

The end device is authenticated in *single supplicant* mode, *single-secure supplicant* mode, or *multiple supplicant* mode:

- **single supplicant**—Authenticates only the first end device. All other end devices that connect later to the port are allowed full access without any further authentication. They effectively *piggyback* on the first end device's authentication.
- **single-secure supplicant**—Allows only one end device to connect to the port. No other end device is allowed to connect until the first device logs out.
- **multiple supplicant**—Allows multiple end devices to connect to the port. Each end device is authenticated individually.

Network access can be further defined by using VLANs and firewall filters, both of which act as filters to separate and match groups of end devices to the areas of the LAN they require. For example, you can configure VLANs to handle different categories of authentication failures depending upon:

- Whether or not the end device is 802.1X-enabled.
- Whether or not MAC RADIUS authentication is configured on the switch interfaces to which the hosts are connected.
- Whether the RADIUS authentication server becomes unavailable or sends a RADIUS access-reject message. See [“Configuring RADIUS Server Fail Fallback \(CLI Procedure\)” on page 437](#).

802.1X Features Overview

The following 802.1X features are supported on Juniper Networks Ethernet Switches:

- **Guest VLAN**—Provides limited access to a LAN, typically only to the Internet, for nonresponsive end devices that are not 802.1X-enabled when MAC RADIUS authentication is not configured on the switch interfaces to which the hosts are connected. Also, a guest VLAN can be used to provide limited access to a LAN for guest users. Typically, the guest VLAN provides access only to the Internet and to other guests' end devices.
- **Server-reject VLAN**—Provides limited access to a LAN, typically only to the Internet, for responsive end devices that are 802.1X-enabled but that have sent the wrong credentials. If the end device that is authenticated using the server-reject VLAN is an IP phone, voice traffic is not allowed.
- **Server-fail VLAN**—Provides limited access to a LAN, typically only to the Internet, for 802.1X end devices during a RADIUS server timeout.
- **Dynamic VLAN**—Enables an end device, after authentication, to be a member of a VLAN dynamically.
- **Private VLAN**—Enables configuration of 802.1X authentication on interfaces that are members of private VLANs (PVLANS).
- **Dynamic changes to a user session**—Enables the switch administrator to terminate an already authenticated session. This feature is based on support of the RADIUS Disconnect Message defined in RFC 3576.
- **VoIP VLAN**—Supports IP telephones. The implementation of a voice VLAN on an IP telephone is vendor-specific. If the phone is 802.1X-enabled, it is authenticated as any other supplicant is. If the phone is not 802.1X-enabled, but has another 802.1X-compatible device connected to its data port, that device is authenticated, and then VoIP traffic can flow to and from the phone (provided that the interface is configured in single supplicant mode and not in single-secure supplicant mode).



NOTE: Configuring a VoIP VLAN on private VLAN (PVLAN) interfaces is not supported.

- **RADIUS accounting**—Sends accounting information to the RADIUS accounting server. Accounting information is sent to the server whenever a subscriber logs in or logs out and whenever a subscriber activates or deactivates a subscription.
- **RADIUS server attributes for 802.1X**—The **Juniper-Switching-Filter** is a vendor-specific attribute (VSA) that can be configured on the RADIUS server to further define a supplicant's access during the 802.1X authentication process. Centrally configuring attributes on the authentication server obviates the need to configure these same attributes in the form of firewall filters on every switch in the LAN to which the supplicant might connect to the LAN. This feature is based on RLI 4583, AAA RADIUS BRAS VSA Support.

The following features are supported to authenticate devices that are not 802.1X-enabled:

- **Static MAC bypass**—Provides a bypass mechanism to authenticate devices that are not 802.1X-enabled (such as printers). Static MAC bypass connects these devices to 802.1X-enabled ports, bypassing 802.1X authentication.
- **MAC RADIUS authentication**—Provides a means to permit hosts that are not 802.1X-enabled to access the LAN. MAC-RADIUS simulates the supplicant functionality of the client device, using the MAC address of the client as username and password.

802.1X Authentication on Trunk Ports

Starting in Junos OS Release 18.4R1, you can configure 802.1X authentication on trunk interfaces, which allows the network access device (NAS) to authenticate an access point (AP) or another connected Layer 2 device. An AP or switch connected to the NAS will support multiple VLANs, so must connect to a trunk port. Enabling 802.1X authentication on the trunk interface protects the NAS from a security breach in which an attacker might disconnect the AP and connect a laptop to get free access to network for all the configured VLANs.

Please note the following caveats when configuring 802.1X authentication on trunk interfaces.

- Only single and single-secure supplicant modes are supported on trunk interfaces.
- You must configure 802.1X authentication locally on the trunk interface. If you configure 802.1X authentication globally using the **set protocol dot1x interface all** command, the configuration is not applied to the trunk interface.
- Dynamic VLANs are not supported on trunk interfaces.
- Guest VLAN and server-reject VLAN are not supported on trunk interfaces.
- Server fail fallback for VoIP clients is not supported on trunk interfaces (**server-fail-voip**).
- Authentication on trunk port is not supported using captive portal.
- Authentication on trunk port is not supported on aggregated interfaces.
- Configuration of 802.1X authentication on interfaces that are members of private VLANs (PVLANS) is not supported on trunk ports.

Release History Table

Release	Description
18.4R1	Starting in Junos OS Release 18.4R1, you can configure 802.1X authentication on trunk interfaces, which allows the network access device (NAS) to authenticate an access point (AP) or another connected Layer 2 device.

Related Documentation

- [Understanding Authentication on Switches on page 348](#)
- [Understanding 802.1X and VoIP on EX Series Switches on page 451](#)
- [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)

- [Understanding 802.1X and RADIUS Accounting on Switches on page 375](#)
- [Understanding Guest VLANs for 802.1X on Switches on page 375](#)
- [Understanding Dynamic Filters Based on RADIUS Attributes on page 373](#)
- [Understanding Server Fail Fallback and Authentication on Switches on page 436](#)

Configuring 802.1X Interface Settings (CLI Procedure)

IEEE 802.1X authentication provides network edge security, protecting Ethernet LANs from unauthorized user access by blocking all traffic to and from a supplicant (client) at the interface until the supplicant's credentials are presented and matched on the *authentication server* (a RADIUS server). When the supplicant is authenticated, the switch stops blocking access and opens the interface to the supplicant.



NOTE:

- You can also specify an 802.1X exclusion list to specify supplicants that can bypass authentication and be automatically connected to the LAN. See [“Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication \(CLI Procedure\)” on page 508](#).
- You cannot configure 802.1X user authentication on interfaces that have been enabled for Q-in-Q tunneling.

Before you begin, specify the RADIUS server or servers to be used as the authentication server. See [“Specifying RADIUS Server Connections on Switches \(CLI Procedure\)” on page 500](#).

To configure 802.1X on an interface:

1. Configure the supplicant mode as **single** (authenticates the first supplicant), **single-secure** (authenticates only one supplicant), or **multiple** (authenticates multiple supplicants):

```
[edit protocols dot1x]
user@switch# set authenticator interface interface-name supplicant multiple
```



NOTE: Multiple supplicant mode is not supported on trunk interfaces.

2. Enable reauthentication and specify the reauthentication interval:

```
[edit protocols dot1x]
user@switch# set authenticator interface interface-name reauthentication interval seconds
```

3. Configure the interface timeout value for the response from the supplicant:

```
[edit protocols dot1x]
```

```
user@switch# set authenticator interface interface-name supplicant-timeout seconds
```

4. Configure the timeout for the interface before it resends an authentication request to the RADIUS server:

```
[edit protocols dot1x]  
user@switch# set authenticator interface interface-name server-timeout seconds
```

5. Configure how long, in seconds, the interface waits before retransmitting the initial EAPOL PDUs to the supplicant:

```
[edit protocols dot1x]  
user@switch# set authenticator interface interface-name transmit-period seconds
```

6. Configure the maximum number of times an EAPOL request packet is retransmitted to the supplicant before the authentication session times out:

```
[edit protocols dot1x]  
user@switch# set authenticator interface interface-name maximum-requests number
```

7. Configure the number of times the switch attempts to authenticate the port after an initial failure. The port remains in a wait state during the quiet period after the authentication attempt.

```
[edit protocols dot1x]  
user@switch# set authenticator interface interface-name retries number
```



NOTE: This setting specifies the number of attempts before the switch puts the interface in a *HELD* state.

Related Documentation

- [Configuring 802.1X Authentication \(J-Web Procedure\) on page 358](#)
- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
- [Monitoring 802.1X Authentication on page 439](#)
- [Verifying 802.1X Authentication on page 440](#)
- [Configuring LLDP \(CLI Procedure\) on page 556](#)
- [Understanding Authentication on Switches on page 348](#)

Configuring 802.1X Authentication (J-Web Procedure)



NOTE: This topic applies only to the J-Web Application package.

J-Web Application package Release 14.1X53-A2 does not support 802.1X authentication on EX4600 switches.

To configure 802.1X settings on an EX Series switch using the J-Web interface:

1. Select **Configure > Security > 802.1X**.

The 802.1X screen displays a list of interfaces, whether 802.1X security has been enabled, and the assigned port role.

When you select an interface, the **Details of 802.1x configuration on port** section displays 802.1X details for that interface.



NOTE: After you make changes to the configuration on this page, you must commit the changes for them to take effect. To commit all changes to the active configuration, select **Commit Options > Commit**. See [Using the Commit Options to Commit Configuration Changes](#) for details about all commit options.

2. Select one of the following options:

- **RADIUS Servers**—Specifies the RADIUS server to be used for authentication. Select the corresponding check box to specify a server. Click **Add** or **Edit** to add or modify the RADIUS server settings. Enter information as specified in [Table 23 on page 359](#).
- **Exclusion List**—Excludes hosts from the 802.1X authentication list by specifying the MAC address. Click **Add** or **Edit** in the Exclusion List screen to include or modify the MAC addresses. Enter information as specified in [Table 24 on page 360](#).
- **Edit**—Specifies 802.1X settings for the selected interface
 - **Apply 802.1X Profile**—Applies an 802.1X profile based on the port role. If a message appears asking whether you want to configure a RADIUS server, click **Yes**.
 - **802.1X Configuration**—Configures custom 802.1X settings for the selected interface. If a message appears asking whether you want to configure a RADIUS server, click **Yes**. Enter information as specified in [Table 23 on page 359](#). To configure 802.1X port settings, enter information as specified in [Table 25 on page 360](#).
- **Delete**—Deletes 802.1X authentication configuration on the selected interface.

Table 23: RADIUS Server Settings

Field	Function	Your Action
IP Address	Specifies the IP address of the server.	Enter the IP address in dotted decimal notation.
Password	Specifies the login password.	Enter the password.
Confirm Password	Verifies the login password for the server.	Reenter the password.
Server Port Number	Specifies the port with which the server is associated.	Type the port number.

Table 23: RADIUS Server Settings (continued)

Field	Function	Your Action
Source Address	Specifies the source address of the switch using which the switch can communicate with the server.	Type the IP address in dotted decimal notation.
Retry Attempts	Specifies the number of login retries allowed after a login failure.	Type the number.
Timeout	Specifies the time interval to wait before the connection to the server is closed.	Type the interval in seconds.

Table 24: 802.1X Exclusion List

Field	Function	Your Action
MAC Address	Specifies the MAC address to be excluded from 802.1X authentication.	Enter the MAC address.
Exclude if connected through the port	Specifies that the host can bypass authentication if it is connected through a particular interface.	Select to enable the option. Select the port through which the host is connected.
Move the host to the VLAN	Specifies moving the host to a specific VLAN once the host is authenticated.	Select to enable the option. Select the VLAN from the list.

Table 25: 802.1X Port Settings

Field	Function	Your Action
Supplicant Mode		
Supplicant Mode	Specifies the mode to be adopted for supplicants: <ul style="list-style-type: none"> Single—Allows only one host for authentication. Multiple—Allows multiple hosts for authentication. Each host is checked before being admitted to the network. Single authentication for multiple hosts—Allows multiple hosts, but only the first host is authenticated. 	Select a mode.
Authentication		
Enable re-authentication	Specifies enabling reauthentication on the selected interface.	<ol style="list-style-type: none"> Select to enable reauthentication. Enter the timeout for reauthentication in seconds.

Table 25: 802.1X Port Settings (continued)

Field	Function	Your Action
Action on authentication failure	Specifies the action to be taken if the host does not respond, leading to an authentication failure.	Select one: <ul style="list-style-type: none"> • Move to the Guest VLAN—Select the VLAN to move the interface to. • Deny—The host is not permitted access.
Timeouts	Specifies timeout values for each action.	Enter the value in seconds for: <ul style="list-style-type: none"> • Port waiting time after an authentication failure • EAPOL retransmitting interval • Maximum number of EAPOL requests • Maximum number of retries • Port timeout value for the response from the supplicant • Port timeout value for the response from the RADIUS server

Release History Table

Release	Description
14.1X53-A2	J-Web Application package Release 14.1X53-A2 does not support 802.1X authentication on EX4600 switches.

Related Documentation

- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)
- [Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch on page 367](#)
- [Understanding Authentication on Switches on page 348](#)

Example: Setting Up 802.1X in Conference Rooms to Provide Internet Access to Corporate Visitors on an EX Series Switch

802.1X on EX Series switches provides LAN access to users who do not have credentials in the RADIUS database. These users, referred to as *guests*, are authenticated and typically provided with access to the Internet.

This example describes how to create a guest VLAN and configure 802.1X authentication for it.

- [Requirements on page 362](#)
- [Overview and Topology on page 362](#)
- [Configuration of a Guest VLAN That Includes 802.1X Authentication on page 364](#)
- [Verification on page 364](#)

Requirements

This example uses the following software and hardware components:



NOTE: This example also applies to QFX5100 switches.

- Junos OS Release 9.0 or later for EX Series switches
- One EX Series switch acting as a port access entity (PAE). The interfaces on the authenticator PAE form a control gate that blocks all traffic to and from supplicants until they are authenticated.
- One RADIUS authentication server that supports 802.1X. The authentication server acts as the backend database and contains credential information for hosts (supplicants) that have permission to connect to the network.

Before you configure guest VLAN authentication, be sure you have:

- Performed the initial switch configuration. See *Connecting and Configuring an EX Series Switch (CLI Procedure)*.
- Performed basic bridging and VLAN configuration on the switch. See the documentation that describes setting up basic bridging and a VLAN for your switch. If you are using a switch that supports the Enhanced Layer 2 Software (ELS) configuration style, see *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch with ELS Support* or *Example: Setting Up Basic Bridging and a VLAN on Switches*. For all other switches, see *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch*.



NOTE: For more about ELS, see: *Using the Enhanced Layer 2 Software CLI*

Overview and Topology

As part of IEEE 802.1X port-based network access control (PNAC), you can provide limited network access to supplicants who do not belong to a VLAN authentication group by configuring authentication for a guest VLAN. Typically, guest VLAN access is used to provide Internet access to visitors to a corporate site. However, you can also use the guest VLAN feature to provide access to a VLAN with limited resources to supplicants that fail 802.1X authentication on a corporate LAN.



NOTE: This figure also applies to QFX5100 switches.

Figure 10 on page 363 shows the conference room connected to the switch at interface ge-0/0/1.

Figure 10: Topology for Guest VLAN Example

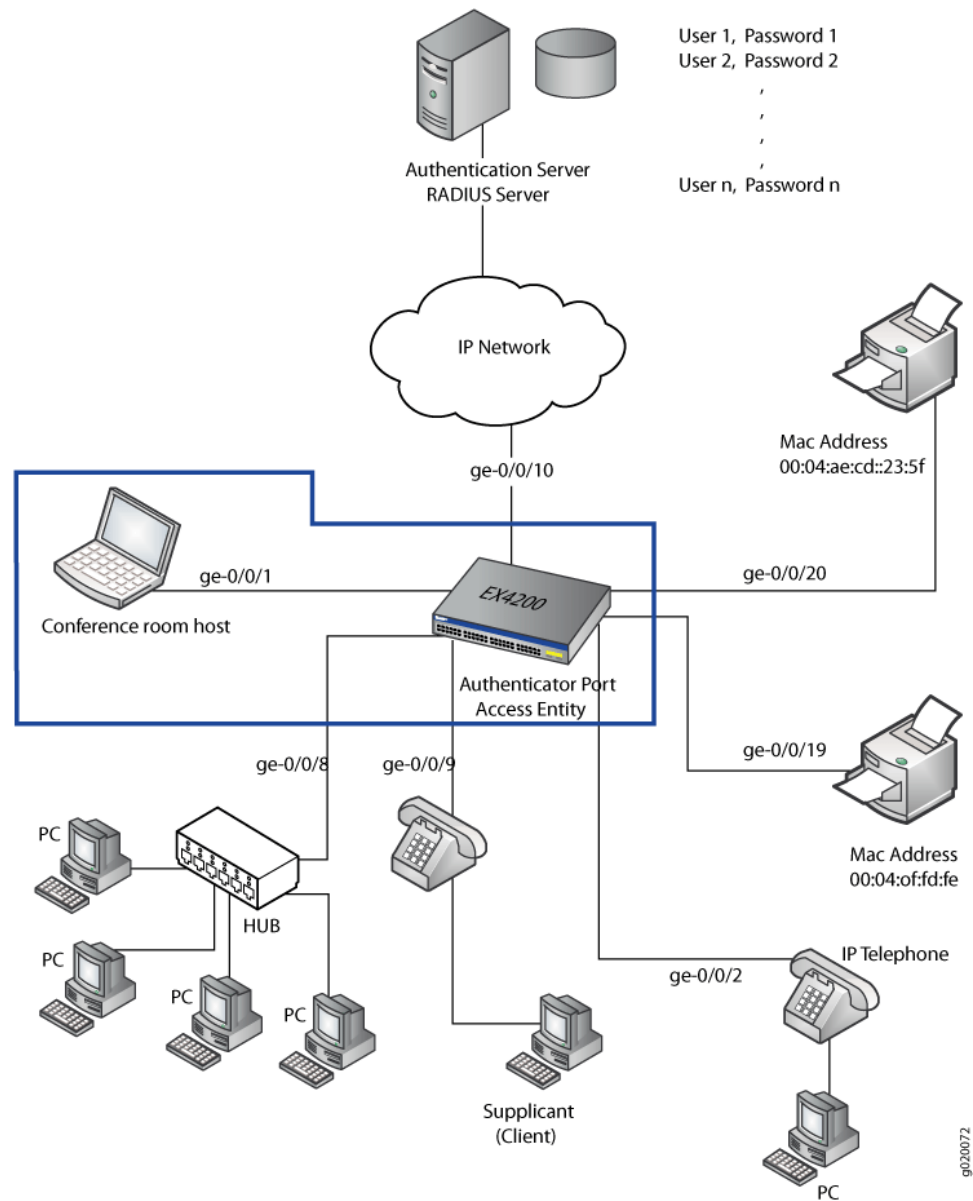


Table 26: Components of the Guest VLAN Topology

Property	Settings
Switch hardware	EX4200 switch, 24 Gigabit Ethernet interfaces: 8 PoE interfaces (ge-0/0/0 through ge-0/0/7) and 16 non-PoE interfaces (ge-0/0/8 through ge-0/0/23)
VLAN names and tag IDs	sales , tag 100 support , tag 200 guest-vlan , tag 300
One RADIUS server	Backend database connected to the switch through interface ge-0/0/10

In this example, access interface **ge-0/0/1** provides LAN connectivity in the conference room. Configure this access interface to provide LAN connectivity to visitors in the conference room who are not authenticated by the corporate VLAN.

Configuration of a Guest VLAN That Includes 802.1X Authentication

CLI Quick Configuration To quickly configure a guest VLAN, with 802.1X authentication, copy the following commands and paste them into the switch terminal window:

```
[edit]
set vlans guest-vlan vlan-id 300
set protocols dot1x authenticator interface all guest-vlan guest-vlan
```

Step-by-Step Procedure To configure a guest VLAN that includes 802.1X authentication on an EX Series switch:

1. Configure the VLAN ID for the guest VLAN:

```
[edit]
user@switch# set vlans guest-vlan vlan-id 300
```

2. Configure the guest VLAN under **dot1x** protocol:

```
[edit]
user@switch# set protocols dot1x authenticator interface all guest-vlan guest-vlan
```

Results Check the results of the configuration:

```
user@switch> show configuration
protocols {
  dot1x {
    authenticator {
      interface {
        all {
          guest-vlan {
            guest-vlan;
          }
        }
      }
    }
  }
}
vlans {
  guest-vlan {
    vlan-id 300;
  }
}
```

Verification

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

- [Verifying That the Guest VLAN Is Configured on page 365](#)

Verifying That the Guest VLAN Is Configured

Purpose Verify that the guest VLAN is created and that an interface has failed authentication and been moved to the guest VLAN.



NOTE: On switches running Junos OS for EX Series with support for ELS, the output for the `show vlans` command will contain additional information. If your switch runs software that supports ELS, see `show vlans`. For ELS details, see *Using the Enhanced Layer 2 Software CLI*.

Action Issue the operational mode commands:

```
user@switch> show vlans
```

Name	Tag	Interfaces
default		ge-0/0/3.0*
dynamic	40	None
guest	30	None
guest-vlan	300	ge-0/0/1.0*
vlan_dyn		None

```
user@switch> show dot1x interface ge-0/0/1.0 detail
```

```
ge-0/0/1.0
  Role: Authenticator
  Administrative state: Auto
  Supplicant mode: Single
  Number of retries: 3
  Quiet period: 60 seconds
  Transmit period: 30 seconds
  Mac Radius: Enabled
  Mac Radius Restrict: Disabled
  Reauthentication: Enabled
  Configured Reauthentication interval: 3600 seconds
  Supplicant timeout: 30 seconds
  Server timeout: 30 seconds
  Maximum EAPOL requests: 2
  Guest VLAN member: guest-vlan
  Number of connected supplicants: 1
    Supplicant: user1, 00:00:00:00:13:23
      Operational state: Authenticated
      Authentication method: Radius
      Authenticated VLAN: vo11
      Dynamic Filter: match source-dot1q-tag 10 action deny
      Session Reauth interval: 60 seconds
      Reauthentication due in 50 seconds
```

Meaning The output of the **show vlans** command shows **guest-vlan** as the the name of the VLAN and the VLAN ID as **300**.

The output of the **show dot1x interface ge-0/0/1.0 detail** command displays the **Guest VLAN membership** field, indicating that a supplicant at this interface failed 802.1X authentication and was passed through to the **guest-vlan**.

Related Documentation

- [Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378](#)
- [Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch on page 367](#)

- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)

Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch

802.1x port-based network access control (PNAC) authentication on EX Series switches provides three types of authentication to meet the access needs of your enterprise LAN:

- Authenticate the first end device (supplicant) on an authenticator port, and allow all other end devices also connecting to have access to the LAN.
- Authenticate only one end device on an authenticator port at one time.
- Authenticate multiple end devices on an authenticator port. Multiple supplicant mode is used in VoIP configurations.

This example configures an EX Series switch to use IEEE 802.1X to authenticate end devices that use three different administrative modes.

- [Requirements on page 367](#)
- [Overview and Topology on page 368](#)
- [Configuration of 802.1X to Support Multiple Supplicant Modes on page 370](#)
- [Verification on page 371](#)

Requirements

This example uses the following software and hardware components:



NOTE: This example also applies to QFX5100 switches.

- Junos OS Release 9.0 or later for EX Series switches
- One EX Series switch acting as an authenticator port access entity (PAE). The ports on the authenticator PAE form a control gate that blocks all traffic to and from end devices until they are authenticated.
- One RADIUS authentication server that supports 802.1X. The authentication server acts as the backend database and contains credential information for end devices (supplicants) that have permission to connect to the network.

Before you configure the ports for 802.1X authentication, be sure you have:

- Performed the initial switch configuration. See *Connecting and Configuring an EX Series Switch (CLI Procedure)*.
- Performed basic bridging and VLAN configuration on the switch. See the documentation that describes setting up basic bridging and a VLAN for your switch. If you are using a

switch that supports the Enhanced Layer 2 Software (ELS) configuration style, see *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch with ELS Support* or *Example: Setting Up Basic Bridging and a VLAN on Switches*. For all other switches, see *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch*.



NOTE: For more about ELS, see *Using the Enhanced Layer 2 Software CLI*.

- Configured users on the authentication server.

Overview and Topology

As shown in [Figure 11 on page 369](#), the topology contains an EX4200 access switch connected to the authentication server on port ge-0/0/10. Interfaces ge-0/0/8, ge-0/0/9, and ge-0/0/11 will be configured for three different administrative modes.



NOTE: This figure also applies to QFX5100 switches.

Figure 11: Topology for Configuring Supplicant Modes

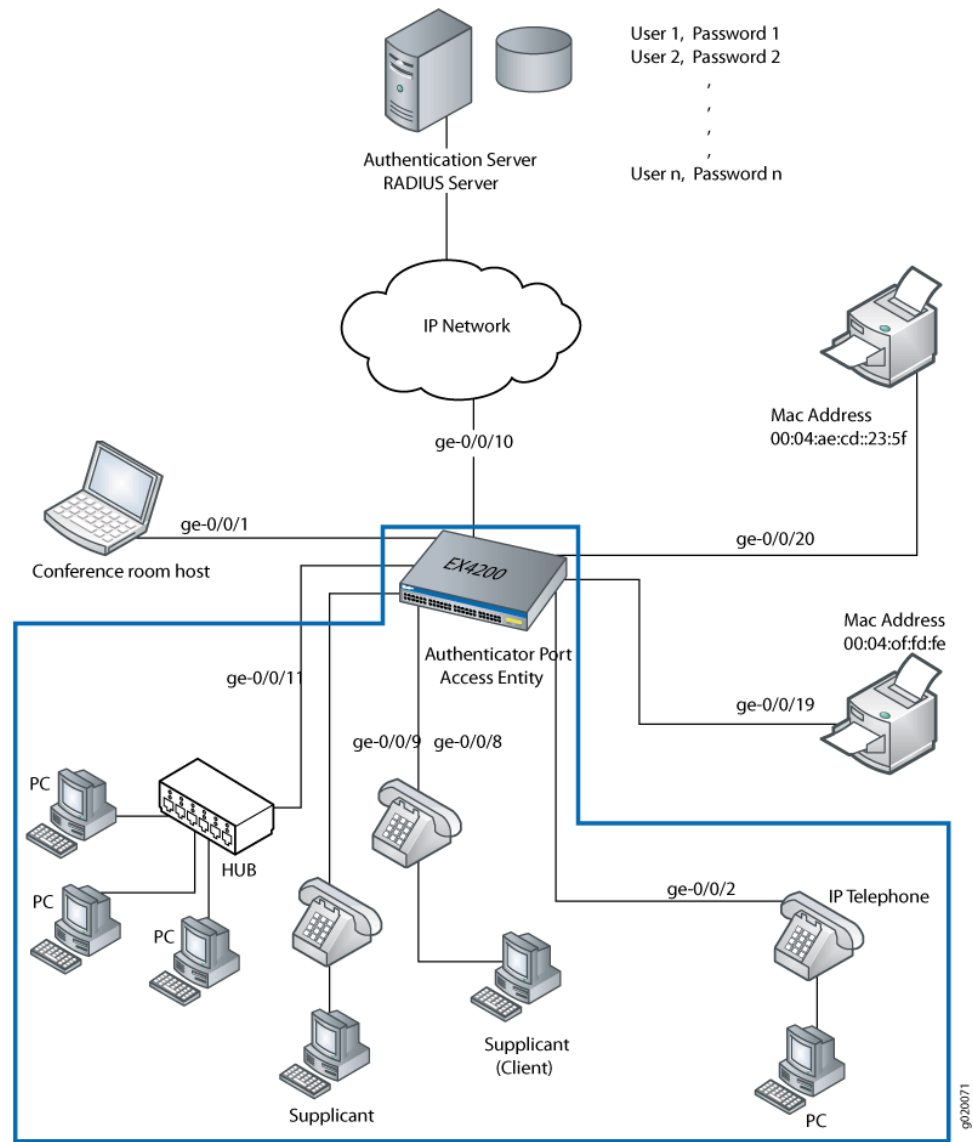


Table 27: Components of the Supplicant Mode Configuration Topology

Property	Settings
Switch hardware	EX4200 switch, 24 Gigabit Ethernet ports: 8 PoE ports (ge-0/0/0 through ge-0/0/7) and 16 non-PoE ports (ge-0/0/8 through ge-0/0/23)
Connections to Avaya phones—with integrated hub, to connect phone and desktop PC to a single port; (requires PoE)	ge-0/0/8, ge-0/0/9, and ge-0/0/11

To configure the administrative modes to support supplicants in different areas of the Enterprise network:

- Configure access port ge-0/0/8 for single supplicant mode authentication.
- Configure access port ge-0/0/9 for single secure supplicant mode authentication.
- Configure access port ge-0/0/11 for multiple supplicant mode authentication.

Single supplicant mode authenticates only the first end device that connects to an authenticator port. All other end devices connecting to the authenticator port after the first has connected successfully, whether they are 802.1X-enabled or not, are permitted access to the port without further authentication. If the first authenticated end device logs out, all other end devices are locked out until an end device authenticates.

Single-secure supplicant mode authenticates only one end device to connect to an authenticator port. No other end device can connect to the authenticator port until the first logs out.

Multiple supplicant mode authenticates multiple end devices individually on one authenticator port. If you configure a maximum number of devices that can be connected to a port through port security, the lesser of the configured values is used to determine the maximum number of end devices allowed per port.

Configuration of 802.1X to Support Multiple Supplicant Modes

CLI Quick Configuration To quickly configure the ports with different 802.1X authentication modes, copy the following commands and paste them into the switch terminal window:

```
[edit]
set protocols dot1x authenticator interface ge-0/0/8 supplicant single
set protocols dot1x authenticator interface ge-0/0/9 supplicant single-secure
set protocols dot1x authenticator interface ge-0/0/11 supplicant multiple
```

Step-by-Step Procedure Configure the administrative mode on the interfaces:

1. Configure the supplicant mode as single on interface ge-0/0/8:

```
[edit protocols]
user@switch# set dot1x authenticator interface ge-0/0/8 supplicant single
```

2. Configure the supplicant mode as single secure on interface ge-0/0/9:

```
[edit protocols]
user@switch# set dot1x authenticator interface ge-0/0/9 supplicant single-secure
```

3. Configure multiple supplicant mode on interface ge-0/0/11:

```
[edit protocols]
user@switch# set dot1x authenticator interface ge-0/0/11 supplicant multiple
```

Results

Check the results of the configuration:

```
[edit]
user@access-switch> show configuration
protocols {
  dot1x {
    authenticator {
      interface {
        ge-0/0/8.0 {
          supplicant single;
        }
        ge-0/0/9.0 {
          supplicant single-secure;
        }
        ge-0/0/11.0 {
          supplicant multiple;
        }
      }
    }
  }
}
```

Verification

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

- [Verifying the 802.1X Configuration on page 371](#)

Verifying the 802.1X Configuration

Purpose Verify the 802.1X configuration on interfaces ge-0/0/8, ge-0/0/9, and ge-0/0/5.

Action Verify the 802.1X configuration by issuing the operational mode command **show dot1x interface**:

```
user@switch> show dot1x interface ge-0/0/8.0 detail
```

```
ge-0/0/8.0
  Role: Authenticator
  Administrative state: Auto
  Supplicant mode: Single
  Number of retries: 3
  Quiet period: 60 seconds
  Transmit period: 30 seconds
  Mac Radius: Disabled
  Mac Radius Restrict: Disabled
  Reauthentication: Enabled
  Configured Reauthentication interval: 3600 seconds
  Supplicant timeout: 30 seconds
  Server timeout: 30 seconds
  Maximum EAPOL requests: 2
  Guest VLAN member: <not configured>
```

```
user@switch> show dot1x interface ge-0/0/9.0 detail
```

```
ge-0/0/9.0
  Role: Authenticator
  Administrative state: Auto
  Supplicant mode: Single-Secure
  Number of retries: 3
  Quiet period: 60 seconds
  Transmit period: 30 seconds
  Mac Radius: Disabled
  Mac Radius Restrict: Disabled
  Reauthentication: Enabled
  Configured Reauthentication interval: 3600 seconds
  Supplicant timeout: 30 seconds
  Server timeout: 30 seconds
  Maximum EAPOL requests: 2
  Guest VLAN member: <not configured>
  Number of connected supplicants: 0
```

```
user@switch> show dot1x interface ge-0/0/11.0 detail
```

```
ge-0/0/11.0
  Role: Authenticator
  Administrative state: Auto
  Supplicant mode: Multiple
  Number of retries: 3
  Quiet period: 60 seconds
  Transmit period: 30 seconds
  Mac Radius: Disabled
  Mac Radius Restrict: Disabled
  Reauthentication: Enabled
  Configured Reauthentication interval: 3600 seconds
  Supplicant timeout: 30 seconds
  Server timeout: 30 seconds
  Maximum EAPOL requests: 2
  Guest VLAN member: <not configured>
  Number of connected supplicants: 0
```


Meaning The **Supplicant mode** output field displays the configured administrative mode for each interface. Interface **ge-0/0/8.0** displays **Single** supplicant mode. Interface **ge-0/0/9.0** displays **Single-Secure** supplicant mode. Interface **ge-0/0/11.0** displays **Multiple** supplicant mode.

- Related Documentation**
- [Controlling Authentication Session Timeouts \(CLI Procedure\) on page 517](#)
 - [Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378](#)
 - [Example: Setting Up 802.1X in Conference Rooms to Provide Internet Access to Corporate Visitors on an EX Series Switch on page 361](#)
 - [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
 - [Configuring 802.1X RADIUS Accounting \(CLI Procedure\) on page 386](#)
 - [Filtering 802.1X Supplicants by Using RADIUS Server Attributes on page 388](#)
 - [Understanding Authentication on Switches on page 348](#)

Understanding Dynamic Filters Based on RADIUS Attributes

You can use RADIUS server attributes to implement port firewall filters on a RADIUS authentication server. These filters can be dynamically applied to supplicants that request authentication through that server. RADIUS server attributes are clear-text fields encapsulated in Access-Accept messages sent from the authentication server to the switch when a supplicant connected to the switch is successfully authenticated. The switch, acting as the authenticator, uses the information in the RADIUS attributes to apply the related filters to the supplicant. Dynamic filters can be applied to multiple ports on the same switch, or to multiple switches that use the same authentication server, providing centralized access control for the network.

You can define firewall filters directly on the RADIUS server by using the `Juniper-Switching-Filter` attribute, which is a RADIUS attribute specific to Juniper Networks, also known as a vendor-specific attribute (VSA). VSAs are described in RFC 2138, *Remote Authentication Dial In User Service* (RADIUS). The `Juniper-Switching-Filter` VSA is listed under attribute ID number 48 in the Juniper dictionary on the RADIUS server, with the vendor ID set to the Juniper Networks ID number 2636. Using this attribute, you define filters on the authentication server, which are applied on all switches that authenticate supplicants through that server. This method eliminates the need to configure the same filters on multiple switches.

Alternatively, you can apply a port firewall filter to multiple ports on the same switch by using the `Filter-ID` attribute, which is RADIUS attribute ID number 11. To use the `Filter-ID` attribute, you must first configure a filter on the switch, and then add the filter name to user policies on the RADIUS server as the value of the `Filter-ID` attribute. When a supplicant defined in one of those policies is authenticated by the RADIUS server, the filter is applied to the switch port that has been authenticated for the supplicant. Use this method when the firewall filter has complex conditions, or if you want to use different conditions for the same filter on different switches. The filter named in the `Filter-ID` attribute must be

configured locally on the switch at the `[edit firewall family ethernet-switching filter]` hierarchy level.

VSAs are supported only for 802.1X single supplicant configurations and multiple supplicant configurations.

Related Documentation

- [Understanding Authentication on Switches on page 348](#)
- [Example: Applying a Firewall Filter to 802.1X-Authenticated Supplicants by Using RADIUS Server Attributes on an EX Series Switch on page 392](#)
- [Filtering 802.1X Supplicants by Using RADIUS Server Attributes on page 388](#)
- [Configuring Firewall Filters \(CLI Procedure\)](#)
- [Juniper-Switching-Filter VSA Match Conditions and Actions on page 443](#)

Understanding Dynamic VLAN Assignment Using RADIUS Attributes

VLANs can be dynamically assigned by a RADIUS server to supplicants requesting 802.1X authentication through that server. You configure the VLAN on the RADIUS server using RADIUS server attributes, which are clear-text fields encapsulated in messages sent from the authentication server to the switch when a supplicant connected to the switch requests authentication. The switch, acting as the authenticator, uses the information in the RADIUS attributes to assign the VLAN to the supplicant. Based on the results of the authentication, a supplicant that began authentication in one VLAN might be assigned to another VLAN.

Successful authentication requires that the VLAN ID or VLAN name is configured on the switch acting as 802.1X authenticator, and that it matches the VLAN ID or VLAN name sent by the RADIUS server during authentication. If neither exists, the end device is not authenticated. If a guest VLAN is established, the unauthenticated end device is automatically moved to the guest VLAN.

The RADIUS server attributes used for dynamic VLAN assignment described in RFC 2868, *RADIUS Attributes for Tunnel Protocol Support*.

- Tunnel-Type—Defined as RADIUS attribute type 64. The value should be set to **VLAN**.
- Tunnel-Medium-Type—Defined as RADIUS attribute type 65. The value should be set to **IEEE-802**.
- Tunnel-Private-Group-ID—Defined as RADIUS attribute type 81. The value should be set to the VLAN ID or the VLAN name.

For more information about configuring dynamic VLANs on your RADIUS server, see the documentation for your RADIUS server.

Related Documentation

- [Understanding Guest VLANs for 802.1X on Switches on page 375](#)
- [Example: Configuring MAC RADIUS Authentication on an EX Series Switch on page 502](#)

- [Example: Setting Up 802.1X in Conference Rooms to Provide Internet Access to Corporate Visitors on an EX Series Switch on page 361](#)

Understanding Guest VLANs for 802.1X on Switches

Guest VLANs can be configured on switches that are using 802.1X authentication to provide limited access—typically only to the Internet—for:

- Corporate guests
- End devices that are not 802.1X-enabled
- Nonresponsive end devices when MAC RADIUS authentication has not been configured on the switch interfaces to which the hosts are connected

A guest VLAN is not used for supplicants that send incorrect credentials. Those supplicants are directed to the server-reject VLAN instead.

For end devices that are not 802.1X-enabled, a guest VLAN can allow limited access to a server from which the non-802.1X-enabled end device can download the supplicant software and attempt authentication again.

A guest VLAN is not used when MAC RADIUS authentication has been configured on the switch interfaces to which the hosts are connected.

Related Documentation

- [Example: Setting Up 802.1X in Conference Rooms to Provide Internet Access to Corporate Visitors on an EX Series Switch on page 361](#)
- [Understanding Dynamic VLAN Assignment Using RADIUS Attributes on page 374](#)
- [Understanding Authentication on Switches on page 348](#)

Understanding 802.1X and RADIUS Accounting on Switches

Juniper Networks EX Series Ethernet Switches support IETF RFC 2866, *RADIUS Accounting*. By configuring RADIUS accounting on an EX Series switch, you can collect statistical data about users logging in to or out of a LAN and send that data to a RADIUS accounting server. The statistical data gathered can be used to perform general network monitoring, to analyze and track usage patterns, or to bill a user based on the amount of time or type of services accessed.

- [RADIUS Accounting Process on page 375](#)
- [Supported RADIUS Attributes on page 376](#)

RADIUS Accounting Process

RADIUS accounting is based on a client/server model in which the switch, operating as the network access server (NAS), is the client. The client forwards user accounting statistics to a designated RADIUS accounting server. The RADIUS accounting server must send a response to the client when it has successfully received and recorded the accounting statistics.

The RADIUS accounting process between a switch and a RADIUS server is based on the exchange of two types of RADIUS messages—Accounting-Request and Accounting-Response. Accounting-Request messages are sent from the switch to the server and convey information used to account for a service provided to a user. Accounting-Response messages are sent from the server to acknowledge receipt of the Accounting-Request packets. The exchange of messages between the switch and the server proceeds as follows:

1. A RADIUS accounting server listens for User Datagram Protocol (UDP) packets on a specific port. For example, on FreeRADIUS, the default port is 1813.
2. When a supplicant is authenticated through 802.1X authentication and then connected to the LAN, the switch forwards an Accounting-Request message with a record of the event to the accounting server. The Accounting-Request message sent by the switch includes the RADIUS attribute Acct-Status-Type with a value of Start, which indicates the beginning of user service for this supplicant. The accounting server records this event in the accounting log file as a start record.
3. The accounting server sends an Accounting-Response message back to the switch confirming that it received the accounting request. If the switch does not receive a response from the server, it continues to send accounting requests until an accounting response is returned from the accounting server.
4. The switch might send an interim message to the accounting server to periodically update the server with information pertaining to a specific session. Interim messages are sent as Accounting-Request messages with the Acct-Status-Type attribute value of Interim-Update. The accounting server sends an Accounting-Response message back to the switch to confirm receipt of an interim update.
5. When the supplicant's session ends, the switch forwards an Accounting-Request message with the Acct-Status-Type attribute value set to Stop, indicating the end of user service. The accounting server records this event in the accounting log file as a stop record that contains session information and the length of the session.

The statistics collected through this process can be displayed from the RADIUS server. To view those statistics, the user needs to access the accounting log file configured to receive them. On FreeRADIUS, the filename is the server's address—for example, 122.69.1.250.

Supported RADIUS Attributes

RADIUS accounting statistics are conveyed through the attributes included in each Accounting-Request message sent from the NAS to the server. [Table 28 on page 377](#) lists the RADIUS attributes supported for Accounting-Request messages.

Table 28: RADIUS Accounting Request Attributes

Type	Attribute	Description
1	User-Name	The name of the authenticated user.
5	NAS-Port	The physical port number of the NAS that authenticates the user. Either NAS-Port or NAS-Port-ID must be contained in the packet.
8	Framed-IP-Address	The IP address of the authenticated user. NOTE: The Framed-IP-Address attribute is sent only if a valid DHCP binding exists for the host in the DHCP snooping table.
11	Filter-ID	The name of the filter list for the user.
12	Framed-MTU	The maximum transmission unit that can be configured for the user.
26	Client-System-Name	Vendor-specific attribute (VSA) used to indicate the client's hostname. Supported for LLDP-capable devices only.
27	Session-Timeout	Sets the maximum time (in seconds) that a session stays active before it terminates or a prompt is issued notifying its termination.
28	Idle-Timeout	The maximum number of consecutive seconds of idle connection allowed to the user before termination of the session or prompt.
30	Called-Station-ID	Enables the NAS to identify the phone number that the user called, using Dialed Number Identification (DNIS) or a similar technology.
31	Calling-Station-ID	Enables the NAS to identify the phone number that the call came from, using Automatic Number Identification (ANI) or a similar technology.
32	NAS-Identifier	Contains a string identifying the NAS originating the Accounting-Request message.
40	Acct-Status-Type	Indicates whether this Accounting-Request message marks the beginning (Start) or the end (Stop) of the user session. Can also be used for an interim update (Interim-Update).
44	Acct-Session-ID	A unique ID for a specific accounting session that can be used to match start and stop records for a session in the log file.
45	Acct-Authentic	Indicates whether the user was authenticated locally, by the RADIUS server, or by another remote authentication protocol.
55	Event-Timestamp	Records the time an event occurred.

Table 28: RADIUS Accounting Request Attributes (continued)

Type	Attribute	Description
87	NAS-Port-ID	Text string that identifies the port that authenticates the user. Either NAS-Port or NAS-Port-ID must be present in the packet.

Related Documentation

- [802.1X for Switches Overview on page 354](#)
- [Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378](#)
- [Configuring 802.1X RADIUS Accounting \(CLI Procedure\) on page 386](#)

Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch

802.1X is the IEEE standard for port-based network access control (PNAC). You use 802.1X to control network access. Only users and devices providing credentials that have been verified against a user database are allowed access to the network. You can use a RADIUS server as the user database for 802.1X authentication, as well as for MAC RADIUS authentication.

This example describes how to connect a RADIUS server to an EX Series switch, and configure it for 802.1X:

- [Requirements on page 378](#)
- [Overview and Topology on page 379](#)
- [Configuration on page 381](#)
- [Verification on page 382](#)

Requirements

This example uses the following software and hardware components:

- Junos OS Release 9.0 or later for EX Series switches
- One EX Series switch acting as an authenticator port access entity (PAE). The ports on the authenticator PAE form a control gate that blocks all traffic to and from supplicants until they are authenticated.
- One RADIUS authentication server that supports 802.1X. The authentication server acts as the backend database and contains credential information for hosts (supplicants) that have permission to connect to the network.

Before you connect the server to the switch, be sure you have:

- Performed basic bridging and VLAN configuration on the switch. See the documentation that describes setting up basic bridging and a VLAN for your switch. If you are using a switch that supports the Enhanced Layer 2 Software (ELS) configuration style, see *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch with ELS Support*. For all other switches, see *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch*.



NOTE: For more about ELS, see *Using the Enhanced Layer 2 Software CLI*.

- Configured users on the RADIUS authentication server.

Overview and Topology

The EX Series switch acts as an authenticator PAE. It blocks all traffic and acts as a control gate until the supplicant (client) is authenticated by the server. All other users and devices are denied access.

[Figure 12 on page 380](#) shows one EX4200 switch that is connected to the devices listed in [Table 29 on page 380](#).

Figure 12: Topology for Configuration

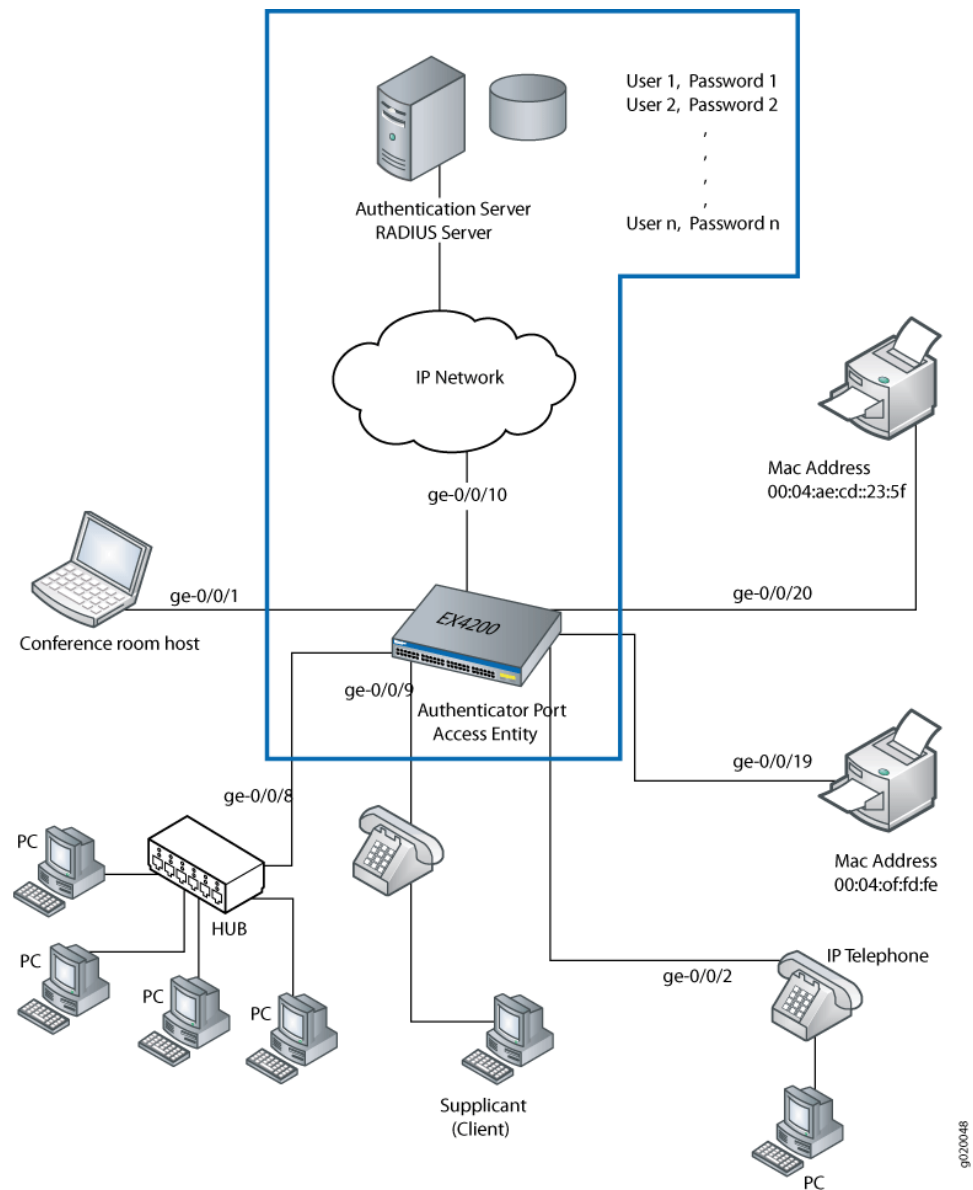


Table 29: Components of the Topology

Property	Settings
Switch hardware	EX4200 access switch, 24 Gigabit Ethernet ports: 8 PoE ports (ge-0/0/0 through ge-0/0/7) and 16 non-PoE ports (ge-0/0/8 through ge-0/0/23)
VLAN name	default
One RADIUS server	Backend database with an address 10.0.0.100 connected to the switch at port ge-0/0/10

In this example, connect the RADIUS server to access port ge-0/0/10 on the EX4200 switch. The switch acts as the authenticator and forwards credentials from the supplicant to the user database on the RADIUS server. You must configure connectivity between the EX4200 and the RADIUS server by specifying the address of the server and configuring the secret password. This information is configured in an access profile on the switch.



NOTE: For more information about authentication, authorization, and accounting (AAA) services, see the [Junos OS System Basics Configuration Guide](#).

Configuration

CLI Quick Configuration To quickly connect the RADIUS server to the switch, copy the following commands and paste them into the switch terminal window:

```
[edit]
set access radius-server 10.0.0.100 secret juniper
set access radius-server 10.0.0.200 secret juniper
set access profile profile1 authentication-order radius
set access profile profile1 radius authentication-server [10.0.0.100 10.0.0.200]
```

Step-by-Step Procedure To connect the RADIUS server to the switch:

1. Define the address of the servers, and configure the secret password. The secret password on the switch must match the secret password on the server:

```
[edit]
user@switch# set access radius-server 10.0.0.100 secret juniper
user@switch# set access radius-server 10.0.0.200 secret juniper
```

2. Configure the authentication order, making **radius** the first method of authentication:

```
[edit]
user@switch# set access profile profile1 authentication-order radius
```

3. Configure a list of server IP addresses to be tried in sequential order to authenticate the supplicant:

```
[edit]
user@switch# set access profile profile1 radius authentication-server [10.0.0.100
10.0.0.200]
```

Results Display the results of the configuration:

```
user@switch> show configuration access
radius-server {
  10.0.0.100
  port 1812;
  secret "$ABC123"; ## SECRET-DATA
}
```

```
}
profile profile1{
  authentication-order radius;
  radius {
    authentication-server 10.0.0.100 10.0.0.200;
  }
}
```

Verification

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

- [Verify That the Switch and RADIUS Server Are Properly Connected on page 382](#)

Verify That the Switch and RADIUS Server Are Properly Connected

Purpose	Verify that the RADIUS server is connected to the switch on the specified port.
Action	<p>Ping the RADIUS server to verify the connection between the switch and the server:</p> <pre>user@switch> ping 10.0.0.100</pre> <pre>PING 10.0.0.100 (10.0.0.100): 56 data bytes 64 bytes from 10.93.15.218: icmp_seq=0 ttl=64 time=9.734 ms 64 bytes from 10.93.15.218: icmp_seq=1 ttl=64 time=0.228 ms</pre>
Meaning	ICMP echo request packets are sent from the switch to the target server at 10.0.0.100 to test whether the server is reachable across the IP network. ICMP echo responses are being returned from the server, verifying that the switch and the server are connected.
Related Documentation	<ul style="list-style-type: none">• Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch on page 367• Example: Setting Up 802.1X in Conference Rooms to Provide Internet Access to Corporate Visitors on an EX Series Switch on page 361• Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455• Configuring 802.1X RADIUS Accounting (CLI Procedure) on page 386• Filtering 802.1X Suplicants by Using RADIUS Server Attributes on page 388

Understanding RADIUS-Initiated Changes to an Authorized User Session

When using an authentication service that is based on a client/server RADIUS model, requests are typically initiated by the client and sent to the RADIUS server. There are instances in which a request might be initiated by the server and sent to the client in order

to dynamically modify an authenticated user session already in progress. The client that receives and processes the messages is the switch, which acts as the network access server, or NAS. The server can send the switch a Disconnect message requesting to terminate a session, or a Change of Authorization (CoA) message requesting to modify the session authorization attributes.

The switch listens for unsolicited RADIUS requests on UDP port 3799, and accepts requests only from a trusted source. Authorization to send a Disconnect or CoA request is determined based on the source address and the corresponding shared secret, which must be configured on the switch as well as on the RADIUS server. For more information about configuring the source address and shared secret on the switch, see [“Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch” on page 378](#).

- [Disconnect Messages on page 383](#)
- [Change of Authorization Messages on page 383](#)
- [CoA Request Port Bounce on page 384](#)
- [Error-Cause Codes on page 384](#)

Disconnect Messages

The RADIUS server sends a Disconnect-Request message to the switch in order to terminate a user session and discard all associated session context. The switch responds to a Disconnect-Request packet with a Disconnect-ACK message if the request is successful, that is, all associated session context is discarded and the user session is no longer connected, or with a Disconnect-NAK packet if the request fails, that is, the authenticator is unable to disconnect the session and discard all associated session context.

In Disconnect-Request messages, RADIUS attributes are used to uniquely identify the switch (NAS) and the user session. The combination of NAS identification attributes and session identification attributes included in the message must match at least one session for the request to be successful; otherwise, the switch responds with a Disconnect-NAK message. A Disconnect-Request message can contain only NAS and session identification attributes; if any other attributes are included, the switch responds with a Disconnect-NAK message.

Change of Authorization Messages

Change of Authorization (CoA) messages contain information for dynamically modifying the authorization attributes for a user session to change the authorization level. This occurs as part of a two-step authentication process, in which the endpoint is first authenticated using MAC RADIUS authentication, and is then profiled based on the type of device. The CoA message is used to apply an enforcement policy that is appropriate for the device, typically by changing the data filters or the VLAN.

The switch responds to a CoA message with a CoA-ACK message if the authorization change is successful, or a with CoA-NAK message if the change is unsuccessful. If one or more authorization changes specified in a CoA-Request message cannot be carried out, the switch responds with a CoA-NAK message.

In CoA-Request messages, RADIUS attributes are used to uniquely identify the switch (acting as the NAS) and the user session. The combination of NAS identification attributes and session identification attributes included in the message must match the identification attributes of at least one session for the request to be successful; otherwise, the switch responds with a CoA-NAK message.

CoA-Request packets also include the session authorization attributes that will be modified if the request is accepted. The supported session authorization attributes are listed below. The CoA message can contain any or all of these attributes. If any attribute is not included as part of the CoA-Request message, the NAS assumes that the value for that attribute is to remain unchanged.

- Filter-ID
- Tunnel-Private-Group-ID
- Juniper-Switching-Filter
- Juniper-VoIP-VLAN
- Session-Timeout

CoA Request Port Bounce

When a CoA message is used to change the VLAN for an authenticated host, end devices such as printers do not have a mechanism to detect the VLAN change, so they do not renew the lease for their DHCP address in the new VLAN. Starting in Junos OS Release 17.3, the port bounce feature can be used to force the end device to initiate DHCP re-negotiation by causing a link flap on the authenticated port.

The command to bounce the port is sent from the RADIUS server using a Juniper Networks vendor-specific attribute (VSA). The port is bounced if the following VSA attribute-value pair is received in the CoA message from the RADIUS server:

- Juniper-AV-Pair = "Port-Bounce"

To enable the port bounce feature, you must update the Junos dictionary file (**juniper.dct**) on the RADIUS server with the Juniper-AV-Pair VSA. Locate the dictionary file and add the following text to the file:

```
ATTRIBUTE Juniper-AV-Pair Juniper-VSA(52, string) r
```

For more information about adding the VSA, consult the FreeRADIUS documentation.

You can disable the feature by configuring the **ignore-port-bounce** statement at the **[edit protocols dot1x authenticator interface interface-name mac-radius]** hierarchy level.

Error-Cause Codes

When a disconnect or CoA operation is unsuccessful, an Error-Cause attribute (RADIUS attribute 101) can be included in the response message sent by the NAS to the server to provide detail about the cause of the problem. If the detected error does not map to one

of the supported Error-Cause attribute values, the router sends the message without an error-cause attribute. See [Table 30 on page 385](#) for descriptions of error-cause codes that can be included in response messages sent from the NAS.

Table 30: Error-Cause Codes (RADIUS Attribute 101)

Code	Value	Description
201	Residual session context removed	Sent in response to a Disconnect-Request message if one or more user sessions are no longer active, but residual session context was found and successfully removed. This code is sent only within a Disconnect-ACK message.
401	Unsupported attribute	The request contains an attribute that is not supported (for example, a third-party attribute).
402	Missing attribute	A critical attribute (for example, the session identification attribute) is missing from a request.
403	NAS identification mismatch	Request contains one or more NAS identification attributes that do not match the identity of the NAS receiving the request.
404	Invalid request	Some other aspect of the request is invalid—for example, if one or more attributes are not formatted properly.
405	Unsupported service	The Service-Type attribute included with the request contains an invalid or unsupported value.
406	Unsupported extension	The entity receiving the request (either an NAS or a RADIUS proxy) does not support RADIUS-initiated requests.
407	Invalid attribute value	The request contains an attribute with an unsupported value.
501	Administratively prohibited	The NAS is configured to prohibit honoring of Disconnect-Request or CoA-Request messages for the specified session.
503	Session context not found	The session context identified in the request does not exist on the NAS.
504	Session context not removable	The subscriber identified by attributes in the request is owned by a component that is not supported. This code is sent only within a Disconnect-NAK message.
506	Resources unavailable	A request could not be honored because of lack of available NAS resources (such as memory).
507	Request initiated	The CoA-Request message includes a Service-Type attribute with a value of Authorize Only.
508	Multiple session selection unsupported	The session identification attributes included in the request match multiple sessions, but the NAS does not support requests that apply to multiple sessions.

Release History Table

Release	Description
17.3R1	Starting in Junos OS Release 17.3, the port bounce feature can be used to force the end device to initiate DHCP re-negotiation by causing a link flap on the authenticated port.

Related Documentation

- [Understanding Dynamic Filters Based on RADIUS Attributes on page 373](#)
- [Understanding Dynamic VLAN Assignment Using RADIUS Attributes on page 374](#)

Configuring 802.1X RADIUS Accounting (CLI Procedure)

RADIUS accounting enables statistical data about users logging in to or out of a LAN to be collected and sent to a RADIUS accounting server. The statistical data gathered can be used to perform general network monitoring, to analyze and track usage patterns, or to bill a user based upon the amount of time or type of services accessed.

RADIUS accounting is based on a client/server model in which the switch, operating as the network access server (NAS), is the client. The client is responsible for forwarding user accounting statistics to a designated RADIUS accounting server. To configure RADIUS accounting, specify one or more RADIUS accounting servers to receive the statistical data from the switch, and select the type of accounting data to be collected.

The RADIUS accounting server you specify can be the same server used for RADIUS authentication, or it can be a separate RADIUS server. You can specify a list of RADIUS accounting servers. If the primary server (the first one configured) is unavailable, then each RADIUS server in the list is tried in the order in which the servers are configured in Junos OS.

To configure RADIUS accounting by using the CLI:

1. Configure an access profile and specify the accounting servers to which the switch forwards accounting statistics:

```
[edit access]
user@switch# set profile profile-name radius accounting-server [server-addresses]
```

2. Define the address of RADIUS accounting servers and configure the secret password (the secret password on the switch must match the secret password on the server):

```
[edit access]
user@switch# set radius-server server-address secret password
```

3. Enable accounting for the access profile:

```
[edit access]
user@switch# set profile profile-name accounting
```

4. Configure the accounting order, making RADIUS the first method for sending accounting messages and updates:

```
[edit access]
user@switch# set profile profile-name accounting order radius
```

5. Configure the statistics to be collected on the switch and forwarded to the accounting server:

```
[edit access]
user@switch# set profile profile-name accounting accounting-stop-on-access-deny
user@switch# set profile profile-name accounting accounting-stop-on-failure
```

6. (Optional) Configure the switch to send periodic updates for a user session at a specified interval to the accounting server:

```
[edit access]
user@switch# set profile profile-name accounting update-interval minutes
```

7. Display accounting statistics collected on the switch using the **show network-access aaa statistics accounting** command, for example:

```
user@switch> show network-access aaa statistics accounting
```

```
Accounting module statistics
  Requests received: 1
  Accounting Response failures: 0
  Accounting Response Success: 1
  Requests timedout: 0
```

8. Open an accounting log on the RADIUS accounting server by using the server's address, and view accounting statistics, for example:

```
[root@freeradius]# cd /usr/local/var/log/radius/radacct/192.168.0.1
[root@freeradius 192.168.0.1]# ls
```

```
detail-20071214
```

```
[root@freeradius 192.168.0.1]# vi details-20071214
```

```
User-Name = "000347e1bab9"
NAS-Port = 67
Acct-Status-Type = Stop
Acct-Session-Id = "802.1x811912"
Acct-Input-Octets = 17454
Acct-Output-Octets = 4245
Acct-Session-Time = 1221041249
Acct-Input-Packets = 72
Acct-Output-Packets = 53
Acct-Terminate-Cause = Lost-Carrier
Acct-Input-Gigawords = 0
Acct-Output-Gigawords = 0
Called-Station-Id = "00-19-e2-50-52-60"
Calling-Station-Id = "00-03-47-e1-ba-b9"
Event-Timestamp = "Sep 10 2008 16:52:39 PDT"
NAS-Identifier = "esp48t-1b-01"
NAS-Port-Type = Virtual
```

```
User-Name = "000347e1bab9"  
NAS-Port = 67  
Acct-Status-Type = Start  
Acct-Session-Id = "802.1x811219"  
Called-Station-Id = "00-19-e2-50-52-60"  
Calling-Station-Id = "00-03-47-e1-ba-b9"  
Event-Timestamp = "Sep 10 2008 18:58:52 PDT"  
NAS-Identifier = "esp48t-1b-01"  
NAS-Port-Type = Virtual
```

- Related Documentation**
- [Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378](#)
 - [Understanding 802.1X and RADIUS Accounting on Switches on page 375](#)

Filtering 802.1X Supplicants by Using RADIUS Server Attributes

There are two ways to configure the a RADIUS server with port firewall filters (Layer 2 firewall filters):

- Include one or more filter terms in the Juniper-Switching-Filter attribute. The Juniper-Switching-Filter attribute is a vendor-specific attribute (VSA) listed under attribute ID number 48 in the Juniper dictionary on the RADIUS server. Use this VSA to configure simple filter conditions for 802.1X authenticated users. Nothing needs to be configured on the switch; all of the configuration is on the RADIUS server.
- Configure a local firewall filter on each switch and apply that firewall filter to users authenticated through the RADIUS server. Use this method for more complex filters. Use this method for more complex filters. The firewall filter must be configured on each switch.



NOTE: If the firewall filter configuration is modified after users are authenticated using the 802.1X authentication, then the established 802.1X authentication session must be terminated and re-established for the firewall filter configuration changes to take effect.

This topic includes the following tasks:

1. [Configuring Firewall Filters on the RADIUS Server on page 388](#)
2. [Applying a Locally Configured Firewall Filter from the RADIUS Server on page 391](#)

Configuring Firewall Filters on the RADIUS Server

You can configure simple filter conditions by using the Juniper-Switching-Filter attribute in the Juniper dictionary on the RADIUS server. These filters are sent to a switch whenever a new user is authenticated successfully. The filters are created and applied on all EX Series switches that authenticate users through that RADIUS server without the need for you to configure anything on each individual switch.



NOTE: This procedure describes using FreeRADIUS software to configure the Juniper-Switching-Filter VSA. For specific information about configuring your server, consult the AAA documentation included with your server.

To configure the Juniper-Switching-Filter attribute, enter one or more filter terms by using the CLI for the RADIUS server. Each filter term consists of match conditions with a corresponding action. Enter the filter terms enclosed within quotation marks (" ") by using the following syntax:

```
Juniper-Switching-Filter = "match <destination-mac mac-address> <source-vlan
vlan-name> <source-dot1q-tag tag> <destination-ip ip-address> <ip-protocol
protocol-id> <source-port port> <destination-port port> action (allow | deny)
<forwarding-class class-of-service> <loss-priority (low | medium | high)>"
```

More than one match condition can be included in a filter term. When multiple conditions are specified in a filter term, they must all be fulfilled for the packet to match the filter term. For example, the following filter term requires a packet to match *both* the destination IP address and the destination MAC address to meet the term criteria:

```
Juniper-Switching-Filter = "match destination-ip 10.10.10.8 destination-mac
00:00:00:01:02:03 action allow"
```

Multiple filter terms should be separated with commas—for example:

```
Juniper-Switching-Filter = "match destination-mac 00:00:00:01:02:03 action allow,
match destination-port 80 destination-mac 00:aa:bb:cc:dd:ee action allow"
```

See “[Juniper-Switching-Filter VSA Match Conditions and Actions](#)” on page 443 for definitions of match conditions and actions.



NOTE: On EX9200 switches, and in a Junos Fusion Enterprise with EX9200 as the aggregate device, the dynamic firewall filter is strictly applied for all IP packets. If the filter is configured to allow only a specific destination IP address, packets with other IP addresses as the destination IP will be dropped per the filter rules. This includes any IP protocol packets, such as DHCP, IGMP and ARP packets.

To configure match conditions on the RADIUS server:

1. Verify that the Juniper dictionary is loaded on your RADIUS server and includes the filtering attribute **Juniper-Switching-Filter** (attribute ID 48):

```
[root@freeradius]# cat /usr/local/share/freeradius/dictionary.juniper

# dictionary.juniper
#
# Version:      $Id: dictionary.juniper,v 1.2.6.1 2005/11/30 22:17:25 aland
Exp
```

```

$
#  Vendor      Juniper      2636
BEGIN-VENDOR  Juniper
ATTRIBUTE     Juniper-Local-User-Name      1      string
ATTRIBUTE     Juniper-Allow-Commands      2      string
ATTRIBUTE     Juniper-Deny-Commands      3      string
ATTRIBUTE     Juniper-Allow-Configuration      4      string
ATTRIBUTE     Juniper-Deny-Configuration      5      string
ATTRIBUTE     Juniper-Switching-Filter      48     string
<-

```

2. Enter the match conditions and actions. For example:

- To deny authentication based on the 802.1Q tag (here, the 802.1Q tag is 10):

```

[root@freeradius]#
cd /usr/local/etc/raddb
vi users

```

For each relevant user, add the **Juniper-Switching-Filter** attribute:

Juniper-Switching-Filter = "Match Source-dot1q-tag 10 Action deny"

- To deny access based on a destination IP address:

```

[root@freeradius]# cd /usr/local/etc/raddb
vi users

```

For each relevant user, add the **Juniper-Switching-Filter** attribute:

Juniper-Switching-Filter = "Match Destination-ip 192.168.1.0/31 Action deny"

- To set the packet loss priority (PLP) to **high** based on a destination MAC address and the IP protocol:

```

[root@freeradius]# cd /usr/local/etc/raddb
vi users

```

For each relevant user, add the **Juniper-Switching-Filter** attribute:

Juniper-Switching-Filter = "Match Destination-mac 00:04:0f:fd:ac:fe, Ip-protocol 2, forwarding-class high, Action loss-priority high"



NOTE: For the forwarding-class option to be applied, the forwarding class must be configured on the switch and the packet loss priority specified. If it is not configured on the switch, this option is ignored. You must specify both the forwarding class and the packet loss priority.

3. Stop and restart the RADIUS process to activate the configuration.

Applying a Locally Configured Firewall Filter from the RADIUS Server

You can apply a port firewall filter (Layer 2 firewall filter) to user policies centrally from the RADIUS server. The RADIUS server can then specify the firewall filters that are to be applied to each user that requests authentication, reducing the need to configure the same firewall filter on multiple switches. Use this method when the firewall filter contains a large number of conditions or you want to use different conditions for the same filter on different switches. The firewall filters must be configured on each switch.

For more information about firewall filters, see *Firewall Filters for EX Series Switches Overview*.

To apply a port firewall filter centrally from the RADIUS server:



NOTE: If port firewall filters are also configured locally for the interface, then the firewall filters configured by using VSAs take precedence if they conflict with the locally configured port firewall filters. If there is no conflict, they are merged.

1. Create the firewall filter on the local switch. See *Configuring Firewall Filters (CLI Procedure)* for more information on configuring a port firewall filter.
2. On the RADIUS server, open the **users** file to display the local user profiles of the end devices to which you want to apply the filter:

```
[root@freeradius]#  
cat /usr/local/etc/raddb/usersvi users
```

3. Apply the filter to each user profile by adding the Filter-ID attribute with the filter name as the attribute value:

Filter-Id =filter-name

For example, the user profile below for **supplicant1** includes the Filter-ID attribute with the filter name **filter1**:

```
[root@freeradius]# cat /usr/local/etc/raddb/users  
  
supplicant1 Auth-Type := EAP, User-Password == "supplicant1"  
    Tunnel-Type = VLAN,  
    Tunnel-Medium-Type = IEEE-802,  
    Tunnel-Private-Group-Id = "1005",  
    Filter-Id = "filter1"
```



NOTE: Multiple filters are not supported on a single interface. However, you can support multiple filters for multiple users that are connected to

the switch on the same interface by configuring a single filter with policies for each of those users.

.....

4. Stop and restart the RADIUS process to activate the configuration.

**Related
Documentation**

- [Example: Applying a Firewall Filter to 802.1X-Authenticated Supplicants by Using RADIUS Server Attributes on an EX Series Switch on page 392](#)
- [Example: Configuring Firewall Filters for Port, VLAN, and Router Traffic on EX Series Switches](#)
- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)
- [Understanding Dynamic Filters Based on RADIUS Attributes on page 373](#)

Example: Applying a Firewall Filter to 802.1X-Authenticated Supplicants by Using RADIUS Server Attributes on an EX Series Switch

You can use RADIUS server attributes and a port firewall filter to centrally apply terms to multiple supplicants (end devices) connected to an EX Series switch in your enterprise. Terms are applied after a device is successfully authenticated through 802.1X. If the firewall filter configuration is modified after end devices are authenticated using the 802.1X authentication, then the established 802.1X authentication session must be terminated and re-established for the firewall filter changes to take effect.

EX Series switches support port firewall filters. Port firewall filters are configured on a single EX Series switch, but in order for them to operate throughout an enterprise, they must be configured on multiple switches. To reduce the need to configure the same port firewall filter on multiple switches, you can instead apply the filter centrally on the RADIUS server by using RADIUS server attributes.

The following example uses FreeRADIUS to apply a port firewall filter on a RADIUS server. For information about configuring your server, consult the documentation that was included with your RADIUS server.

This example describes how to configure a port firewall filter with terms, create counters to count packets for the supplicants, apply the filter to user profiles on the RADIUS server, and display the counters to verify the configuration:

- [Requirements on page 393](#)
- [Overview and Topology on page 393](#)
- [Configuring the Port Firewall Filter and Counters on page 396](#)
- [Applying the Port Firewall Filter to the Supplicant User Profiles on the RADIUS Server on page 398](#)
- [Verification on page 399](#)

Requirements

This example uses the following software and hardware components:



NOTE: This example also applies to QFX5100 switches.

- Junos OS Release 9.3 or later for EX Series switches
- One EX Series switch acting as an authenticator port access entity (PAE). The ports on the authenticator PAE form a control gate that blocks all traffic to and from supplicants until they are authenticated.
- One RADIUS authentication server. The authentication server acts as the backend database and contains credential information for hosts (supplicants) that have permission to connect to the network.

Before you connect the server to the switch, be sure you have:

- Set up a connection between the switch and the RADIUS server. See [“Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch” on page 378](#).
- Configured 802.1X authentication on the switch, with the supplicant mode for interface ge-0/0/2 set to **multiple**. See [“Configuring 802.1X Interface Settings \(CLI Procedure\)” on page 357](#) and [“Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch” on page 367](#).
- Configured users on the RADIUS authentication server (in this example, the user profiles for Supplicant 1 and Supplicant 2 in the topology are modified on the RADIUS server).

Overview and Topology

When the 802.1X configuration on an interface is set to **multiple** supplicant mode, you can apply a single port firewall filter configured through the Junos OS CLI on the EX Series switch to any number of end devices (supplicants) by adding the filter centrally to the RADIUS server. Only a single filter can be applied to an interface; however, the filter can contain multiple terms for separate end devices.

For more information about firewall filters, see *Firewall Filters for EX Series Switches Overview* or *Overview of Firewall Filters*.

RADIUS server attributes are applied to the port where the end device is connected after the device is successfully authenticated using 802.1X. To authenticate an end device, the switch forwards the end device's credentials to the RADIUS server. The RADIUS server matches the credentials against preconfigured information about the supplicant located in the supplicant's user profile on the RADIUS server. If a match is found, the RADIUS server instructs the switch to open an interface to the end device. Traffic then flows from and to the end device on the LAN. Further instructions configured in the port firewall filter and added to the end device's user profile using a RADIUS server attribute further define the access that the end device is granted. Filtering terms configured in the port firewall

filter are applied to the port where the end device is connected after 802.1X authentication is complete.



NOTE: If you modify the port firewall filter after an end device is successfully authenticated using 802.1X, you must terminate and re-establish the 802.1X authentication session for the firewall filter configuration changes to be effective.

Figure 13 on page 395 shows the topology used for this example. The RADIUS server is connected to an EX4200 switch on access port ge-0/0/10. Two end devices (supplicants) are accessing the LAN on interface ge-0/0/2. Supplicant 1 has the MAC address 00:50:8b:6f:60:3a. Supplicant 2 has the MAC address 00:50:8b:6f:60:3b.



NOTE: This figure also applies to QFX5100 switches.

Figure 13: Topology for Firewall Filter and RADIUS Server Attributes Configuration

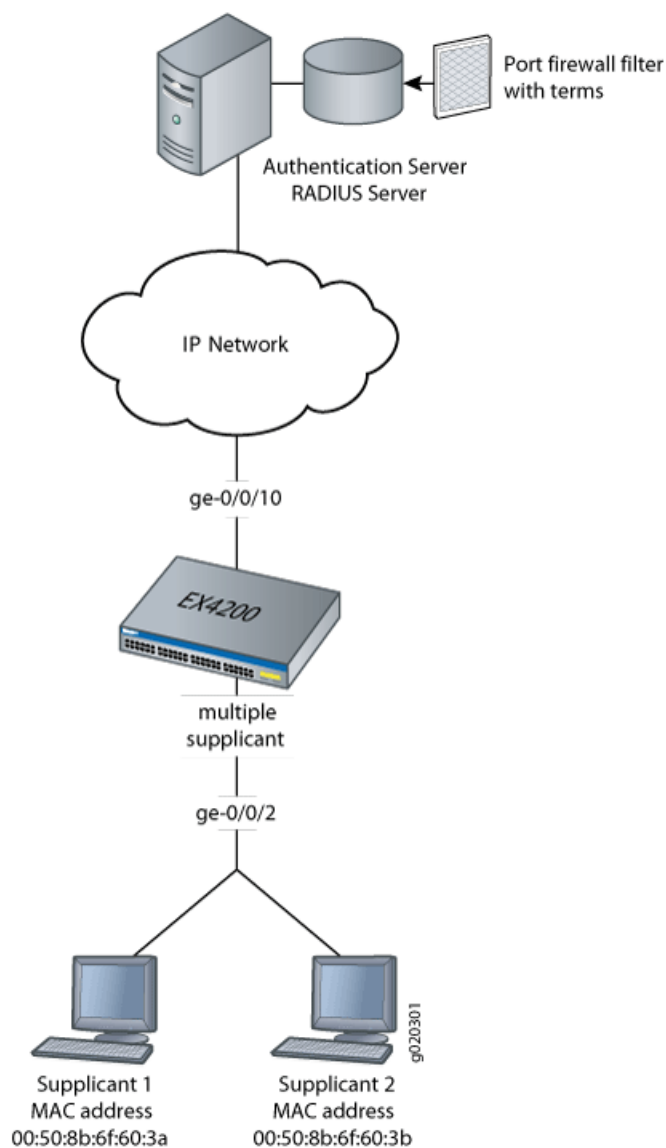


Table 31 on page 395 describes the components in this topology.

Table 31: Components of the Firewall Filter and RADIUS Server Attributes Topology

Property	Settings
Switch hardware	EX4200 access switch, 24 Gigabit Ethernet ports: 16 non-PoE ports and 8 PoE ports.
One RADIUS server	Backend database with the address 10.0.0.100 connected to the switch at port ge-0/0/10.
802.1X supplicants connected to the switch on interface ge-0/0/2	<ul style="list-style-type: none"> Supplicant 1 has MAC address 00:50:8b:6f:60:3a. Supplicant 2 has MAC address 00:50:8b:6f:60:3b.

Table 31: Components of the Firewall Filter and RADIUS Server Attributes Topology (continued)

Property	Settings
Port firewall filter to be applied on the RADIUS server	filter1
Counters	counter1 counts packets from Supplicant 1, and counter2 counts packets from Supplicant 2.
Policer	policer p1
User profiles on the RADIUS server	<ul style="list-style-type: none"> Supplicant 1 has the user profile supplicant1. Supplicant 2 has the user profile supplicant2.

In this example, you configure a port firewall filter named **filter1**. The filter contains terms that will be applied to the end devices based on the MAC addresses of the end devices. When you configure the filter, you also configure the counters **counter1** and **counter2**. Packets from each end device are counted, which helps you verify that the configuration is working. Policer **p1** limits the traffic rate based on the values for **exceeding** and **discard** parameters. Then, you check to see that the RADIUS server attribute is available on the RADIUS server and apply the filter to the user profiles of each end device on the RADIUS server. Finally, you verify the configuration by displaying output for the two counters.

Configuring the Port Firewall Filter and Counters

CLI Quick Configuration

To quickly configure a port firewall filter with terms for Supplicant 1 and Supplicant 2 and create parallel counters for each supplicant, copy the following commands and paste them into the switch terminal window:

```
[edit]
set firewall family ethernet-switching filter filter1 term supplicant1 from source-mac-address 00:50:8b:6f:60:3a
set firewall family ethernet-switching filter filter1 term supplicant2 from source-mac-address 00:50:8b:6f:60:3b
set firewall policer p1 if-exceeding bandwidth-limit 1m
set firewall policer p1 if-exceeding burst-size-limit 1k
set firewall policer p1 then discard
set firewall family ethernet-switching filter filter1 term supplicant1 then count counter1
set firewall family ethernet-switching filter filter1 term supplicant1 then policer p1
set firewall family ethernet-switching filter filter1 term supplicant2 then count counter2
```

Step-by-Step Procedure

To configure a port firewall filter and counters on the switch:

1. Configure a port firewall filter (here, **filter1**) with terms for each end device based on the MAC address of each end device:

```
[edit firewall family ethernet-switching]
user@switch# set filter filter1 term supplicant1 from source-mac-address 00:50:8b:6f:60:3a
user@switch# set filter filter1 term supplicant2 from source-mac-address 00:50:8b:6f:60:3b
```

2. Set policer definition:


```
[edit]
user@switch# set firewall policer p1 if-exceeding bandwidth-limit 1m
user@switch# set firewall policer p1 if-exceeding burst-size-limit 1k
user@switch# set firewall policer p1 then discard
```

3. Create two counters that will count packets for each end device and a policer that limits the traffic rate:

```
[edit firewall family ethernet-switching]
user@switch# set filter filter1 term supplicant1 then count counter1
user@switch# set filter filter1 term supplicant1 then policer p1
user@switch# set filter filter1 term supplicant2 then count counter2
```

Results Display the results of the configuration:

```
user@switch> show configuration
firewall {
  family ethernet-switching {
    filter filter1 {
      term supplicant1 {
        from {
          source-mac-address {
            00:50:8b:6f:60:3a;
          }
        }
        then count counter1;
        then policer p1;
      }
      term supplicant2 {
        from {
          source-mac-address {
            00:50:8b:6f:60:3b;
          }
        }
        then count counter2;
      }
    }
  }
}
policer p1 {
  if-exceeding {
    bandwidth-limit 1m;
    burst-size-limit 1k;
  }
  then discard;
}
```

Applying the Port Firewall Filter to the Supplicant User Profiles on the RADIUS Server

Step-by-Step Procedure To verify that the RADIUS server attribute **Filter-ID** is on the RADIUS server and to apply the filter to the user profiles:

1. Display the dictionary **dictionary.rfc2865** on the RADIUS server, and verify that the attribute **Filter-ID** is in the dictionary:

```
[root@freeradius]# cd usr/share/freeradius/dictionary.rfc2865
```

2. Close the dictionary file.

3. Display the local user profiles of the end devices to which you want to apply the filter (here, the user profiles are called **supplicant1** and **supplicant2**):

```
[root@freeradius]# cat /usr/local/etc/raddb/users
```

The output shows:

```
supplicant1 Auth-Type := EAP, User-Password == "supplicant1"
    Tunnel-Type = VLAN,
    Tunnel-Medium-Type = IEEE-802,
    Tunnel-Private-Group-Id = "1005"

supplicant2 Auth-Type := EAP, User-Password == "supplicant2"
    Tunnel-Type = VLAN,
    Tunnel-Medium-Type = IEEE-802,
    Tunnel-Private-Group-Id = "1005"
```

4. Apply the filter to both user profiles by adding the line **Filter-Id = "filter1"** to each profile, and then close the file:

```
[root@freeradius]# cat /usr/local/etc/raddb/users
```

After you paste the line into the files, the files look like this:

```
supplicant1 Auth-Type := EAP, User-Password == "supplicant1"
    Tunnel-Type = VLAN,
    Tunnel-Medium-Type = IEEE-802,
    Tunnel-Private-Group-Id = "1005",
    Filter-Id = "filter1"

supplicant2 Auth-Type := EAP, User-Password == "supplicant2"
    Tunnel-Type = VLAN,
    Tunnel-Medium-Type = IEEE-802,
    Tunnel-Private-Group-Id = "1005",
    Filter-Id = "filter1"
```

Verification

Verifying That the Filter Has Been Applied to the Supplicants

Purpose After the end devices are authenticated on interface ge-0/0/2, verify that the filter has been configured on the switch and includes the results for both supplicants:

Action user@switch> `show dot1x firewall`

```
Filter: dot1x-filter-ge-0/0/2
Counters
counter1_dot1x_ge-0/0/2_user1 100
counter2_dot1x_ge-0/0/2_user2 400
```

Meaning The output of the `show dot1x firewall` command displays **counter1** and **counter2**. Packets from User_1 are counted using **counter1**, and packets from User 2 are counted using **counter2**. The output displays packets incrementing for both counters. The filter has been applied to both end devices.

- Related Documentation**
- [Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch on page 367](#)
 - [Example: Configuring Firewall Filters for Port, VLAN, and Router Traffic on EX Series Switches](#)
 - [Configuring 802.1X RADIUS Accounting \(CLI Procedure\) on page 386](#)
 - [Understanding Authentication on Switches on page 348](#)
 - [Understanding Dynamic Filters Based on RADIUS Attributes on page 373](#)

Example: Applying Firewall Filters to Multiple Supplicants on Interfaces Enabled for 802.1X or MAC RADIUS Authentication

On EX Series switches, firewall filters that you apply to interfaces enabled for 802.1X or MAC RADIUS authentication are dynamically combined with the per-user policies sent to the switch from the RADIUS server. The switch uses internal logic to dynamically combine the interface firewall filter with the user policies from the RADIUS server and create an individualized policy for each of the multiple users or nonresponsive hosts that are authenticated on the interface.

This example describes how dynamic firewall filters are created for multiple supplicants on an 802.1X-enabled interface (the same principles shown in this example apply to interfaces enabled for MAC RADIUS authentication):

- [Requirements on page 400](#)
- [Overview and Topology on page 400](#)

- [Configuration on page 402](#)
- [Verification on page 404](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 9.5 or later for EX Series switches
- One EX Series switch
- One RADIUS authentication server. The authentication server acts as the backend database and contains credential information for hosts (supplicants) that have permission to connect to the network.

Before you apply firewall filters to an interface for use with multiple supplicants, be sure you have:

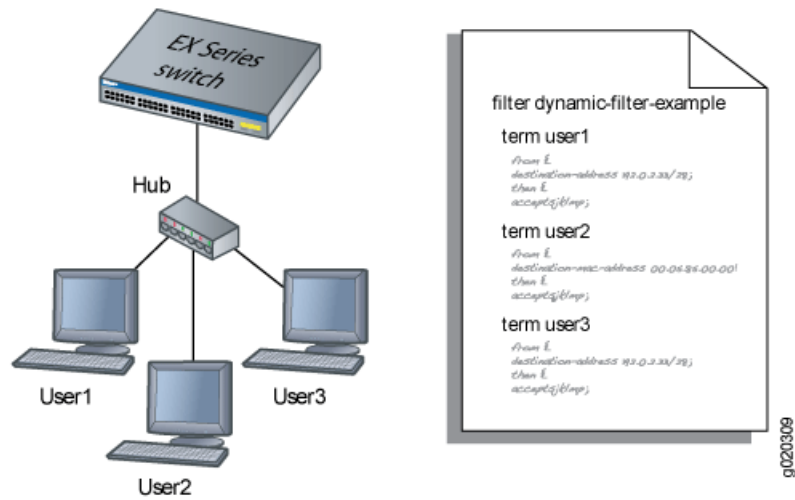
- Set up a connection between the switch and the RADIUS server. See [“Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch” on page 378](#).
- Configured 802.1X authentication on the switch, with the authentication mode for interface **ge-0/0/2** set to **multiple**. See [“Configuring 802.1X Interface Settings \(CLI Procedure\)” on page 357](#) and [“Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch” on page 367](#).
- Configured users on the RADIUS authentication server.

Overview and Topology

When the 802.1X configuration on an interface is set to multiple supplicant mode, the system dynamically combines interface firewall filter with the user policies sent to the switch from the RADIUS server during authentication and creates separate terms for each user. Because there are separate terms for each user authenticated on the interface, you can, as shown in this example, use counters to view the activities of individual users that are authenticated on the same interface.

When a new user (or a nonresponsive host) is authenticated on an interface, the system adds a term to the firewall filter associated with the interface, and the term (policy) for each user is associated with the MAC address of the user. The term for each user is based on the user-specific filters set on the RADIUS server and the filters configured on the interface. For example, as shown in [Figure 14 on page 401](#), when User1 is authenticated by the EX Series switch, the system creates the firewall filter **dynamic-filter-example**. When User2 is authenticated, another term is added to the firewall filter, and so on.

Figure 14: Conceptual Model: Dynamic Filter Updated for Each New User



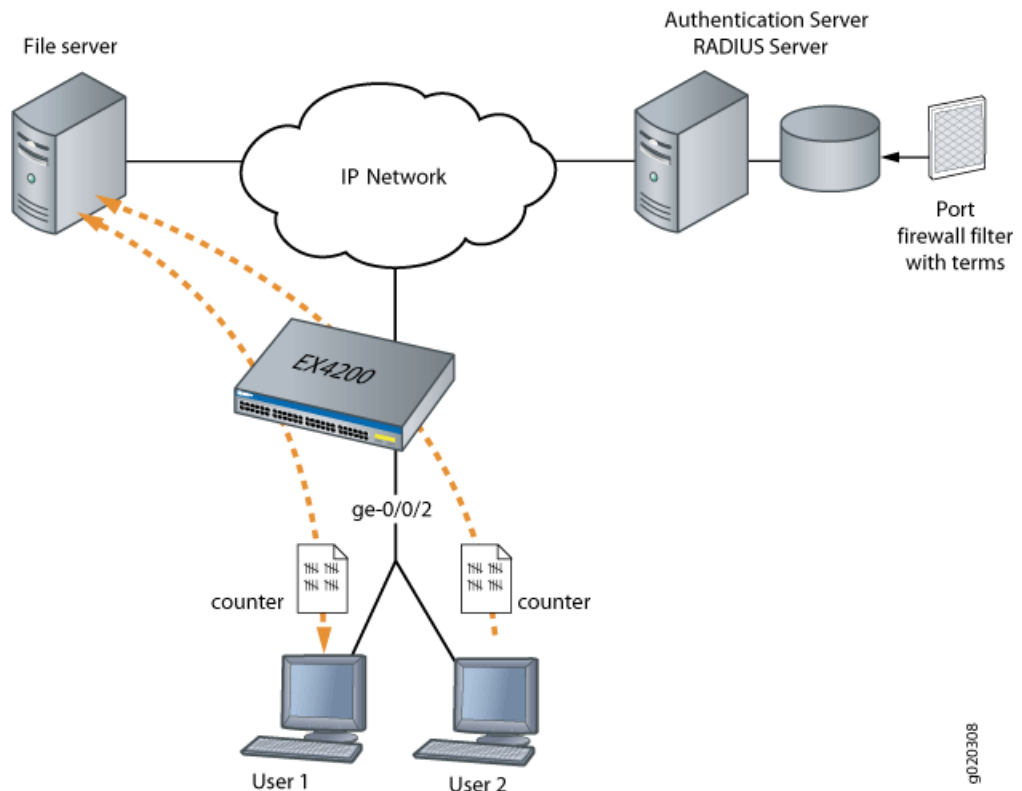
This is a conceptual model of the internal process—you cannot access or view the dynamic filter.



NOTE: If the firewall filter on the interface is modified after the user (or nonresponsive host) is authenticated, the modifications are not reflected in the dynamic filter unless the user is reauthenticated.

In this example, you configure a firewall filter to count the requests made by each endpoint authenticated on interface **ge-0/0/2** to the file server, which is located on subnet **192.0.2.16/28**, and set policer definitions to rate limit the traffic. [Figure 15 on page 402](#) shows the network topology for this example.

Figure 15: Multiple Supplicants on an 802.1X-Enabled Interface Connecting to a File Server



Configuration

To configure firewall filters for multiple supplicants on 802.1X-enabled interfaces:

- [Configuring Firewall Filters on Interfaces with Multiple Supplicants on page 402](#)

Configuring Firewall Filters on Interfaces with Multiple Supplicants

CLI Quick Configuration

To quickly configure firewall filters for multiple supplicants on an 802.1X-enabled interface copy the following commands and paste them into the switch terminal window:

```
[edit]
set protocols dot1x authenticator interface ge-0/0/2 supplicant multiple
set firewall family ethernet-switching filter filter1 term term1 from destination-address 192.0.2.16/28
set firewall policer p1 if-exceeding bandwidth-limit 1m
set firewall policer p1 if-exceeding burst-size-limit 1k
set firewall family ethernet-switching filter filter1 term term1 then count counter1
set firewall family ethernet-switching filter filter1 term term2 then policer p1
```

Step-by-Step Procedure

To configure firewall filters on an interface enabled for multiple supplicants:

1. Configure interface **ge-0/0/2** for multiple supplicant mode authentication:

```
[edit protocols dot1x]
user@switch# set authenticator interface ge-0/0/2 supplicant multiple
```

2. Set policer definition:

```
user@switch# show policer p1 |display set
set firewall policer p1 if-exceeding bandwidth-limit 1m
set firewall policer p1 if-exceeding burst-size-limit 1k
set firewall policer p1 then discard
```

3. Configure a firewall filter to count packets from each user and a policer that limits the traffic rate. As each new user is authenticated on the multiple supplicant interface, this filter term will be included in the dynamically created term for the user:

```
[edit firewall family ethernet-switching]
user@switch# set filter filter1 term term1 from destination-address 192.0.2.16/28
user@switch# set filter filter1 term term1 then count counter1
user@switch# set filter filter1 term term2 then policer p1
```

Results Check the results of the configuration:

```
user@switch> show configuration
```

```
firewall {
  family ethernet-switching {
    filter filter1 {
      term term1 {
        from {
          destination-address {
            192.0.2.16/28;
          }
        }
        then count counter1;
      }
      term term2 {
        from {
          destination-address {
            192.0.2.16/28;
          }
        }
        then policer p1;
      }
    }
  }
}
policer p1 {
  if-exceeding {
    bandwidth-limit 1m;
    burst-size-limit 1k;
  }
  then discard;
}
protocols {
```

```
dot1x {
  authenticator
    interface ge-0/0/2 {
      supplicant multiple;
    }
  }
}
```

Verification

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

- [Verifying Firewall Filters on Interfaces with Multiple Supplicants on page 404](#)

Verifying Firewall Filters on Interfaces with Multiple Supplicants

Purpose Verify that firewall filters are functioning on the interface with multiple supplicants.

Action 1. Check the results with one user authenticated on the interface. In this case, the user is authenticated on **ge-0/0/2**:

```
user@switch> show dot1x firewall
Filter: dot1x_ge-0/0/2
Counters
counter1_dot1x_ge-0/0/2_user1 100
```

2. When a second user, User2, is authenticated on the same interface, **ge-0/0/2**, you can verify that the filter includes the results for both of the users authenticated on the interface:

```
user@switch> show dot1x firewall
Filter: dot1x-filter-ge-0/0/0
Counters
counter1_dot1x_ge-0/0/2_user1 100
counter1_dot1x_ge-0/0/2_user2 400
```

Meaning The results displayed by the **show dot1x firewall** command output reflect the dynamic filter created with the authentication of each new user. User1 accessed the file server located at the specified destination address 100 times, while User2 accessed the same file server 400 times.

- Related Documentation**
- [Example: Applying a Firewall Filter to 802.1X-Authenticated Supplicants by Using RADIUS Server Attributes on an EX Series Switch on page 392](#)
 - [Example: Configuring Firewall Filters for Port, VLAN, and Router Traffic on EX Series Switches](#)
 - [Filtering 802.1X Supplicants by Using RADIUS Server Attributes on page 388](#)

Example: Applying Firewall Filters to Multiple Supplicants on Interfaces Enabled for 802.1X or MAC RADIUS Authentication on EX Series Switches with ELS Support



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: Applying Firewall Filters to Multiple Supplicants on Interfaces Enabled for 802.1X or MAC RADIUS Authentication” on page 399](#). For ELS details, see *Using the Enhanced Layer 2 Software CLI*.

On EX Series switches, firewall filters that you apply to interfaces enabled for 802.1X or MAC RADIUS authentication are dynamically combined with the per-user policies sent to the switch from the RADIUS server. The switch uses internal logic to dynamically combine the interface firewall filter with the user policies from the RADIUS server and create an individualized policy for each of the multiple users or nonresponsive hosts that are authenticated on the interface.

This example describes how dynamic firewall filters are created for multiple supplicants on an 802.1X-enabled interface (the same principles shown in this example apply to interfaces enabled for MAC RADIUS authentication):

- [Requirements on page 405](#)
- [Overview and Topology on page 406](#)
- [Configuration on page 408](#)
- [Verification on page 410](#)

Requirements

This example uses the following software and hardware components:



NOTE: This example also applies to QFX5100 switches.

- Junos OS Release 13.2 or later for EX Series switches
- One EX Series switch with support for ELS
- One RADIUS authentication server. The authentication server acts as the backend database and contains credential information for hosts (supplicants) that have permission to connect to the network.

Before you apply firewall filters to an interface for use with multiple supplicants, be sure you have:

- Set up a connection between the switch and the RADIUS server. See [“Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch” on page 378](#).

- Configured 802.1X authentication on the switch, with the authentication mode for the interface ge-0/0/2 set to **multiple**. See [“Configuring 802.1X Interface Settings \(CLI Procedure\)” on page 357](#) and [“Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch” on page 367](#).
- Configured users on the RADIUS authentication server.

Overview and Topology

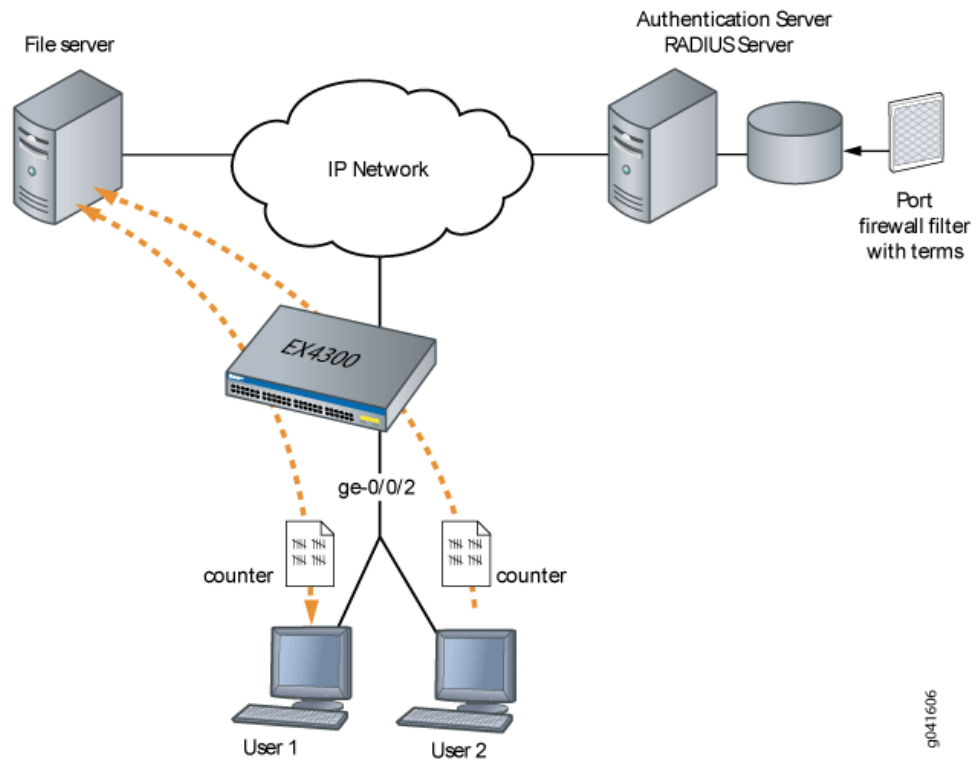
When the 802.1X configuration on an interface is set to multiple supplicant mode, the system dynamically combines the interface firewall filter with the user policies sent to the switch from the RADIUS server during authentication and creates separate terms for each user. Because there are separate terms for each user authenticated on the interface, you can, as shown in this example, use counters to view the activities of individual users that are authenticated on the same interface.

When a new user (or a nonresponsive host) is authenticated on an interface, the system adds a term to the firewall filter associated with the interface, and the term (policy) for each user is associated with the MAC address of the user. The term for each user is based on the user-specific filters set on the RADIUS server and the filters configured on the interface. For example, as shown in [Figure 14 on page 401](#), when User 1 is authenticated by the EX Series switch, the system adds a term to the firewall filter **dynamic-filter-example**. When User 2 is authenticated, another term is added to the firewall filter, and so on.



NOTE: This figure also applies to QFX5100 switches.

Figure 16: Conceptual Model: Dynamic Filter Updated for Each New User



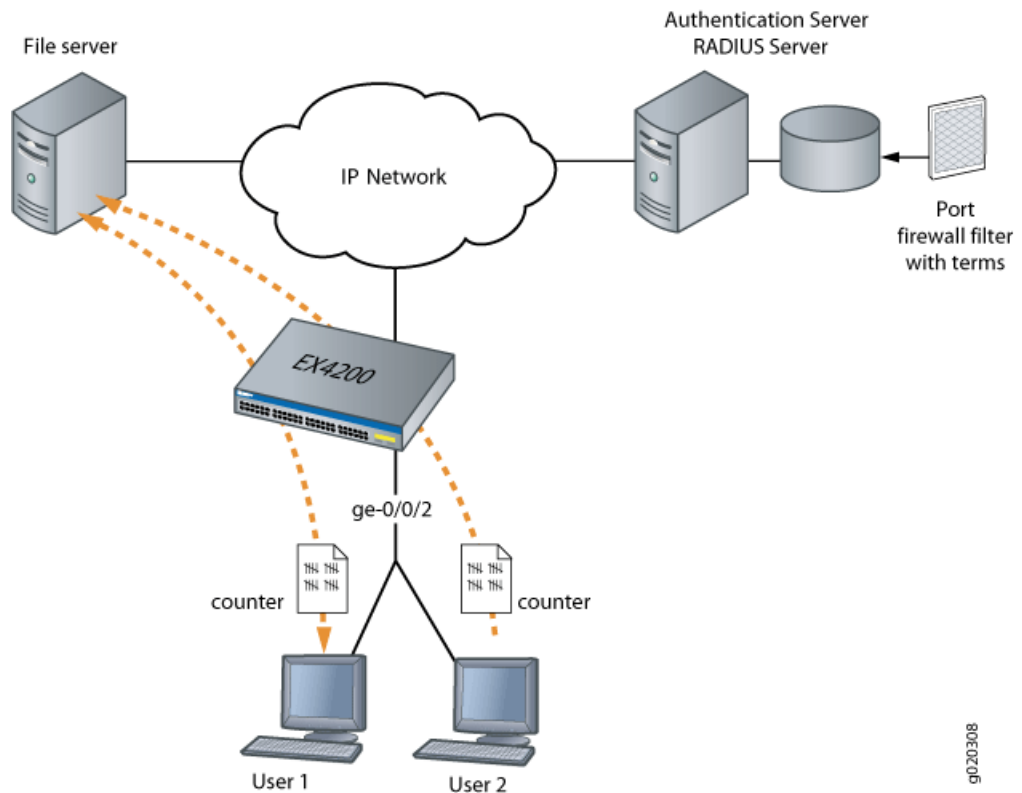
This is a conceptual model of the internal process—you cannot access or view the dynamic filter.



NOTE: If the firewall filter on the interface is modified after the user (or nonresponsive host) is authenticated, the modifications are not reflected in the dynamic filter unless the user is reauthenticated.

In this example, you configure a firewall filter to count the requests made by each endpoint authenticated on interface ge-0/0/2 to the file server, which is located on subnet 192.0.2.16/28, and set policer definitions to rate-limit the traffic. [Figure 15 on page 402](#) shows the network topology for this example.

Figure 17: Multiple Supplicants on an 802.1X-Enabled Interface Connecting to a File Server



Configuration

Configuring Firewall Filters on Interfaces with Multiple Supplicants

CLI Quick Configuration To quickly configure firewall filters for multiple supplicants on an 802.1X-enabled interface copy the following commands and paste them into the switch terminal window:

```
[edit]
set firewall family ethernet-switching filter filter1 term term1 from ip-destination-address 192.0.2.16/28
set firewall family ethernet-switching filter filter1 term term2 from ip-destination-address 192.0.2.16/28
set firewall policer p1 if-exceeding bandwidth-limit 1m
set firewall policer p1 if-exceeding burst-size-limit 1500
set firewall policer p1 then discard
set firewall family ethernet-switching filter filter1 term term1 then count counter1
set firewall family ethernet-switching filter filter1 term term2 then policer p1
```

Step-by-Step Procedure To configure firewall filters on an interface enabled for multiple supplicants:

1. Set the policer definition:

```
user@switch# show policer p1 |display set
set firewall policer p1 if-exceeding bandwidth-limit 1m
```

```
set firewall policer p1 if-exceeding burst-size-limit 1500
set firewall policer p1 then discard
```

2. Configure a firewall filter to count packets from each user and a policer that limits the traffic rate. As each new user is authenticated on the multiple supplicant interface, this filter term will be included in the dynamically created term for the user:

```
[edit firewall family ethernet-switching]
user@switch# set filter filter1 term term1 from ip-destination-address 192.0.2.16/28
user@switch# set filter filter1 term term2 from ip-destination-address 192.0.2.16/28
user@switch# set filter filter1 term term1 then count counter1
user@switch# set filter filter1 term term2 then policer p1
```

Results Check the results of the configuration:

```
user@switch> show configuration
```

```
firewall {
  family ethernet-switching {
    filter filter1 {
      term term1 {
        from {
          ip-destination-address {
            192.0.2.16/28;
          }
        }
        then count counter1;
      }
      term term2 {
        from {
          ip-destination-address {
            192.0.2.16/28;
          }
        }
        then policer p1;
      }
    }
  }
  policer p1 {
    if-exceeding {
      bandwidth-limit 1m;
      burst-size-limit 1500;
    }
    then discard;
  }
}
protocols {
  dot1x {
    authenticator
    interface ge-0/0/2 {
      supplicant multiple;
    }
  }
}
```

```
}
```

Verification

Verifying Firewall Filters on Interfaces with Multiple Supplicants

Purpose Verify that firewall filters are functioning on the interface with multiple supplicants.

Action 1. Check the results with one user authenticated on the interface. In this case, User 1 is authenticated on ge-0/0/2:

```
user@switch> show dot1x firewall
Filter: dot1x_ge-0/0/2
Counters
counter1_dot1x_ge-0/0/2_user1 100
```

2. When a second user, User 2, is authenticated on the same interface, ge-0/0/2, you can verify that the filter includes the results for both of the users authenticated on the interface:

```
user@switch> show dot1x firewall
Filter: dot1x-filter-ge-0/0/0
Counters
counter1_dot1x_ge-0/0/2_user1 100
counter1_dot1x_ge-0/0/2_user2 400
```

Meaning The results displayed by the **show dot1x firewall** command output reflect the dynamic filter created with the authentication of each new user. User 1 accessed the file server located at the specified destination address **100** times, while User 2 accessed the same file server **400** times.

- Related Documentation**
- [Example: Applying a Firewall Filter to 802.1X-Authenticated Supplicants by Using RADIUS Server Attributes on an EX Series Switch on page 392](#)
 - [Example: Configuring Firewall Filters for Port, VLAN, and Router Traffic on EX Series Switches](#)
 - [Filtering 802.1X Supplicants by Using RADIUS Server Attributes on page 388](#)

Example: Configuring Fallback Options on EX Series Switches for EAP-TTLS Authentication and Odyssey Access Clients

For 802.1X user authentication, EX Series switches support RADIUS authentication servers that are using Extensible Authentication Protocol–Tunneled TLS (EAP-TTLS) to authenticate Odyssey Access Client (OAC) supplicants. OAC networking software runs

on endpoint computers (desktop, laptop, or notepad computers and supported wireless devices) and provides secure access to both wired and wireless networks.

This example describes how to configure an 802.1X-enabled interface on the switch to provide fallback support for OAC users who have entered incorrect login credentials:

- [Requirements on page 411](#)
- [Overview and Topology on page 411](#)
- [Configuration on page 413](#)
- [Verification on page 415](#)

Requirements

This example uses the following software and hardware components:



NOTE: This example also applies to QFX5100 switches.

- Junos OS Release 11.2 or later for EX Series switches
- One EX Series switch acting as an authenticator port access entity (PAE). The ports on the authenticator PAE form a control gate that blocks all traffic to and from supplicants until they are authenticated.
- One RADIUS authentication server that supports 802.1X. The authentication server acts as the backend database and contains credential information for hosts (supplicants) that have permission to connect to the network.
- One OAC end device acting as a supplicant.

Before you begin configuring the fallback option, ensure that you have:

- Set up a connection between the switch and the RADIUS server. See [“Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch” on page 378](#).
- Configured EAP-TTLS on the server. See your RADIUS server documentation.
- Configured users on the RADIUS server. See your RADIUS server documentation.

Overview and Topology

OAC is networking software that runs on endpoint computers (desktop, laptop, or notepad) and supported wireless devices. OAC provides full support for EAP, which is required for secure wireless LAN access.

In this topology, OAC is deployed with an 802.1X-enabled switch and a RADIUS server. The switch functions as an enforcement point in the network security architecture. This topology:

- Ensures that only authorized users can connect.
- Maintains privacy of login credentials.
- Maintains data privacy over the wireless link.

This example includes the configuration of a server-reject VLAN on the switch, which can be used to prevent accidental lockout for users who have entered incorrect login credentials. These users can be given limited LAN access.

However, this fallback configuration is complicated by the fact that the OAC supplicant and RADIUS server are using EAP-TTLS. EAP-TTLS creates a secure encrypted tunnel between the server and the end device to complete the authentication process. When the user enters incorrect login credentials, the RADIUS server sends EAP failure messages directly to the client through this tunnel. The EAP failure message causes the client to restart the authentication procedure, so that the switch's 802.1X authentication process tears down the session that was established with the switch using the server-reject VLAN. You can enable the remedial connection to continue by configuring:

- **eapol-block**—Enable the EAPoL block timer on the 802.1X interface that is configured to belong to the server-reject VLAN. The block timer causes the authentication port access entity to ignore EAP start messages from the client, attempting to restart the authentication procedure.



NOTE: The EAPoL block timer is triggered only after the configured number of allowed reattempts (using the `retries` option) on the 802.1X interface have been exhausted. You can configure `retries` to specify the number of times the switch attempts to authenticate the port after an initial failure. The default is three retries.

- **block-interval**—Configure the amount of time that you want the EAPoL block timer to continue to ignore EAP start messages. If you do not configure the block interval, the EAPoL block timer defaults to 120 seconds.

When the 802.1X interface ignores the EAP start messages from the client, the switch allows the existing remedial session that was established through the server-reject VLAN to remain open.

These configuration options apply to single, single-secure, and multiple supplicant authentication modes. In this example, the 802.1X interface is configured in single supplicant mode.

Figure 18 on page 413 shows an EX Series switch connecting an OAC end device to a RADIUS server, and indicates the protocols being used to connect the network entities.



NOTE: This figure also applies to QFX5100 switches.

Figure 18: EX Series Switch Connecting OAC to RADIUS Server Using EAP-TTLS Authentication

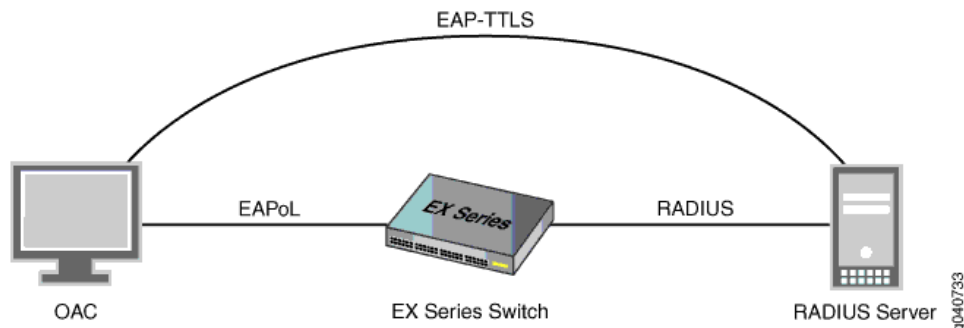


Table 32 on page 413 describes the components in this OAC deployment:

Table 32: Components of the OAC Deployment

Property	Settings
Switch hardware	EX Series switch
VLANs	default server-reject-vlan: VLAN name is remedial and VLAN ID is 700
802.1X interface	ge-0/0/8
OAC supplicant	EAP-TTLS
One RADIUS authentication server	EAP-TTLS

Configuration

CLI Quick Configuration To quickly configure the fallback options for EAP-TTLS and OAC supplicants, copy the following commands and paste them into the switch terminal window:

```
[edit]
set vlans remedial vlan-id 700
set protocols dot1x authenticator interface ge-0/0/8 retries 4
set protocols dot1x authenticator interface ge-0/0/8 server-reject-vlan remedial
set protocols dot1x authenticator interface ge-0/0/8 server-reject-vlan eapol-block
set protocols dot1x authenticator interface ge-0/0/8 server-reject-vlan block-interval 130
```

**Step-by-Step
Procedure**

To configure the fallback options for EAP-TTLS and OAC supplicants:



TIP: In this example, the switch has only one server-reject VLAN. Therefore, the configuration specifies `eapol-block` and `block-interval` directly after `server-reject-vlan`. However, if you have configured multiple VLANs on the switch, you must include the VLAN name or VLAN ID directly after `server-reject-vlan` to indicate which VLAN is being modified.

1. Configure a VLAN that will function as the server-reject VLAN to provide limited LAN access for users who have entered incorrect login credentials:

```
[edit]
user@switch# set vlans remedial vlan-id 700
```

2. Configure the number of times for the client to be prompted for username and password before an incorrect login is directed to the server-reject VLAN:

```
[edit protocols dot1x authenticator interface ge-0/0/8]
user@switch# set retries 4
```

3. Configure the 802.1X authenticator interface to use the server-reject VLAN as a fallback for incorrect logins:

```
[edit protocols dot1x authenticator interface ge-0/0/8]
user@switch# set server-reject-vlan remedial
```

4. Enable the EAPoL block timer on the 802.1X interface that is configured to belong to the server-reject VLAN.

```
[edit protocols dot1x authenticator interface ge-0/0/8]
user@switch# set server-reject-vlan eapol-block
```

5. Configure the amount of time for the EAPoL block to remain in effect:

```
[edit protocols dot1x authenticator interface ge-0/0/8]
user@switch# set server-reject-vlan block-interval 130
```

Results

Check the results of the configuration:

```
user@switch> show configuration
protocols {
  dot1x {
    authenticator {
      interface {
        ge-0/0/8.0 {
          supplicant single;
          retries 4;
        }
      }
    }
  }
}
```

```
server-reject-vlan remedial block-interval 130 eapol-block;
}
```

Verification

To confirm that the configuration and the fallback options are working correctly, perform this task:

- [Verifying the Configuration of the 802.1X Interface on page 415](#)

Verifying the Configuration of the 802.1X Interface

Purpose Verify that the 802.1X interface is configured with the desired options.

Action user@switch> **show dot1x** interface ge-0/0/8.0 detail

```
ge-0/0/8.0
  Role: Authenticator
  Administrative state: Auto
  Supplicant mode: Single
  Number of retries: 4
  Quiet period: 60 seconds
  Transmit period: 30 seconds
  Mac Radius: Disabled
  Mac Radius Restrict: Disabled
  Reauthentication: Enabled
  Configured Reauthentication interval: 120 seconds
  Supplicant timeout: 30 seconds
  Server timeout: 30 seconds
  Maximum EAPoL requests: 2
  Guest VLAN member: guest
  Number of connected supplicants: 1
    Supplicant: tem, 2A:92:E6:F2:00:00
      Operational state: Authenticated
      Backend Authentication state: Idle
      Authentication method: Radius
      Authenticated VLAN: remedial
      Session Reauth interval: 120 seconds
      Reauthentication due in 68 seconds
```

Meaning The **show dot1x ge-0/0/8 detail** command output shows that the **ge-0/0/8** interface is in the **Authenticated** state and that it is using the **remedial** VLAN.

Related Documentation • [Understanding Authentication on Switches on page 348](#)

Example: Configuring Centralized Access Control to Network Resources, with an EX Series Switch Connected to Junos Pulse Access Control Service

You can deploy an EX Series switch and Junos Pulse Access Control Service to control who is admitted to your network and what resources—servers, applications, stored data,

and other devices—the user can access after being admitted to the network. Access Control Service provides both authentication and authorization:

With this combination of products, the switch serves as an *Infranet Enforcer*, that is, a policy enforcement point for Access Control Service. Access Control Service sends auth table entries and resource access policies when an endpoint successfully completes 802.1X or MAC authentication (unmanaged devices). Access for any endpoint is governed by the resource access policies that you configure on Access Control Service. The switch converts the resource access policies into filter definitions and applies these to the appropriate port. Because resource access policies are employed, firewall filters are not required for the switch configuration.

This example describes how to configure the switch to use Access Control Service for authentication and authorization and how to configure Access Control Service to use the switch as an Infranet Enforcer.



NOTE: This example configures the switch prior to configuring the Access Control Service. However, you can configure the Access Control Service first, if you prefer. The sequence does not matter.

The example also describes the requisite configuration procedures on Access Control Service for configuring user roles, user realms, and resource access policies:

- [Requirements on page 416](#)
- [Overview and Topology on page 417](#)
- [Configuring the EX Series Switch to Connect to the Junos Pulse Access Control Device on page 419](#)
- [Creating an Authentication Server Instance on the UAC NAC Device on page 422](#)
- [Configuring User Roles on the UAC NAC Device on page 423](#)
- [Configuring a User Realm on page 424](#)
- [Mapping User Roles to the User Realm on page 424](#)
- [Configuring Sign-In Policies on page 425](#)
- [Configuring a Location Group on page 425](#)
- [Configuring an EX Series Switch Infranet Enforcer Instance on the UAC NAC Device on page 426](#)
- [Configuring Resource Access Policies on the UAC NAC Device on page 426](#)
- [Verification on page 427](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 12.2 or later for EX Series switches
- One EX Series switch acting as an Infranet Enforcer and an authenticator port access entity (PAE)

- Junos Pulse Access Control Service Release 4.2 or later
- Access Control Service IC Series device or MAG Series device

Before you configure the switch to use Access Control Service, be sure you have:

- Installed and set up the IC Series device or the MAG Series device.
 - For information on the IC Series, see https://www.juniper.net/documentation/en_US/elastic-independent/uc/information-products/pathway/pages/united-access-control/product/.
 - For information on the MAG Series, see https://www.juniper.net/documentation/en_US/elastic-independent/mag/information-products/pathway/pages/mag-series/product/.
- The IP address and password of the IC Series or MAG Series device.



NOTE: Within the example, the IC Series or MAG Series device is referred to as a Network Access Control (NAC) device.

Overview and Topology

You use 802.1X to control network access. Only users and devices providing credentials that have been verified against a user database are allowed access to the network. You can use Access Control Service as the user database for 802.1X authentication, as well as for MAC RADIUS authentication.

In addition, Access Control Service functions as a centralized policy management server. It eliminates the need to configure firewall filters on the individual switch. Instead, you define resource access policies centrally on Access Control Service. The resource access policy defines which network resources are allowed and denied for a user, based upon the user's role. Access Control Service NAC device distributes these policies to all connected switches. For messages relating to access policies, the NAC device communicates with the switch using the Junos UAC Enforcer Protocol (JUEP).

The Access Control Service IC Series device or MAG Series device acts as your centralized NAC device. Specific resources are allocated through resource access policies from the Access Control Service device. The ports on the switch form a control gate that blocks all traffic to and from supplicants until they are authenticated.

Limit access to protected resources by defining *user roles* and *user realms* with accompanying *resource access policies* in the UAC admin console.

In this example, we are configuring access control for a medical facility. Because we are using Access Control Service for centralized access control, we specify the permissions and limitations on the UAC NAC device.

To ensure patient privacy, the patient medical history files are accessible only to the medical staff (**med-staf**). The patient insurance information and payment records are available only to the accounts personnel (**accounts**). Other information pertaining to the patients is available to anyone of the general staff (**other**).

The switch acts as an Infranet Enforcer and an authenticator port access entity (PAE). It blocks all traffic and acts as a control gate until the supplicant (client) is authenticated by the server. All other users and devices are denied access.

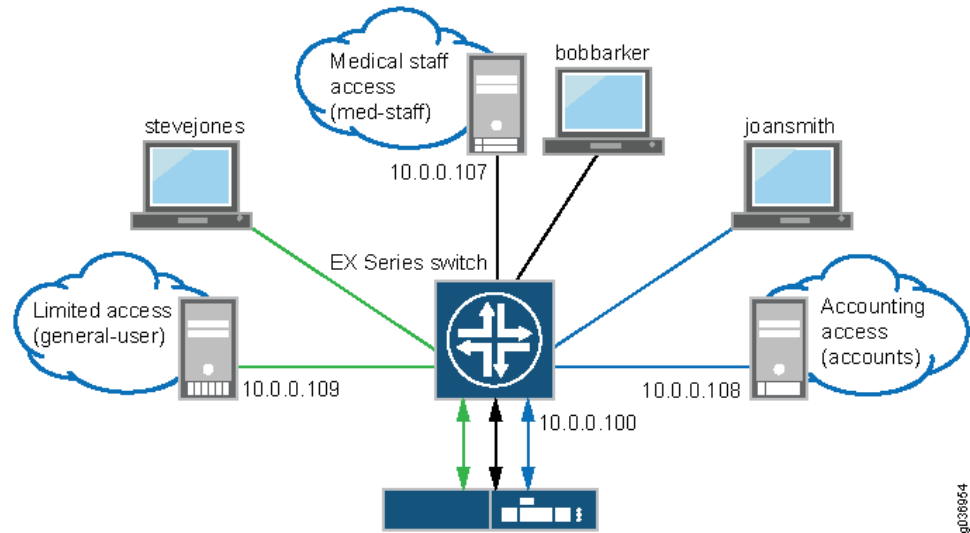
[Table 33 on page 418](#) shows the configuration components used for the switch and the Access Control Service NAC device in this example.

Table 33: Components of the Topology for Access Control Service and the EX Series Switch

Property	Settings
Access Control Service NAC device properties that must be specified on the switch	IP address— 10.204.88.148 hostname— my_nac password— MyUACPassword
Password to use for connecting the switch with the RADIUS server	MySecret
Access profile, specified on the switch, to define the connection to the UAC	myuac_profile
Switch hostname	myswitch
User roles on the NAC device	med-staff accounts general-user
User realm on the NAC device	hospital-staff
Location group on the NAC device	medical-group

[Figure 19 on page 419](#) shows the topology used in this example.

Figure 19: Centralized Access Control to Network Resources with an EX Series Switch Connected to Junos Pulse Access Control Service



Configuring the EX Series Switch to Connect to the Junos Pulse Access Control Device

CLI Quick Configuration To quickly connect the switch to Access Control Service, copy the following commands and paste them into the switch terminal window:



NOTE: This example uses the default values for **timeout**, **interval**, and **timeout-action**.

```
[edit]
set ethernet-switching-options uac-policy
set access profile myuac_profile authentication-order radius
set access profile myuac radius authentication-server 10.204.88.148
set access radius-server 10.204.88.148
set access radius-server secret MySecret
set services unified-access-control infranet-controller my_nacaddress 10.204.88.148
set services unified-access-control infranet-controller myswitch interface me0.0
set services unified-access-control infranet-controller myswitch password MyUACPassword
set protocols dot1x authenticator authentication-profile-name myuac_profile
set protocols dot1x authenticator interface ge-0/0/10.0
```

**Step-by-Step
Procedure**

To connect the switch to your UAC NAC device:

1. Configure the switch to use Access Control Service for authentication and authorization:

```
[edit ethernet-switching-options]  
user@switch# set uac-policy
```

2. Configure the access profile to specify Access Control Service. The access profile contains the authentication and authorization configuration that aids in handling authentication and authorization requests, including the authentication method and sequence, and Access Control Service address:
 - a. Configure **radius** as the authentication method to be used when attempting to authenticate a user. For each login attempt, the software tries the authentication methods in order, starting with the first one, until the password matches:

```
[edit access profile]  
user@switch# set myuac_profile authentication-order radius
```

- b. Define the access profile for connecting to the UAC by specifying the IP address of the authentication server:



NOTE: Specify the same IP address that you use for the RADIUS server and the NAC device.

```
[edit access profile]  
user@switch# set myuac_profile radius authentication-server 10.204.88.148
```

3. Configure the RADIUS server to use the same IP address that you specified for the authentication server:

```
[edit access]  
user@switch# set radius-server 10.204.88.148
```

4. Configure the password to use for connecting the switch with the RADIUS server:



NOTE: The password specified here is used for RADIUS communications between the switch and Access Control Service. It does not need to match the password that is specified on Access Control Service through the administrative interface on Access Control Service.

```
[edit access]  
user@switch# set radius-server secret MySecret
```

5. Configure the address of Access Control Service NAC device:



NOTE: Specify the hostname and IP address of the NAC device. This is the same IP address that you used for specifying the authentication server.

```
[edit services united-access-control infranet-controller my_nac ]
user@switch# set address 10.204.88.148
```

6. Configure the switch's management Ethernet interface for the NAC device:

```
[edit services united-access-control infranet-controller myswitch]
user@switch# set interface me0.0
```

7. Configure the password for connecting the switch to the Access Control Service NAC device:



NOTE: This password must match the password specified on Access Control Service through its administrative interface. It is used for Junos UAC Enforcer Protocol (JUEP) communications between the switch and Access Control Service.

```
[edit services united-access-control infranet-controller myswitch]
user@switch# set password MyUACPassword
```

8. Specify the name of the access profile to use for 802.1X, MAC RADIUS, or captive portal authentication:



NOTE: Use the same access profile that you configured previously (step 2).

```
[edit protocols dot1x]
user@switch# set authenticator authentication-profile-name myuac_profile
```

9. Configure the 802.1X interface that the switch will use for communicating with Access Control Service:

```
[edit protocols dot1x]
user@switch# set authenticator interface ge-0/0/10.0
```

Results Display the results of the configuration:

```
user@switch> show configuration
```

```
services {
```

```
unified-access-control {
  infranet-controller myuac {
    address 10.204.88.148;
    interface me0.0;
    password "$ABC123"; ## SECRET-DATA
  }
}
ethernet-switching-options {
  uac-policy;
}
protocols {
  dot1x {
    authenticator {
      authentication-profile-name myuac_profile;
      interface {
        ge-0/0/10.0;
      }
    }
  }
}
access {
  radius-server {
    10.204.88.148
    port 1812;
    secret "$ABC123"; ## SECRET-DATA
  }
}
profile myuac_profile {
  authentication-order radius;
  radius {
    authentication-server 10.204.88.148;
  }
}
```

Creating an Authentication Server Instance on the UAC NAC Device

Step-by-Step Procedure Access Control Service supports a variety of user authentication and authorization servers. To quickly set up user authentication, you can use local authentication on the Access Control Service NAC device. This example uses the preconfigured local authentication server, System Local.

To set up local user authentication on the NAC device:

1. In the NAC device admin console, select **Authentication > Auth. Servers**.
2. Click **System Local**.
3. Select the **Users** tab.
4. Click **New**.

5. In the dialog box for **New Local User**, enter information into the text boxes of the following fields:

- **Username**
- **Full Name**
- **Password**



NOTE: All other fields are optional.

6. Click **Save Changes**.
7. Repeat this procedure for each user that you want to include in the device database. For example, we created three users: **bobbarker**, **joansmith**, and **stevejones**

Results The users **bobbarker**, **joansmith**, and **stevejones** are available in the NAC device database and can be associated with a role.

Configuring User Roles on the UAC NAC Device

Step-by-Step Procedure To set up the user roles:



NOTE: In this example, either Odyssey Access Client or the Junos Pulse client is installed on the client.

1. In the NAC device admin console, select **Users > User Roles**.
2. Click **New Role** and then enter the **Name** of the role that allows users with compliant endpoints to access the protected resources. You can also enter additional information about this role into the **Description** text box.
3. Click **Save Changes**.
4. Repeat these steps to create the additional user roles. For example, we created three roles: **med-staff**, **accounts**, and **general-user**

Results The roles, **med-staff**, **accounts**, and **general-user**, are available in the NAC database.

Configuring a User Realm

Step-by-Step Procedure To configure a user realm within the authentication server instance.



NOTE: Only one user realm is required.

1. In the NAC device admin console, select **Users > User Realms**.
2. In the dialog box **User Authentication Realms**, click **New**.
3. In **New Authentication Realm**, :
 - Enter information into the text boxes:
 - **Name**—Name of the realm. For this example, we are using **hospital-staff**.
 - **Description**—(Optional) Any additional information that you wish to provide.
 - Under **Servers**:
 - **Authentication**—Select **System Local**.
 - **Directory/Attribute**—Select **None**.
 - **Accounting**—Select **None**.
4. Click **Save Changes**.

Results The new user realm can be associated with the roles you have created.

Mapping User Roles to the User Realm

Step-by-Step Procedure To map each user role to a rule within the user authentication realm.

1. In the NAC device admin console, select **Users > User Realms>Role Mapping hospital-staff**.
2. Click **New Rule**.
3. In the Role Mapping Rule dialog box, for a rule based on username, enter the information for the appropriate fields:
 - Under **Rule: If username**, is———**bobbarker**.
 - Under **then assign these roles**, select **med-staff** role and then click **Add**.

4. Create additional role mapping rules for additional users. For example, create a role mapping rule to associate user joansmith with accounts, and a role mapping rule to associate user stevejones with medical-staff.
5. Click **Save Changes**.

Results Each user is associated with a role.

Configuring Sign-In Policies

- Step-by-Step Procedure** To create a user sign-in policy:
1. In the admin console, select **Authentication > Signing in > Sign-in Policies**.
 2. To create a new sign-in policy, click **New URL** and select **Users**.
 3. In the **Sign-in URL** field, enter the URL that you want to associate with the policy. Use the format *<host>/<path>* where *<host>* is the hostname of the NAC device, and *<path>* is any string users must enter. For example **/testsite/*.
 4. (Optional) Enter a **Description** for the policy.
 5. In the **Sign-in Page** list, select **Default Sign-in Page**.
 6. Under **Available realms**, select the hospital-staff that you created.
 7. Under **Authentication protocol set**, select 802.1X.
 8. Click **Save Changes**.

Results A sign-in URL is available for users.

Configuring a Location Group

- Step-by-Step Procedure** You must create a location group to associate with an Infranet Enforcer instance.
1. In the admin console, select **Network Access > Location Group**.
 2. Select **New Location Group**.
 3. For **Name**, type medical-group.

4. Add an optional description.
5. Leave the default sign-in policy.
6. Click **Save Changes**.

Results A location group that can be assigned to the EX Series switch is created.

Configuring an EX Series Switch Infranet Enforcer Instance on the UAC NAC Device

Step-by-Step Procedure To configure Junos Pulse Access Control Service to accept a connection from the switch:

1. On the left navigation bar in the NAC device admin console, select **UAC > Infranet Enforcer > Connection**.
2. Click **New Enforcer**. The New Infranet Enforcer dialog box appears. By default, the new ScreenOS Enforcer page is displayed.
3. Select the **Junos EX** option button. The New Infranet Enforcer page is displayed.
4. Enter the name of the switch in the **Name** box.
5. Enter the password for the switch. This password is a shared secret that administrators of both the switch and Junos Pulse Access Control Service can use for connectivity between the two devices.
6. Enter the serial number of the switch.
7. For **Location Group**, select medical-group.
8. Click **Save Changes**.

Results Junos Pulse Access Control Service and the EX switch can be connected.

Configuring Resource Access Policies on the UAC NAC Device

Step-by-Step Procedure To create a resource access policy:

1. In the Infranet Enforcer admin console, select **UAC > Infranet Enforcer > Resource Access**.
2. Click **New Policy**.

3. On the **New Policy** page:
 - a. For **Name** and **Description**, enter any name and description for this policy, such as **MedicalServer**.
 - b. For **Resources**, specify the protocol, IP address, network mask, and port of each resource (or range of addresses) for which this Infranet Enforcer resource access policy applies, one per line. You cannot specify a hostname in an Infranet Enforcer resource access policy. You can specify only an IP address. You can use TCP, UDP, or ICMP.

For example, type:10.204.91.20 to specify the med-staff protected resources on the switch.
 - c. In the **Infranet Enforcer** box, add the switch you created to selected Enforcers.
 - d. In the **Roles** box, select **Policy applies to SELECTED roles**, select **med-staff**, and click **Add** to apply this resource access policy to users who are mapped to the med-staff role.
 - e. In the **Action** box, select **Allow** access.
4. Click **Save Changes**.
5. Complete two additional resource access policies:
 - Allow role accounts with the IP address 10.204.91.21.
 - Allow role general-access with the IP address 10.204.91.22.

Results Individual users, through their assigned roles, are provided access to the proper protected assets.

Verification

The following procedures verify the connections between the switch and the NAC device.

- [Verifying That the Switch Is Connected to Access Control Service on page 427](#)
- [Verifying the Configuration of Resource Access Policies on page 428](#)
- [Verifying the Mapping of Roles to Resources on page 429](#)

Verifying That the Switch Is Connected to Access Control Service

Purpose Verify that the switch is connected to Access Control Service.

Action Confirm the status of the connection to Access Control Service.

```
user@switch> show services unified-access-control status
```

Host	Address	Port	Interface	State
ic	10.204.88.148	11123	vlan.60	connected

Meaning Confirm that the **State** indicates that the Access Control Service is connected.

Verifying the Configuration of Resource Access Policies

Purpose After you have configured the access resource policies on the UAC device admin console, verify that they have been deployed to the switch.

Action Confirm that resource access policies for the switch have been configured on Access Control Service .

```
user@switch> show services unified-access-control policies detail
```

```
Identifier: 1
  Resource: 10.204.91.20:*
  Action: allow
  Apply: selected
  Role identifier      Role name
    0000000001.000005.0 med-staff
Identifier: 2
  Resource: 10.204.91.21:*
  Action: allow
  Apply: selected
  Role identifier      Role name
    1331203933.456038.0 accounts
Identifier: 3
  Resource: 10.204.91.23:*
  Action: allow
  Apply: selected
  Role identifier      Role name
    1318918961.643263.0 general-user
Identifier: 4
  Resource: 10.204.88.148:*
  Resource: udp://*:53,67
  Action: allow
  Apply: all
Total: 4
```



NOTE: There must always be a resource access policy to allow traffic to the Access Control Service.

Meaning The results show the resource access policies that were configured in this example. The policy with identifier 4 is the policy that allows traffic to the Access Control Service. It lists the IP address of the Access Control Service and an additional resource for **udp** indicating that it allows dhcp/dns traffic, too.

Verifying the Mapping of Roles to Resources

Purpose Display the content of the authentication table in a user role firewall implementation. The table, pushed from a supporting Access Control Service device, provides the user roles associated with incoming traffic.

Action Display the contents of the authentication table to show the mapping of roles to resources.

```
user@switch> show services unified-access-control authentication-table detail
```

```
Identifier: 6
Source: 00-50-56-a4-5a-4c/10.204.90.61
Username: bobbarker
Age: 0
Role identifier      Role name
0000000001.000005.0 med-staff
Total: 1
```

Meaning This output shows the mapping for username **bobbarker**. The output shows only one user, because only this user is connected at the time that the command is issued. If additional users were connected, the other users would also be displayed.

Related Documentation

- [Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service \(CLI Procedure\) on page 522](#)
- [Understanding Centralized Network Access Control and EX Series Switches on page 545](#)

Example: Configuring 802.1X Authentication Options When the RADIUS Server Is Unavailable to an EX Series Switch

Server fail fallback enables you to specify how 802.1X supplicants connected to the switch are supported if the RADIUS authentication server becomes unavailable or sends a RADIUS access-reject message.

You use 802.1X to control network access. Only users and devices (supplicants) providing credentials that have been verified against a user database are allowed access to the network. You use a RADIUS server as the user database.

This example describes how to configure an interface to move a supplicant to a VLAN in the event of a RADIUS server timeout:

- [Requirements on page 430](#)
- [Overview and Topology on page 431](#)
- [Configuration on page 433](#)
- [Verification on page 434](#)

Requirements

This example uses the following software and hardware components:



NOTE: This example also applies to QFX5100 switches.

- Junos OS Release 9.3 or later for EX Series switches

- One EX Series switch acting as an authenticator port access entity (PAE). The ports on the authenticator PAE form a control gate that blocks all traffic to and from supplicants until they are authenticated.
- One RADIUS authentication server that supports 802.1X. The authentication server acts as the backend database and contains credential information for hosts (supplicants) that have permission to connect to the network.

Before you connect the server to the switch, be sure you have:

- Performed basic bridging and VLAN configuration on the switch. See the documentation that describes setting up basic bridging and a VLAN for your switch. If you are using a switch that supports the Enhanced Layer 2 Software (ELS) configuration style, see *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch with ELS Support* or *Example: Setting Up Basic Bridging and a VLAN on Switches*. For all other switches, see *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch*.



NOTE: For more about ELS, see *Using the Enhanced Layer 2 Software CLI*.

- Set up a connection between the switch and the RADIUS server. See “[Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch](#)” on page 378.
- Configured users on the authentication server.

Overview and Topology

A RADIUS server timeout occurs if no authentication RADIUS servers are reachable when a supplicant logs in and attempts to access the LAN. Using server fail fallback, you configure alternative options for supplicants attempting LAN access. You can configure the switch to accept or deny access to supplicants or to maintain the access already granted to supplicants before the RADIUS server timeout. Additionally, you can configure the switch to move supplicants to a specific VLAN if a RADIUS timeout occurs or if the RADIUS server sends an EAP Access-Reject message.

[Figure 20 on page 432](#) shows the topology used for this example. The RADIUS server is connected to the EX4200 switch on access port **ge-0/0/10**. The switch acts as the authenticator port access entity (PAE) and forwards credentials from the supplicant to the user database on the RADIUS server. The switch blocks all traffic and acts as a control gate until the supplicant is authenticated by the authentication server. A supplicant is connected to the switch through interface **ge-0/0/1**.



NOTE: This figure also applies to QFX5100 switches.

Figure 20: Topology for Configuring 802.1X Options

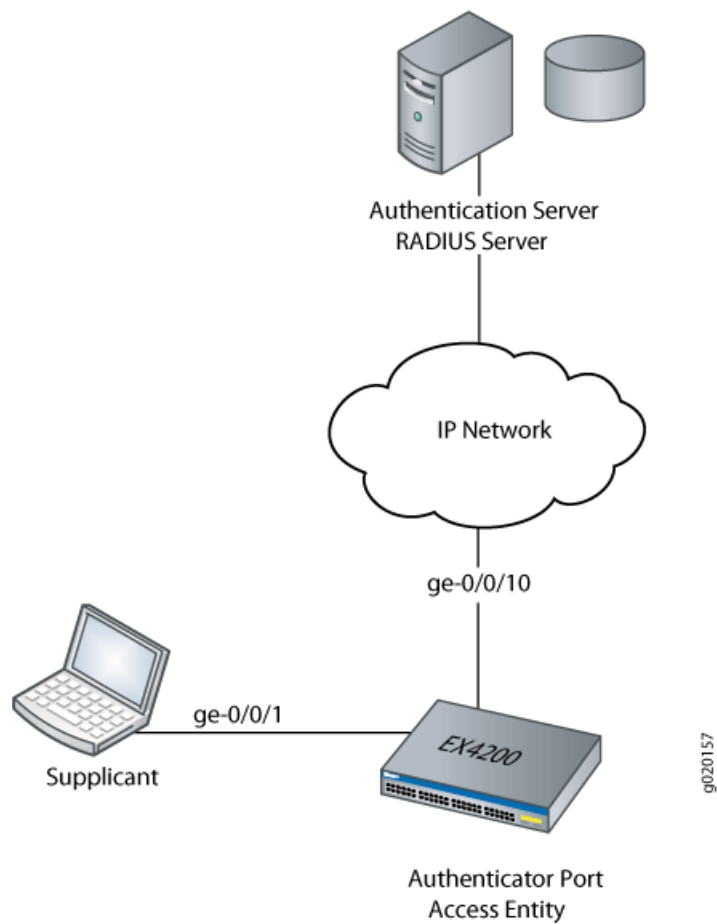


Table 34 on page 432 describes the components in this topology.

Table 34: Components of the Topology

Property	Settings
Switch hardware	EX4200 access switch, 24 Gigabit Ethernet ports: 16 non-PoE ports and 8 PoE ports.
VLAN names	default VLAN vlan-sf VLAN
Supplicant	Supplicant attempting access on interface ge-0/0/1
One RADIUS server	Backend database with an address of 10.0.0.100 connected to the switch at port ge-0/0/10

In this example, configure interface ge-0/0/1 to move a supplicant attempting access to the LAN during a RADIUS timeout to another VLAN. A RADIUS timeout prevents the normal exchange of EAP messages that carry information from the RADIUS server to the

switch and permit the authentication of a supplicant. The default VLAN is configured on interface ge-0/0/1. When a RADIUS timeout occurs, supplicants on the interface will be moved from the default VLAN to the VLAN named `vlan-sf`.

Configuration

CLI Quick Configuration To quickly configure server fail fallback on the switch, copy the following commands and paste them into the switch terminal window:

```
[edit protocols dot1x authenticator]
set interface ge-0/0/1 server-fail vlan-name vlan-sf
```

Step-by-Step Procedure To configure an interface to divert supplicants to a specific VLAN when a RADIUS timeout occurs (here, the VLAN is `vlan-sf`):

1. Define the VLAN to which supplicants are diverted:

```
[edit protocols dot1x authenticator]
user@switch# set interface ge-0/0/1 server-fail vlan-name vlan-sf
```

Results Display the results of the configuration:

```
user@switch> show configuration
interfaces {
  ge-0/0/1 {
    unit 0 {
      family ethernet-switching {
        vlan {
          members default;
        }
      }
    }
  }
}
protocols {
  dot1x {
    authenticator {
      interface {
        ge-0/0/1.0 {
          server-fail vlan-name vlan-sf;
        }
      }
    }
  }
}
```

Verification

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

- [Verifying That the Supplicants Are Moved to an Alternative VLAN During a RADIUS Timeout on page 434](#)

Verifying That the Supplicants Are Moved to an Alternative VLAN During a RADIUS Timeout

Purpose Verify that the interface moves supplicants to an alternative VLAN during a RADIUS timeout.



.....

NOTE: On switches running Junos OS for EX Series with support for ELS, the output for the `show vlans` command will contain additional information. If your switch runs software that supports ELS, see `show vlans`. For ELS details, see *Using the Enhanced Layer 2 Software CLI*

.....

Action Display the VLANs configured on the switch; the interface **ge-0/0/1.0** is a member of the **default** VLAN:

```
user@switch> show vlans
```

Name	Tag	Interfaces
default		ge-0/0/0.0, ge-0/0/1.0*, ge-0/0/5.0*, ge-0/0/10.0, ge-0/0/12.0*, ge-0/0/14.0*, ge-0/0/15.0, ge-0/0/20.0
v2	77	None
vlan-sf	50	None
mgmt		me0.0*

Display 802.1X protocol information on the switch to view supplicants that are authenticated on interface **ge-0/0/1.0**:

```
user@switch> show dot1x interface brief
```

802.1X Information:

Interface	Role	State	MAC address	User
ge-0/0/1.0	Authenticator	Authenticated	00:00:00:00:00:01	abc
ge-0/0/10.0	Authenticator	Initialize		
ge-0/0/14.0	Authenticator	Connecting		
ge-0/0/15.0	Authenticator	Initialize		
ge-0/0/20.0	Authenticator	Initialize		

A RADIUS server timeout occurs. Display the Ethernet switching table to show that the supplicant with the MAC address **00:00:00:00:00:01** previously accessing the LAN through the **default** VLAN is now being learned on the VLAN named **vlan-sf**:

```
user@switch> show ethernet-switching table
```

Ethernet-switching table: 3 entries, 1 learned

VLAN	MAC address	Type	Age	Interfaces
v1	*	Flood		- All-members
vlan-sf	00:00:00:00:00:01	Learn	1:07	ge-0/0/1.0
default	*	Flood		- All-members

Display 802.1X protocol information to show that interface **ge-0/0/1.0** is connecting and will open LAN access to supplicants:

```
user@switch> show dot1x interface brief
```

802.1X Information:

Interface	Role	State	MAC address	User
ge-0/0/1.0	Authenticator	Connecting		
ge-0/0/10.0	Authenticator	Initialize		
ge-0/0/14.0	Authenticator	Connecting		
ge-0/0/15.0	Authenticator	Initialize		
ge-0/0/20.0	Authenticator	Initialize		

Meaning The `show vlans` command displays interface `ge-0/0/1.0` as a member of the **default** VLAN. The `show dot1x interface brief` command shows that a supplicant (`abc`) is authenticated on interface `ge-0/0/1.0` and has the MAC address `00:00:00:00:00:01`. A RADIUS server timeout occurs, and the authentication server cannot be reached by the switch. The `show-ethernet-switching table` command shows that MAC address `00:00:00:00:00:01` is learned on VLAN `vlan-sf`. The supplicant has been moved from the **default** VLAN to the `vlan-sf` VLAN. The supplicant is then connected to the LAN through the VLAN named `vlan-sf`.

- Related Documentation**
- [Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch on page 367](#)
 - [Configuring RADIUS Server Fail Fallback \(CLI Procedure\) on page 437](#)
 - [Configuring 802.1X RADIUS Accounting \(CLI Procedure\) on page 386](#)
 - [Filtering 802.1X Supplicants by Using RADIUS Server Attributes on page 388](#)
 - [Understanding Server Fail Fallback and Authentication on Switches on page 436](#)

Understanding Server Fail Fallback and Authentication on Switches

Juniper Networks Ethernet Switches use authentication to implement access control in an enterprise network. If 802.1X, MAC RADIUS, or captive portal authentication is configured on the switch, end devices are evaluated at the initial connection by an authentication (RADIUS) server. If the end device is configured on the authentication server, the device is granted access to the LAN and the EX Series switch opens the interface to permit access.

Server fail fallback enables you to specify how end devices connected to the switch are supported if the RADIUS authentication server becomes unavailable or sends a RADIUS access-reject message. Server fail fallback is triggered most often during reauthentication when the already configured and in-use RADIUS server becomes inaccessible. However, server fail fallback can also be triggered by an end device's first attempt at authentication through the RADIUS server.

Server fail fallback enables you to specify one of four actions to be taken for end devices awaiting authentication when the server is timed out. The switch can accept or deny access to supplicants or maintain the access already granted to supplicants before the RADIUS timeout occurred. You can also configure the switch to move the supplicants to a specific VLAN. The VLAN must already be configured on the switch. The configured VLAN name overrides any attributes sent by the server.

- *Permit* authentication, allowing traffic to flow from the end device through the interface as if the end device were successfully authenticated by the RADIUS server.
- *Deny* authentication, preventing traffic from flowing from the end device through the interface. This is the default.

- Move the end device to a specified VLAN if the switch receives a RADIUS access-reject message. The configured VLAN name overrides any attributes sent by the server. (The VLAN must already exist on the switch.)
- Sustain authenticated end devices that already have LAN access and *deny* unauthenticated end devices. If the RADIUS servers time out during reauthentication, previously authenticated end devices are reauthenticated and new users are denied LAN access.

Related Documentation

- [802.1X for Switches Overview on page 354](#)
- [Example: Configuring 802.1X Authentication Options When the RADIUS Server Is Unavailable to an EX Series Switch on page 430](#)
- [Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch on page 367](#)
- [Configuring RADIUS Server Fail Fallback \(CLI Procedure\) on page 437](#)
- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)

Configuring RADIUS Server Fail Fallback (CLI Procedure)

You can configure authentication fallback options to specify how end devices connected to a switch are supported if the RADIUS authentication server becomes unavailable or sends a RADIUS access-reject message.

When you set up 802.1X or MAC RADIUS authentication on the switch, you specify a primary authentication server and one or more backup authentication servers. If the primary authentication server cannot be reached by the switch and the secondary authentication servers are also unreachable, a RADIUS server timeout occurs. If this happens, because it is the authentication server that grants or denies access to the end devices awaiting authentication, the switch does not receive access instructions for end devices attempting access to the LAN, and normal authentication cannot be completed.

You can configure the server fail fallback feature to specify an action that the switch applies to end devices when the authentication servers are unavailable. The switch can accept or deny access to supplicants or maintain the access already granted to supplicants before the RADIUS timeout occurred. You can also configure the switch to move the supplicants to a specific VLAN.

You can also configure the server reject fallback feature for end devices that receive a RADIUS access-reject message from the authentication server. The server reject fallback feature provides limited access to a LAN, typically only to the Internet, for responsive end devices that are 802.1X-enabled but that have sent the wrong credentials.

Server fail fallback is supported for voice traffic starting in Release 14.1X53-D40 and Release 15.1R4. To configure server fail fallback actions for VoIP clients sending voice traffic, use the **server-fail-voip** statement. For all data traffic, use the **server-fail** statement. The switch determines the fallback method to use based on the type of traffic sent by the client. Untagged data frames are subject to the action configured with **server-fail**,

even if they are sent by a VoIP client. Tagged VoIP VLAN frames are subject to the action configured with **server-fail-voip**. If **server-fail-voip** is not configured, the voice traffic is dropped.



NOTE: Server reject fallback is not supported for VoIP VLAN tagged traffic. If a VoIP client starts authentication by sending untagged data traffic to a VLAN while server reject fallback is in effect, the VoIP client is allowed to access the fallback VLAN. If the same client subsequently sends tagged voice traffic, the voice traffic is dropped.

If a VoIP client starts authentication by sending tagged voice traffic while server reject fallback is in effect, the VoIP client is denied access to the fallback VLAN.

You can use the following procedure to configure server fail actions for data clients. To configure server fail fallback for VoIP clients sending voice traffic, use the **server-fail-voip** statement in place of the **server-fail** statement.

To configure server fail fallback actions:

- Configure an interface to allow traffic to flow from a supplicant to the LAN if a RADIUS server timeout occurs (as if the end device had been successfully authenticated by a RADIUS server):

```
[edit protocols dot1x authenticator]
user@switch# set interface interface-name server-fail permit
```

- Configure an interface to prevent traffic flow from an end device to the LAN (as if the end device had failed authentication and had been denied access by the RADIUS server):

```
[edit protocols dot1x authenticator]
user@switch# set interface interface-name server-fail deny
```

- Configure an interface to move an end device to a specified VLAN if a RADIUS server timeout occurs:

```
[edit protocols dot1x authenticator]
user@switch# set interface interface-name server-fail vlan-name
```

- Configure an interface to recognize already connected end devices as reauthenticated if there is a RADIUS timeout during reauthentication (new end devices are denied access):

```
[edit protocols dot1x authenticator]
user@switch# set interface interface-name server-fail use-cache
```

You can configure an interface that receives a RADIUS access-reject message from the authentication server to move end devices attempting LAN access on the interface to a server-reject VLAN, a specified VLAN already configured on the switch.

To configure a server reject fallback VLAN:

- [edit protocols dot1x authenticator]
user@switch# **set interface *interface-name* server-reject-vlan vlan-sf**

Release History Table

Release	Description
14.1X53-D40	Server fail fallback is supported for voice traffic starting in Release 14.1X53-D40 and Release 15.1R4.

Related Documentation

- [Example: Configuring 802.1X Authentication Options When the RADIUS Server Is Unavailable to an EX Series Switch on page 430](#)
- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)
- [Monitoring 802.1X Authentication on page 439](#)
- [Understanding Server Fail Fallback and Authentication on Switches on page 436](#)

Monitoring 802.1X Authentication

Purpose



NOTE: This topic applies only to the J-Web Application package.

J-Web Application package Release 14.1X53-A2 does not support 802.1X authentication on EX4600 switches.

Use the monitoring feature to display details of authenticated users and users that failed authentication.

Action

To display authentication details in the J-Web interface, select **Monitoring > Security > 802.1X**.

To display authentication details in the CLI, enter the following commands:

- **show dot1x interface detail | display xml**
- **show dot1x interface detail <interface> | display xml**
- **show dot1x auth-failed-users**

Meaning

The details displayed include:

- A list of authenticated users.

- The number of connected users.
- A list of users that failed authentication.

You can also specify an interface for which the details must be displayed.

Release History Table

Release	Description
14.1X53-A2	J-Web Application package Release 14.1X53-A2 does not support 802.1X authentication on EX4600 switches.

**Related
Documentation**

- [Configuring 802.1X Authentication \(J-Web Procedure\) on page 358](#)
- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)
- [Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch on page 367](#)

Verifying 802.1X Authentication

Purpose Verify that supplicants are being authenticated on an interface on a switch with the interface configured for 802.1X authentication, and display the method of authentication being used.

Action Display detailed information about an interface configured for 802.1X (here, the interface is ge-0/0/16):

```
user@switch> show dot1x interface ge-0/0/16.0 detail
```

```
ge-0/0/16.0
  Role: Authenticator
  Administrative state: Auto
  Supplicant mode: Single
  Number of retries: 3
  Quiet period: 60 seconds
  Transmit period: 30 seconds
  Mac Radius: Enabled
  Mac Radius Strict: Disabled
  Reauthentication: Enabled Reauthentication interval: 40 seconds
  Supplicant timeout: 30 seconds
  Server timeout: 30 seconds
  Maximum EAPOL requests: 1
  Guest VLAN member: <not configured>
  Number of connected supplicants: 1
    Supplicant: user5, 00:30:48:8C:66:BD
      Operational state: Authenticated
      Authentication method: Radius
      Authenticated VLAN: v200
      Reauthentication due in 17 seconds
```

Meaning The sample output from the **show dot1x interface detail** command shows that the **Number of connected supplicants** is 1. The supplicant that was authenticated and is now connected to the LAN is known as **user5** on the RADIUS server and has the MAC address **00:30:48:8C:66:BD**. The supplicant was authenticated by means of the 802.1X authentication method called RADIUS authentication, as indicated by **Radius** in the output. When RADIUS authentication is used, the supplicant is configured on the RADIUS server, the RADIUS server communicates this to the switch, and the switch opens LAN access on the interface to which the supplicant is connected. The sample output also shows that the supplicant is connected to VLAN **v200**.

Other 802.1X authentication methods supported on EX Series switches in addition to RADIUS authentication are:

- Guest VLAN—A nonresponsive host is granted Guest-VLAN access.
- MAC Radius—A nonresponsive host is authenticated based on its MAC address. The MAC address is configured as permitted on the RADIUS server, the RADIUS server notifies the switch that the MAC address is a permitted address, and the switch grants LAN access to the nonresponsive host on the interface to which it is connected.
- Server-fail deny—If the RADIUS servers time out, all supplicants are denied access to the LAN, preventing traffic from the supplicant from traversing through the interface. This is the default.
- Server-fail permit—When the RADIUS server is unavailable, a supplicant is still permitted access to the LAN as if the supplicant were successfully authenticated by the RADIUS server.

- **Server-fail use-cache**—If the RADIUS servers time out during reauthentication, previously authenticated supplicants are granted LAN access, but new supplicants are denied LAN access.
- **Server-fail VLAN**—A supplicant is configured to be moved to a specified VLAN if the RADIUS server is unavailable to reauthenticate the supplicant. (The VLAN must already exist on the switch.)

Related Documentation

- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)
- [Configuring 802.1X Authentication \(J-Web Procedure\) on page 358](#)
- [Configuring MAC RADIUS Authentication \(CLI Procedure\) on page 501](#)
- [Configuring RADIUS Server Fail Fallback \(CLI Procedure\) on page 437](#)

Troubleshooting Authentication of End Devices on EX Series Switches

Problem **Description:** End devices configured using static MAC addresses lose connection to the switch after the clear dot1x interface command is run to clear all learned MAC addresses. Before clearing MAC addresses:

```
user@switch# run show ethernet-switching table
Ethernet-switching table: 3 entries, 1 learned, 0 persistent entries
VLAN          MAC address      Type      Age Interfaces
vlan100        *                Flood     - All-members
default        *                Flood     - All-members
default        00:a0:d4:00:03:00 Learn       0 ge-3/0/16.0
```

```
user@switch> show dot1x authentication-bypassed-users
MAC address      Interface      VLAN
00:a0:d4:00:03:00 ge-3/0/16.0    configured/default
```

To clear MAC addresses:

```
user@switch> clear dot1x interface
```

After clearing MAC addresses:

```
user@switch> show ethernet-switching table
Ethernet-switching table: 2 entries, 0 learned, 0 persistent entries
VLAN          MAC address      Type      Age Interfaces
vlan100        *                Flood     - All-members
default        *                Flood     - All-members
```

```
user@switch> show dot1x authentication-bypassed-users
```

Note that there are no end devices on the authentication bypass list.

Cause Static MAC addresses are treated the same as other learned MAC addresses on an interface. When the `clear dot1x interface` command is run, it clears all learned MAC addresses from the interface, including the static MAC bypass list (also known as the exclusion list).

Solution If you run the `clear dot1x interfaces` command for an interface that has static MAC addresses configured for authentication bypass, re-add the static MAC addresses to the static MAC bypass list.

Related Documentation

- [clear dot1x on page 1944](#)
- [Understanding Authentication on Switches on page 348](#)

Juniper-Switching-Filter VSA Match Conditions and Actions

Devices support the configuration of RADIUS server attributes specific to Juniper Networks. These attributes are known as vendor-specific attributes (VSAs) and are described in RFC 2138, *Remote Authentication Dial In User Service (RADIUS)*.

Through VSAs, you can configure port-filtering attributes on the RADIUS server. VSAs are cleartext fields sent from the RADIUS server to the device as a result of authentication success or failure. Authentication prevents unauthorized user access by blocking a supplicant at the port until the device is authenticated by the RADIUS server. The VSA attributes are interpreted by the device during authentication, and the device takes appropriate actions. Implementing port-filtering attributes with authentication on the RADIUS server provides a central location for controlling LAN access for supplicants.

These port-filtering attributes specific to Juniper Networks are encapsulated in a RADIUS server VSA with the vendor ID set to the Juniper Networks ID number, 2636.

As well as configuring port-filtering attributes through VSAs, you can apply a port firewall filter that has already been configured on the device directly to the RADIUS server. Like port-filtering attributes, the filter is applied during the authentication process, and its actions are applied at the device port. Adding a port firewall filter to a RADIUS server eliminates the need to add the filter to multiple ports and devices.

The Juniper-Switching-Filter VSA works in conjunction with 802.1X authentication to centrally control access of supplicants to the network. You can use this VSA to configure filters on the RADIUS server, which are sent to the switch and applied to users that have been authenticated using 802.1X authentication.

The Juniper-Switching-Filter VSA can contain one or more filter terms. Filter terms are configured using one or more *match conditions* with a resulting *action*. Match conditions are the criteria that a packet must meet for a configured action to be applied on it. The action is the action that the switch takes if a packet meets the criteria in the match conditions. The action that the switch can take is either accept or deny a packet.

The following guidelines apply when you specify match conditions and actions for VSAs:

- Both **match** and **action** statements are mandatory.
- If no match condition is specified, any packet is considered a match by default.
- If no action is specified, the default action is to deny the packet.
- Any or all options can be included in each **match** and **action** statement.
- The AND operation is performed on fields that are of a different type, which are separated by commas. Fields of the same type cannot be repeated.
- For the **forwarding-class** option to be applied, the forwarding class must be configured on the switch. If the forwarding class is not configured on the switch, this option is ignored.

Table 35 on page 444 describes the match conditions that you can specify when you configure a VSA attribute as a firewall filter by using the **match** command on the RADIUS server. The string that defines a match condition is called a *match statement*.

Table 35: Match Conditions

Option	Description
destination-mac <i>mac-address</i>	Destination media access control (MAC) address of the packet.
source-vlan <i>source-vlan</i>	Name of the source VLAN.
source-dot1q-tag <i>tag</i>	Tag value in the 802.1Q header, in the range 0 through 4095.
destination-ip <i>ip-address</i>	Address of the final destination node.
ip-protocol <i>protocol-id</i>	IPv4 protocol value. In place of the numeric value, you can specify one of the following text synonyms: ah , egp (8), esp (50), gre (47), icmp (1), igmp (2), ipip (4), ipv6 (41), ospf (89), pim (103), rsvp (46), tcp (6), or udp (17)
source-port <i>port</i>	TCP or User Datagram Protocol (UDP) source port field. Normally, you specify this match statement in conjunction with the ip-protocol match statement to determine which protocol is being used on the port. In place of the numeric field, you can specify one of the text options listed under destination-port .

Table 35: Match Conditions (continued)

Option	Description
destination-port <i>port</i>	<p>TCP or UDP destination port field. Normally, you specify this match statement in conjunction with the ip-protocol match statement to determine which protocol is being used on the port. In place of the numeric value, you can specify one of the following text synonyms (the port numbers are also listed):</p> <p>afs (1483), bgp (179), biff (512), bootpc (68), bootps (67), cvspserver (2401), cmd (514), dhcp (67), domain (53), eklogin (2105), ekshell (2106), exec (512), finger (79), ftp (21), ftp-data (20), http (80), https (443), ident (113), imap (143), kerberos-sec (88), klogin (543), kpasswd (761), krb-prop (754), krbupdate (760), kshell (544), ldap (389), login (513), mobileip-agent (434), mobilip-mn (435), msdp (639), netbios-dgm (138), netbios-ns (137), netbios-ssn (139), nfsd (2049), nntp (119), ntalk (518), ntp (123), pop3 (110), pptp (1723), printer (515), radacct (1813), radius (1812), rip (520), rkinit (2108), smtp (25), snmp (161), snmptrap (162), snpp (444), socks (1080), ssh (22), sunrpc (111), syslog (514), telnet (23), tacacs-ds (65), talk (517), tftp (69), timed (525), who (513), xdmcp (177), zephyr-clt (2103), zephyr-hm (2104)</p>

When you define one or more terms that specify the filtering criteria, you also define the action to take if the packet matches all criteria. [Table 36 on page 445](#) shows the actions that you can specify in a term.

Table 36: Actions for VSAs

Option	Description
(allow deny)	Accept a packet or discard a packet silently without sending an Internet Control Message Protocol (ICMP) message.
forwarding-class <i>class-of-service</i>	<p>(Optional) Classify the packet in one of the following forwarding classes:</p> <ul style="list-style-type: none"> assured-forwarding best-effort expedited-forwarding network-control
loss-priority (low medium high)	(Optional) Set the packet loss priority (PLP) to low , medium , or high . Specify both the forwarding class and the loss priority.

- Related Documentation**
- Filtering 802.1X Supplicants by Using RADIUS Server Attributes on page 388
 - Understanding Dynamic Filters Based on RADIUS Attributes on page 373

Juniper Networks Vendor-Specific RADIUS Attributes

Junos OS supports the configuration of Juniper Networks RADIUS vendor-specific attributes (VSAs). These VSAs are encapsulated in a RADIUS vendor-specific attribute with the vendor ID set to the Juniper Networks ID number, 2636. [Table 14 on page 219](#) lists the Juniper Networks VSAs you can configure.

Table 37: Juniper Networks Vendor-Specific RADIUS Attributes

Name	Description	Type	Length	String
Juniper-Local-User-Name	Indicates the name of the user template used by this user when logging in to a device. This attribute is used only in Access-Accept packets.	1	≥3	One or more octets containing printable ASCII characters.
Juniper-Allow-Commands	Contains an extended regular expression that enables the user to run operational mode commands in addition to the commands authorized by the user's login class permission bits. This attribute is used only in Access-Accept packets.	2	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See "Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies" on page 117.
Juniper-Deny-Commands	Contains an extended regular expression that denies the user permission to run operation mode commands authorized by the user's login class permission bits. This attribute is used only in Access-Accept packets.	3	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See "Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies" on page 117.
Juniper-Allow-Configuration	Contains an extended regular expression that enables the user to run configuration mode commands in addition to the commands authorized by the user's login class permission bits. This attribute is used only in Access-Accept packets.	4	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See "Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies" on page 117.

Table 37: Juniper Networks Vendor-Specific RADIUS Attributes (continued)

Name	Description	Type	Length	String
Juniper-Deny-Configuration	Contains an extended regular expression that denies the user permission to run configuration commands authorized by the user's login class permission bits. This attribute is used only in Access-Accept packets.	5	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See "Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies" on page 117.
Juniper-Interactive-Command	Indicates the interactive command entered by the user. This attribute is used only in Accounting-Request packets.	8	≥3	One or more octets containing printable ASCII characters.
Juniper-Configuration-Change	Indicates the interactive command that results in a configuration (database) change. This attribute is used only in Accounting-Request packets.	9	≥3	One or more octets containing printable ASCII characters.
Juniper-User-Permissions	<p>Contains information the server uses to specify user permissions. This attribute is used only in Access-Accept packets.</p> <p>NOTE: When the Juniper-User-Permissions attribute is configured to grant the Junos OS maintenance or all permissions on a RADIUS server, the UNIX wheel group membership is not automatically added to a user's list of group memberships. Some operations such as running the su root command from a local shell require wheel group membership permissions. However, when a user is configured locally with the permissions maintenance or all, the user is automatically granted membership to the UNIX wheel group. Therefore, we recommend that you create a template user account with the required permissions and associate individual user accounts with the template user account.</p>	10	≥3	<p>One or more octets containing printable ASCII characters.</p> <p>The string is a list of permission flags separated by a space. The exact name of each flag must be specified in its entirety. See Table 7 on page 108.</p>

Table 37: Juniper Networks Vendor-Specific RADIUS Attributes (continued)

Name	Description	Type	Length	String
Juniper-Authentication-Type	Indicates the authentication method (local database, or RADIUS server) used to authenticate a user. If the user is authenticated using a local database, the attribute value shows 'local'. If the user is authenticated using RADIUS server, the attribute value shows 'remote'.	11	≥5	One or more octets containing printable ASCII characters.
Juniper-Session-Port	Indicates the source port number of the established session.	12	size of integer	Integer

For more information about the VSAs, see RFC 2138, *Remote Authentication Dial In User Service (RADIUS)*.

Related Documentation

- [Configuring RADIUS Server Authentication on page 203](#)

Juniper Networks Vendor-Specific TACACS+ Attributes

Junos OS supports the configuration of Juniper Networks TACACS+ vendor-specific attributes (VSAs). These VSAs are encapsulated in a TACACS+ vendor-specific attribute with the vendor ID set to the Juniper Networks ID number, 2636. [Table 15 on page 240](#) lists the Juniper Networks VSAs you can configure.

Table 38: Juniper Networks Vendor-Specific TACACS+ Attributes

Name	Description	Length	String
local-user-name	Indicates the name of the user template used by this user when logging in to a device.	≥3	One or more octets containing printable ASCII characters.
allow-commands	Contains an extended regular expression that enables the user to run operational mode commands in addition to those commands authorized by the user's login class permission bits.	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See “Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies” on page 117 .

Table 38: Juniper Networks Vendor-Specific TACACS+ Attributes (continued)

Name	Description	Length	String
allow-configuration	Contains an extended regular expression that enables the user to run configuration mode commands in addition to those commands authorized by the user's login class permission bits.	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See “Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies” on page 117.
deny-commands	Contains an extended regular expression that denies the user permission to run operational mode commands authorized by the user's login class permission bits.	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See “Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies” on page 117.
deny-configuration	Contains an extended regular expression that denies the user permission to run configuration mode commands authorized by the user's login class permission bits.	≥3	One or more octets containing printable ASCII characters, in the form of an extended regular expression. See “Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies” on page 117.
user-permissions	<p>Contains information the server uses to specify user permissions.</p> <p>NOTE: When the user-permissions attribute is configured to grant the Junos OS maintenance or all permissions on an IPv4 or IPv6 TACACS+ server, the UNIX wheel group membership is not automatically added to a user's list of group memberships. Some operations such as running the su root command from a local shell require wheel group membership permissions. However, when a user is configured locally with the permissions maintenance or all, the user is automatically granted membership to the UNIX wheel group. Therefore, we recommend that you create a template user account with the required permissions and associate individual user accounts with the template user account.</p>	≥3	One or more octets containing printable ASCII characters. See “Understanding Junos OS Access Privilege Levels” on page 107.

Table 38: Juniper Networks Vendor-Specific TACACS+ Attributes (continued)

Name	Description	Length	String
authentication-type	Indicates the authentication method (local database, or TACACS+ server) used to authenticate a user. If the user is authenticated using a local database, the attribute value shows 'local'. If the user is authenticated using TACACS+ server, the attribute value shows 'remote'.	≥5	One or more octets containing printable ASCII characters.
session-port	Indicates the source port number of the established session.	size of integer	Integer

Related Documentation

- [Configuring TACACS+ Authentication on page 229](#)

Configuring 802.1X and VoIP on EX Series Switches

- [Understanding 802.1X and VoIP on EX Series Switches on page 451](#)
- [Configuring Multi-Domain Authentication \(CLI Procedure\) on page 454](#)
- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
- [Example: Configuring VoIP on an EX Series Switch Without Including LLDP-MED Support on page 463](#)
- [Example: Configuring VoIP on an EX Series Switch Without Including 802.1X Authentication on page 468](#)
- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch with ELS Support on page 475](#)
- [Example: Configuring VoIP on an EX Series Switch with ELS Support Without Including 802.1X Authentication on page 484](#)
- [Example: Configuring VoIP on an EX Series Switch Without Including LLDP-MED Support on page 491](#)
- [Configuring EAPoL Block to Maintain an Existing Authentication Session on page 496](#)

Understanding 802.1X and VoIP on EX Series Switches

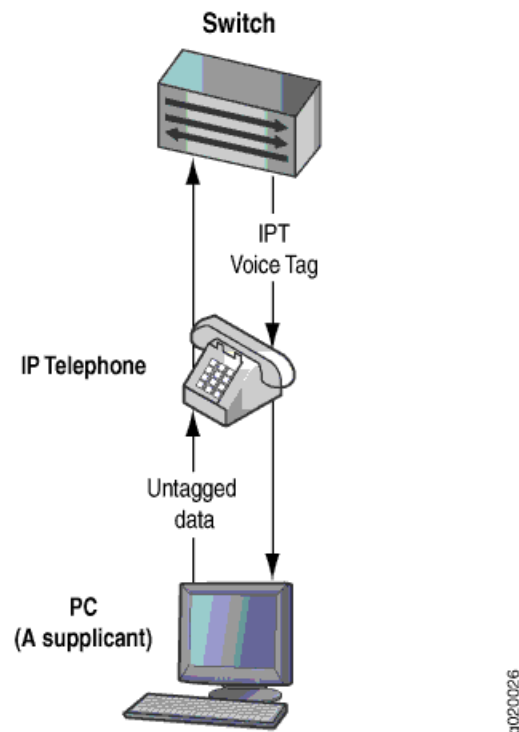
When you use VoIP, you can connect IP telephones to the switch and configure IEEE 802.1X authentication for 802.1X-compatible IP telephones. The 802.1X authentication provides network edge security, protecting Ethernet LANs from unauthorized user access.

VoIP is a protocol used for the transmission of voice through packet-switched networks. VoIP transmits voice calls by using a network connection instead of an analog phone line.

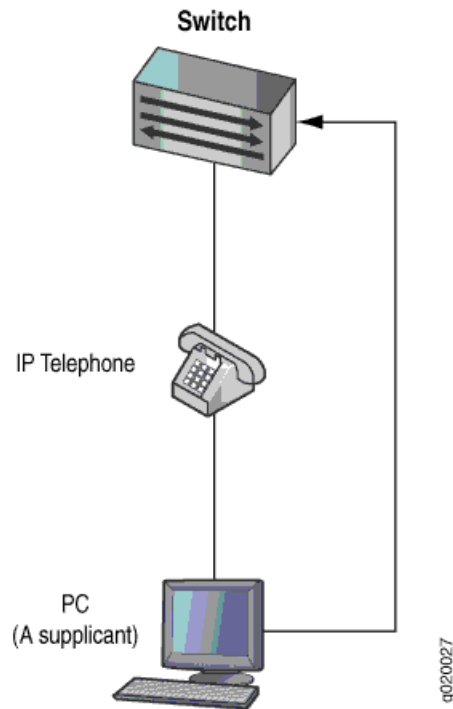
When VoIP is used with 802.1X, the RADIUS server authenticates the phone, and Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED) provides the class-of-service (CoS) parameters to the phone.

You can configure 802.1X authentication to work with VoIP in multiple supplicant or single supplicant mode. In *multiple supplicant* mode, the 802.1X process allows multiple supplicants to connect to the interface. Each supplicant is authenticated individually. For an example of a VoIP multiple supplicant topology, see [Figure 21 on page 452](#).

Figure 21: VoIP Multiple Supplicant Topology



If an 802.1X-compatible IP telephone does not have an 802.1X host but has another 802.1X-compatible device connected to its data port, you can connect the phone to an interface in single supplicant mode. In *single supplicant* mode, the 802.1X process authenticates only the first supplicant. All other supplicants who connect later to the interface are allowed full access without any further authentication. They effectively “piggyback” on the first supplicant’s authentication. For an example of a VoIP single supplicant topology, see [Figure 22 on page 453](#).

Figure 22: VoIP Single Supplicant Topology

If an IP telephone does not support 802.1X, you can configure VoIP to bypass 802.1X and LLDP-MED and have the packets forwarded to a VoIP VLAN.

Multi Domain 802.1X Authentication

Multi-domain 802.1X authentication is an extension of multiple supplicant mode that allows one default VoIP device and multiple data devices to authenticate on a single port. Multi-domain 802.1X authentication provides enhanced security over multiple supplicant mode by restricting the number of authenticated data and VoIP sessions on the port. In multiple supplicant mode, any number of VoIP or data sessions can be authenticated; the number of sessions can be restricted using MAC limiting, but there is no way to apply the limit specifically to either data or VoIP sessions.

With multi-domain 802.1X authentication, the single port is divided into two domains; one is the data domain and the other is the voice domain. Multi-domain 802.1X authentication maintains separate session counts based on the domain. You can configure the maximum number of authenticated data sessions allowed on the port. The number of VoIP sessions is not configurable; only one authenticated VoIP session is allowed on the port.

If a new client attempts to authenticate on the interface after the maximum session count has been reached, the default action is to drop the packet and generate an error log message. You can also configure the action to shut down the interface. The port can be manually recovered from the down state by issuing the **clear dot1x recovery-timeout** command, or by can recover automatically after a configured recovery timeout period.

Multi-domain authentication does not enforce the order of device authentication. However, for the best results, the VoIP device should be authenticated before a data device on a multi domain 802.1X-enabled port. Multi-domain authentication is supported only in multiple supplicant mode.

Related Documentation

- [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)
- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
- [Example: Configuring VoIP on an EX Series Switch Without Including 802.1X Authentication on page 468](#)
- [Example: Configuring VoIP on an EX Series Switch Without Including LLDP-MED Support on page 463](#)

Configuring Multi-Domain Authentication (CLI Procedure)

Multi-domain authentication is an extension of multiple supplicant mode for 802.1X authentication, and is designed to support VoIP and data clients on the same interface. The interface is divided into two domains; one is the data domain and the other is the voice domain. Multi-domain authentication maintains separate session counts based on the domain type, and you configure the maximum number of data sessions allowed on the interface. Only one VoIP session is allowed on the interface.



NOTE:

- Multi-domain authentication is only supported in multiple supplicant mode.
 - Guest VLAN and server-reject VLAN features only apply to the data devices on a multi-domain authentication interface. A VoIP device that fails authorization is treated as a data device.
-

Before you begin, specify the RADIUS server or servers to be used as the authentication server. See “[Specifying RADIUS Server Connections on Switches \(CLI Procedure\)](#)” on [page 500](#).

To configure multi-domain authentication on an interface:

1. Configure 802.1X authentication with the supplicant mode of multiple:

```
[edit protocols dot1x]  
user@switch# set authenticator interface interface-name supplicant multiple
```

2. Configure multi-domain authentication on the interface:

```
[edit protocols dot1x]  
user@switch# set authenticator interface interface-name multi-domain
```

3. Configure the maximum number of data sessions that will be allowed to authenticate on the interface:

```
[edit protocols dot1x]
user@switch# set authenticator interface interface-name multi-domain max-data-session
max-data-sessions
```

4. Configure the action to take on clients that attempt to authenticate on the interface after the maximum number of sessions has been reached:
 - To drop the packet and generate an error syslog message:

```
[edit protocols dot1x]
user@switch# set authenticator interface interface-name multi-domain packet-action
drop-and-log
```

- To shut down the interface:

```
[edit protocols dot1x]
user@switch# set authenticator interface interface-name multi-domain packet-action
shutdown
```

5. Configure the recovery timeout period for an interface that has been shut down, in seconds, so that the interface can recover automatically:

```
[edit protocols dot1x]
user@switch# set authenticator interface interface-name multi-domain recovery-timeout
seconds
```

Related Documentation

- [Configuring 802.1X Authentication \(J-Web Procedure\) on page 358](#)
- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)

Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch

You can configure voice over IP (VoIP) on an EX Series switch to support IP telephones. The Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED) protocol forwards VoIP parameters from the switch to the phone. You also configure 802.1X authentication to allow the telephone access to the LAN. Authentication is done through a backend RADIUS server.

This example describes how to configure VoIP on an EX Series switch to support an Avaya IP phone, as well as the LLDP-MED protocol and 802.1X authentication:



NOTE: If your switch runs Junos OS for EX Series switches with support for the Enhanced Layer 2 Software (ELS) configuration style, see [“Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch with ELS Support” on page 475](#). For ELS details, see *Using the Enhanced Layer 2 Software CLI*.

- [Requirements on page 456](#)
- [Overview and Topology on page 456](#)

- [Configuration on page 458](#)
- [Verification on page 460](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 9.1 or later for EX Series switches
- One EX Series switch acting as an authenticator port access entity (PAE). The interfaces on the authenticator PAE form a control gate that blocks all traffic to and from supplicants until they are authenticated.
- An Avaya 9620 IP telephone that supports LLDP-MED and 802.1X

Before you configure VoIP, be sure you have:

- Installed your EX Series switch. See *Installing and Connecting an EX3200 Switch*.
- Performed the initial switch configuration. See *Connecting and Configuring an EX Series Switch (J-Web Procedure)*.
- Performed basic bridging and VLAN configuration on the switch. See *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch*.
- Configured the RADIUS server for 802.1X authentication and set up the access profile. See [“Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch” on page 378](#).
- (Optional) Configured interface **ge-0/0/2** for Power over Ethernet (PoE). The PoE configuration is not necessary if the VoIP supplicant is using a power adapter. For information about configuring PoE, see *Configuring PoE on EX Series Switches (CLI Procedure)*.



NOTE: If the IP address isn't configured on the Avaya IP phone, the phone exchanges LLDP-MED information to get the VLAN ID for the voice VLAN. You must configure the **voip** statement on the interface to designate the interface as a VoIP interface and allow the switch to forward the VLAN name and VLAN ID for the voice VLAN to the IP telephone. The IP telephone then uses the voice VLAN (that is, it references the voice VLAN's ID) to send a DHCP discover request and exchange information with the DHCP server (voice gateway).

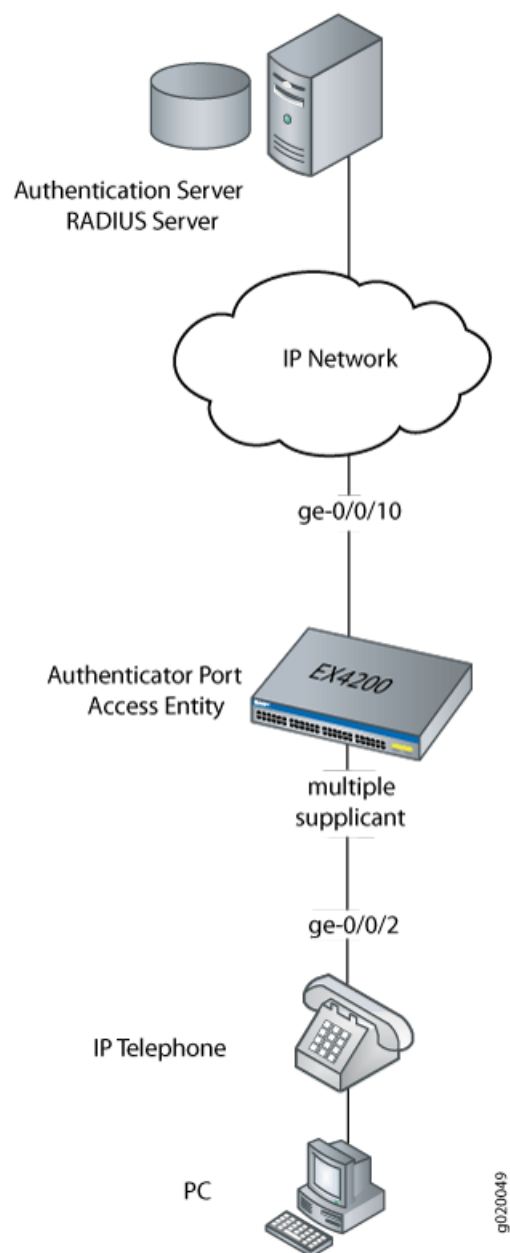
Overview and Topology

Instead of using a regular telephone, you connect an IP telephone directly to the switch. An IP phone has all the hardware and software needed to handle VoIP. You also can power an IP telephone by connecting it to one of the Power over Ethernet (PoE) interfaces on the switch.

In this example, the access interface **ge-0/0/2** on the EX4200 switch is connected to an Avaya 9620 IP telephone. Avaya phones have a built-in bridge that allows you to connect

a desktop PC to the phone, so the desktop and phone in a single office require only one interface on the switch. The EX Series switch is connected to a RADIUS server on interface **ge-0/0/10** (see [Figure 23 on page 457](#)).

Figure 23: VoIP Topology



In this example, you configure VoIP parameters and specify the forwarding class **assured-forward** for voice traffic to provide the highest quality of service.

[Table 39 on page 458](#) describes the components used in this VoIP configuration example.

Table 39: Components of the VoIP Configuration Topology

Property	Settings
Switch hardware	EX4200 switch
VLAN names	data-vlan voice-vlan
Connection to Avaya phone—with integrated hub, to connect phone and desktop PC to a single interface (requires PoE)	ge-0/0/2
One RADIUS server	Provides backend database connected to the switch through interface ge-0/0/10 .

As well as configuring a VoIP for interface **ge-0/0/2**, you configure:

- 802.1X authentication. Authentication is set to **multiple** supplicant to support more than one supplicant's access to the LAN through interface **ge-0/0/2**.
- LLDP-MED protocol information. The switch uses LLDP-MED to forward VoIP parameters to the phone. Using LLDP-MED ensures that voice traffic gets tagged and prioritized with the correct values at the source itself. For example, 802.1p class of service and 802.1Q tag information can be sent to the IP telephone.



NOTE: A PoE configuration is not necessary if an IP telephone is using a power adapter.

Configuration

To configure VoIP, LLDP-MED, and 802.1X authentication:

CLI Quick Configuration

To quickly configure VoIP, LLDP-MED, and 802.1X, copy the following commands and paste them into the switch terminal window:

```
[edit]
set vlans data-vlan vlan-id 77
set vlans voice-vlan vlan-id 99
set vlans data-vlan interface ge-0/0/2.0
set interfaces ge-0/0/2 unit 0 family ethernet-switching vlan members data-vlan
set interfaces ge-0/0/2 unit 0 family ethernet-switching port-mode access
set ethernet-switching-options voip interface ge-0/0/2.0 vlan voice-vlan
set ethernet-switching-options voip interface ge-0/0/2.0 forwarding-class assured-forwarding
set protocols lldp-med interface ge-0/0/2.0
set protocols dot1x authenticator interface ge-0/0/2.0 supplicant multiple
```

Step-by-Step Procedure

To configure VoIP with LLDP-MED and 802.1X:

1. Configure the VLANs for voice and data:

```
[edit vlans]
user@switch# set data-vlan vlan-id 77
user@switch# set voice-vlan vlan-id 99
```

2. Associate the VLAN **data-vlan** with the interface:

```
[edit vlans]
user@switch# set data-vlan interface ge-0/0/2.0
```

3. Configure the interface as an access interface, configure support for Ethernet switching, and add the **data-vlan** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/2 unit 0 family ethernet-switching vlan members data-vlan
user@switch# set ge-0/0/2 unit 0 family ethernet-switching port-mode access
```

4. Configure VoIP on the interface and specify the **assured-forwarding** forwarding class to provide the most dependable class of service:

```
[edit ethernet-switching-options]
user@switch# set voip interface ge-0/0/2.0 vlan voice-vlan
user@switch# set voip interface ge-0/0/2.0 forwarding-class assured-forwarding
```

5. Configure LLDP-MED protocol support:

```
[edit protocols]
user@switch# set lldp-med interface ge-0/0/2.0
```

6. To authenticate an IP phone and a PC connected to the IP phone on the interface, configure 802.1X authentication support and specify **multiple** supplicant mode:



NOTE: If you do not want to authenticate any device, skip the 802.1X configuration on this interface.

```
[edit protocols]
user@switch# set dot1x authenticator interface ge-0/0/2.0 supplicant multiple
```

Results Display the results of the configuration:

```
[edit]
user@switch# show configuration
interfaces {
  ge-0/0/2 {
    unit 0 {
      family ethernet-switching {
        port-mode access;
```

```
        vlan {
            members data-vlan;
        }
    }
}
protocols {
    lldp-med {
        interface ge-0/0/2.0;
    }
    dot1x {
        authenticator {
            interface {
                ge-0/0/2.0 {
                    supplicant multiple;
                }
            }
        }
    }
}
vpls {
    data-vlan {
        vlan-id 77;
        interface {
            ge-0/0/2.0;
        }
    }
    voice-vlan {
        vlan-id 99;
    }
}
ethernet-switching options {
    voip {
        interface ge-0/0/2.0 {
            vlan voice-vlan;
            forwarding-class assured-forwarding;
        }
    }
}
```

Verification

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

- [Verifying LLDP-MED Configuration on page 460](#)
- [Verifying 802.1X Authentication for IP Phone and Desktop PC on page 461](#)
- [Verifying the VLAN Association with the Interface on page 462](#)

Verifying LLDP-MED Configuration

Purpose Verify that LLDP-MED is enabled on the interface.

Action user@switch> `show lldp detail`

```

LLDP                               : Enabled
Advertisement interval             : 30 Second(s)
Transmit delay                     : 2 Second(s)
Hold timer                        : 2 Second(s)
Config Trap Interval              : 300 Second(s)
Connection Hold timer             : 60 Second(s)

LLDP MED                           : Enabled
MED fast start count              : 3 Packet(s)

Interface      LLDP      LLDP-MED      Neighbor count
all            Enabled   -            0
ge-0/0/2.0     -         Enabled      0

Interface      VLAN-id    VLAN-name
ge-0/0/0.0     0          default
ge-0/0/1.0     0          employee-vlan
ge-0/0/2.0     0          data-vlan
ge-0/0/2.0     99         voice-vlan
ge-0/0/3.0     0          employee-vlan
ge-0/0/8.0     0          employee-vlan
ge-0/0/10.0    0          default
ge-0/0/11.0    20         employee-vlan
ge-0/0/23.0    0          default

LLDP basic TLVs supported:
Chassis identifier, Port identifier, Port description, System name, System
description, System capabilities, Management address.

LLDP 802 TLVs supported:
Power via MDI, Link aggregation, Maximum frame size, Port VLAN tag, Port
VLAN name.

LLDP MED TLVs supported:
LLDP MED capabilities, Network policy, Endpoint location, Extended power
Via MDI.

```

Meaning The `show lldp detail` output shows that both LLDP and LLDP-MED are configured on the `ge-0/0/2.0` interface. The end of the output shows the list of supported LLDP basic TLVs, 802.3 TLVs, and LLDP-MED TLVs that are supported.

Verifying 802.1X Authentication for IP Phone and Desktop PC

Purpose Display the 802.1X configuration to confirm that the VoIP interface has access to the LAN.

Action user@switch> `show dot1x interface ge/0/0/2.0 detail`

```
ge-0/0/2.0
  Role: Authenticator
  Administrative state: Auto
  Supplicant mode: Multiple
  Number of retries: 3
  Quiet period: 60 seconds
  Transmit period: 30 seconds
  Mac Radius: Disabled
  Mac Radius Restrict: Disabled
  Reauthentication: Enabled
  Configured Reauthentication interval: 3600 seconds
  Supplicant timeout: 30 seconds
  Server timeout: 30 seconds
  Maximum EAPOL requests: 2
  Guest VLAN member: <not configured>
  Number of connected supplicants: 1
    Supplicant: user101, 00:04:0f:fd:ac:fe
      Operational state: Authenticated
      Authentication method: Radius
      Authenticated VLAN: vo11
      Dynamic Filter: match source-dot1q-tag 10 action deny
      Session Reauth interval: 60 seconds
      Reauthentication due in 50 seconds
```

Meaning The field **Role** shows that the **ge-0/0/2.0** interface is in the authenticator state. The **Supplicant** field shows that the interface is configured in multiple supplicant mode, permitting multiple supplicants to be authenticated on this interface. The MAC addresses of the supplicants currently connected are displayed at the bottom of the output.

Verifying the VLAN Association with the Interface

Purpose Display the interface state and VLAN membership.

Action user@switch> [show ethernet-switching interfaces](#)

Ethernet-switching table: 0 entries, 0 learned

```

user@switch> show ethernet-switching interfaces
Interface  State  VLAN members  Blocking
ge-0/0/0.0 down  default       unblocked
ge-0/0/1.0 down  employee-vlan unblocked
ge-0/0/5.0 down  employee-vlan unblocked
ge-0/0/3.0 down  employee-vlan unblocked
ge-0/0/8.0 down  employee-vlan unblocked
ge-0/0/10.0 down default       unblocked
ge-0/0/11.0 down employee-vlan unblocked
ge-0/0/23.0 down default       unblocked
ge-0/0/2.0 up    voice-vlan    unblocked
              data-vlan     unblocked

```

Meaning The field **VLAN members** shows that the **ge-0/0/2.0** interface supports both the **data-vlan** VLAN and **voice-vlan** VLAN. The **State** field shows that the interface is up.

- Related Documentation**
- [Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378](#)
 - [Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch on page 367](#)
 - [Defining CoS Forwarding Classes \(CLI Procedure\)](#)
 - [Defining CoS Forwarding Classes \(J-Web Procedure\)](#)
 - [Configuring LLDP-MED \(CLI Procedure\) on page 566](#)

Example: Configuring VoIP on an EX Series Switch Without Including LLDP-MED Support

You can configure voice over IP (VoIP) on an EX Series switch to support IP telephones. The Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED) protocol is sometimes used with IP phones to forward VoIP parameters from the switch to the phone. However, not all IP phones support LLDP-MED.

This example describes how to configure VoIP on an EX Series switch without using LLDP-MED:

- [Requirements on page 464](#)
- [Overview on page 464](#)
- [Configuring VoIP Without LLDP-MED by Using a Voice VLAN on an Access Port on page 465](#)
- [Configuring VoIP Without LLDP-MED by Using a Trunk Port with Native VLAN Option on page 466](#)
- [Verification on page 467](#)

Requirements

This example uses the following hardware and software components:

- One EX4200 switch acting as an authenticator port access entity (PAE). The interfaces on the authenticator PAE form a control gate that blocks all traffic to and from supplicants until they are authenticated.
- An IP phone that does not support LLDP-MED.
- Junos OS Release 9.1 or later for EX Series switches.

Before you configure VoIP, be sure you have:

- Performed basic bridging and VLAN configuration on the switch. See *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch*.
- Configured the IP phone as a member of the voice VLAN.
- (Optional) Configured interface ge-0/0/2 for Power over Ethernet (PoE). The PoE configuration is not necessary if the VoIP supplicant is using a power adapter. See *Configuring PoE on EX Series Switches (CLI Procedure)*.

Overview

Instead of using a regular telephone, you connect an IP telephone directly to the switch. An IP phone has all the hardware and software needed to handle VoIP. You can also power an IP telephone by connecting it to one of the Power over Ethernet (PoE) interfaces on the switch.

EX Series switches can accommodate an IP telephone and end host connected to a single switch port. In such a scenario, voice and data traffic must be separated into different broadcast domains, or VLANs. One method for accomplishing this is by configuring a voice VLAN, which enables access ports to accept untagged data traffic as well as tagged voice traffic from IP phones, and associate each type of traffic with separate and distinct VLANs. Voice traffic (tagged) can then be treated differently, generally with a higher priority than data traffic (untagged).

The voice VLAN delivers the greatest benefit when used with IP phones that support LLDP-MED, but it is flexible enough that IP phones that do not support LLDP-MED can also use it effectively. However, in the absence of LLDP-MED, the voice VLAN ID must be set manually on the IP phone because LLDP-MED is not available to accomplish this dynamically. For information about setting up a voice VLAN for IP phones that support LLDP-MED, see [“Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch” on page 455](#).

Another method to separate voice (tagged) and data (untagged) traffic into different VLANs is to use a trunk port with the native VLAN ID option. The trunk port is added as a member of the voice VLAN, and processes only tagged voice traffic from that VLAN. The trunk port must also be configured with the native VLAN ID for the data VLAN so that it can process untagged data traffic from the data VLAN. This configuration also requires that the voice VLAN ID be set manually on the IP phone.

This example illustrates both methods. In this example, the interface ge-0/0/2 on the EX4200 switch is connected to a non-LLDP-MED IP phone.



NOTE: The implementation of a voice VLAN on an IP telephone is vendor-specific. Consult the documentation that came with your IP telephone for instructions on configuring a voice VLAN. For example, on an Avaya phone, you can ensure that the phone gets the correct VoIP VLAN ID even in the absence of LLDP-MED by enabling DHCP option 176.

Configuring VoIP Without LLDP-MED by Using a Voice VLAN on an Access Port

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

```
[edit]
set vlans data-vlan vlan-id 77
set vlans voice-vlan vlan-id 99
set vlans data-vlan interface ge-0/0/2.0
set interfaces ge-0/0/2 unit 0 family ethernet-switching port-mode access
set interfaces ge-0/0/2 unit 0 family ethernet-switching vlan members data-vlan
set ethernet-switching-options voip interface ge-0/0/2.0 vlan voice-vlan
```

Step-by-Step Procedure

1. Configure two VLANs: one for data traffic and one for voice traffic:

```
[edit vlans]
user@switch# set data-vlan vlan-id 77
user@switch# set voice-vlan vlan-id 99
```



NOTE: The voice VLAN ID must be set manually on the IP phone.

2. Configure the VLAN **data-vlan** on the interface ge-0/0/2:

```
[edit vlans]
user@switch# set data-vlan interface ge-0/0/2.0
```

3. Configure the interface ge-0/0/2 as an access port belonging to the data VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/2 unit 0 family ethernet-switching port-mode access
user@switch# set ge-0/0/2 unit 0 family ethernet-switching vlan member data-vlan
```

4. Configure VoIP on the interface ge-0/0/2 and add this interface to the voice VLAN:

```
[edit ethernet-switching-options]
user@switch# set voip interface ge-0/0/2.0 vlan voice-vlan
```

Results Display the results of the configuration:

```
[edit]
user@switch> show configuration
interfaces {
  ge-0/0/2 {
    unit 0 {
      family ethernet-switching {
        port-mode access;
        vlan {
          members data-vlan;
        }
      }
    }
  }
}
vlands {
  data-vlan {
    vlan-id 77;
    interface {
      ge-0/0/2.0;
    }
  }
  voice-vlan {
    vlan-id 99;
  }
}
ethernet-switching options {
  voip {
    interface ge-0/0/2.0 {
      vlan voice-vlan;
    }
  }
}
```

Configuring VoIP Without LLDP-MED by Using a Trunk Port with Native VLAN Option

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

```
[edit]
set vlans data-vlan vlan-id 77
set vlans voice-vlan vlan-id 99
set interfaces ge-0/0/2 unit 0 family ethernet-switching port-mode trunk
set interfaces ge-0/0/2 unit 0 family ethernet-switching vlan members voice-vlan
set interfaces ge-0/0/2 unit 0 family ethernet-switching native-vlan-id data-vlan
```

Step-by-Step Procedure 1. Configure two VLANs: one for data traffic and one for voice traffic:

```
[edit vlans]
user@switch# set data-vlan vlan-id 77
user@switch# set voice-vlan vlan-id 99
```



NOTE: The voice VLAN ID must be set manually on the IP phone.

2. Configure interface ge-0/0/2 as a trunk port that includes only the voice VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/2 unit 0 family ethernet-switching port-mode trunk
user@switch# set ge-0/0/2 unit 0 family ethernet-switching vlan member voice-vlan
```

3. Configure the native VLAN ID for the data VLAN on the trunk port:

```
[edit interfaces]
user@switch# set ge-0/0/2 unit 0 family ethernet-switching native-vlan-id data-vlan
```

Results Display the results of the configuration:

```
[edit]
user@switch> show configuration
interfaces {
  ge-0/0/2 {
    unit 0 {
      family ethernet-switching {
        port-mode trunk;
        vlan {
          members voice-vlan;
        }
        native-vlan-id data-vlan;
      }
    }
  }
}
vlangs {
  data-vlan {
    vlan-id 77;
  }
  voice-vlan {
    vlan-id 99;
  }
}
```

Verification

To confirm that the configuration is working properly, perform the following task:

- [Verifying the VLAN Association With the Interface on page 467](#)

Verifying the VLAN Association With the Interface

Purpose Display the interface state and VLAN membership.

Action user@switch> [show ethernet-switching interfaces](#)

```
Ethernet-switching table: 0 entries, 0 learned
```

```
user@switch> show ethernet-switching interfaces
Interface  State  VLAN members  Blocking
ge-0/0/0.0 down  default       unblocked
ge-0/0/1.0 down  employee-vlan unblocked
ge-0/0/5.0 down  employee-vlan unblocked
ge-0/0/3.0 down  employee-vlan unblocked
ge-0/0/8.0 down  employee-vlan unblocked
ge-0/0/10.0 down default       unblocked
ge-0/0/11.0 down employee-vlan unblocked
ge-0/0/23.0 down default       unblocked
ge-0/0/2.0 up    voice-vlan    unblocked
                data-vlan     unblocked
```

Meaning The field **VLAN members** shows that the ge-0/0/2.0 interface supports both the data VLAN, data-vlan, and the voice VLAN, voice-vlan. The **State** field shows that the interface is up.

- Related Documentation**
- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
 - [Example: Configuring VoIP on an EX Series Switch Without Including 802.1X Authentication on page 468](#)
 - [Understanding 802.1X and VoIP on EX Series Switches on page 451](#)
 - [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)

Example: Configuring VoIP on an EX Series Switch Without Including 802.1X Authentication

You can configure voice over IP (VoIP) on an EX Series switch to support IP telephones.

To configure VoIP on an EX Series switch to support an IP phone that does not support 802.1X authentication, you must either add the MAC address of the phone to the static MAC bypass list or enable MAC RADIUS authentication on the switch.

This example describes how to configure VoIP on an EX Series switch without 802.1X authentication using static MAC bypass of authentication:

- [Requirements on page 469](#)
- [Overview on page 469](#)
- [Configuration on page 470](#)
- [Verification on page 472](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 9.1 or later for EX Series switches
- An IP telephone

Before you configure VoIP, be sure you have:

- Installed your EX Series switch. See the installation information for your switch.
- Performed the initial switch configuration. See *Connecting and Configuring an EX Series Switch (CLI Procedure)*.
- Performed basic bridging and VLAN configuration on the switch. See *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch*.
- Configured the RADIUS server for 802.1X authentication and set up the access profile. See [“Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch” on page 378](#).
- (Optional) Configured interface **ge-0/0/2** for Power over Ethernet (PoE). The PoE configuration is not necessary if the VoIP supplicant is using a power adapter. For information about configuring PoE, see *Configuring PoE on EX Series Switches (CLI Procedure)*.



NOTE: If the IP address isn't configured on the Avaya IP phone, the phone exchanges LLDP-MED information to get the VLAN ID for the voice VLAN. You must configure the **voip** statement on the interface to designate the interface as a VoIP interface and allow the switch to forward the VLAN name and VLAN ID for the voice VLAN to the IP telephone. The IP telephone then uses the voice VLAN (that is, it references the voice VLAN's ID) to send a DHCP discover request and exchange information with the DHCP server (voice gateway).

Overview

Instead of using a regular telephone, you connect an IP telephone directly to the switch. An IP phone has all the hardware and software needed to handle VoIP. You also can power an IP telephone by connecting it to one of the Power over Ethernet (PoE) interfaces on the switch.

In this example, the access interface **ge-0/0/2** on the EX4200 switch is connected to a non-802.1X IP phone.

To configure VoIP on an EX Series switch to support an IP phone that does not support 802.1X authentication, add the MAC address of the phone as a static entry in the authenticator database and set the supplicant mode to multiple.

Configuration

To configure VoIP without 802.1X authentication:

CLI Quick Configuration

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

```
[edit]
set vlans data-vlan vlan-id 77
set vlans voice-vlan vlan-id 99
set vlans data-vlan interface ge-0/0/2.0
set interfaces ge-0/0/2 unit 0 family ethernet-switching vlan members data-vlan
set interfaces ge-0/0/2 unit 0 family ethernet-switching port-mode access
set ethernet-switching-options voip interface ge-0/0/2.0 vlan voice-vlan
set ethernet-switching-options voip interface ge-0/0/2.0 forwarding-class assured-forwarding
set protocols lldp-med interface ge-0/0/2.0
set protocols dot1x authenticator authentication-profile-name auth-profile
set protocols dot1x authenticator static 00:04:f2:11:aa:a7
set protocols dot1x authenticator interface ge-0/0/2.0 supplicant multiple
```

Step-by-Step Procedure

To configure VoIP without 802.1X:

1. Configure the VLANs for voice and data:

```
[edit vlans]
user@switch# set data-vlan vlan-id 77
user@switch# set voice-vlan vlan-id 99
```

2. Associate the VLAN **data-vlan** with the interface:

```
[edit vlans]
user@switch# set data-vlan interface ge-0/0/2.0
```

3. Configure the interface as an access interface, configure support for Ethernet switching, and add the **data-vlan** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/2 unit 0 family ethernet-switching vlan members data-vlan
user@switch# set ge-0/0/2 unit 0 family ethernet-switching port-mode access
```

4. Configure VoIP on the interface and specify the **assured-forwarding** forwarding class to provide the most dependable class of service:

```
[edit ethernet-switching-options]
user@switch# set voip interface ge-0/0/2.0 vlan voice-vlan
user@switch# set voip interface ge-0/0/2.0 forwarding-class assured-forwarding
```

5. Configure LLDP-MED protocol support:

```
[edit protocols]
user@switch# set lldp-med interface ge-0/0/2.0
```

6. Set the authentication profile (see [“Configuring 802.1X Interface Settings \(CLI Procedure\)” on page 357](#) and [“Configuring 802.1X RADIUS Accounting \(CLI Procedure\)” on page 386](#)):

```
[edit protocols]
set dot1x authenticator authentication-profile-name auth-profile
```

7. Add the MAC address of the phone to the static MAC bypass list:

```
[edit protocols]
set dot1x authenticator static 00:04:f2:11:aa:a7
```

8. Set the supplicant mode to multiple:

```
[edit protocols]
set dot1x authenticator interface ge-0/0/2.0 supplicant multiple
```

Results Display the results of the configuration:

```
[edit]
user@switch# show configuration
interfaces {
  ge-0/0/2 {
    unit 0 {
      family ethernet-switching {
        port-mode access;
        vlan {
          members data-vlan;
        }
      }
    }
  }
}
protocols {
  lldp-med {
    interface ge-0/0/2.0;
  }
  dot1x {
    authenticator {
      authentication-profile-name auth-profile;
      static {
        00:04:f2:11:aa:a7;
      }
    }
    interface {
      ge-0/0/2.0 {
        supplicant multiple;
      }
    }
  }
}
vlangs {
  data-vlan {
```

```
    vlan-id 77;
    interface {
        ge-0/0/2.0;
    }
}
voice-vlan {
    vlan-id 99;
}
}
ethernet-switching options {
    voip {
        interface ge-0/0/2.0 {
            vlan voice-vlan;
            forwarding-class assured-forwarding;
        }
    }
}
```

Verification

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

- [Verifying LLDP-MED Configuration on page 472](#)
- [Verifying Authentication for the Desktop PC on page 473](#)
- [Verifying the VLAN Association with the Interface on page 474](#)

Verifying LLDP-MED Configuration

Purpose Verify that LLDP-MED is enabled on the interface.

Action user@switch> `show lldp detail`

```

LLDP                               : Enabled
Advertisement interval             : 30 Second(s)
Transmit delay                     : 2 Second(s)
Hold timer                         : 2 Second(s)
Config Trap Interval              : 300 Second(s)
Connection Hold timer             : 60 Second(s)

LLDP MED                           : Enabled
MED fast start count              : 3 Packet(s)

Interface      LLDP      LLDP-MED      Neighbor count
all            Enabled   -            0
ge-0/0/2.0     -         Enabled      0

Interface      VLAN-id    VLAN-name
ge-0/0/0.0     0          default
ge-0/0/1.0     0          employee-vlan
ge-0/0/2.0     0          data-vlan
ge-0/0/2.0     99         voice-vlan
ge-0/0/3.0     0          employee-vlan
ge-0/0/8.0     0          employee-vlan
ge-0/0/10.0    0          default
ge-0/0/11.0    20         employee-vlan
ge-0/0/23.0    0          default

LLDP basic TLVs supported:
Chassis identifier, Port identifier, Port description, System name, System
description, System capabilities, Management address.

LLDP 802 TLVs supported:
Power via MDI, Link aggregation, Maximum frame size, Port VLAN tag, Port
VLAN name.

LLDP MED TLVs supported:
LLDP MED capabilities, Network policy, Endpoint location, Extended power
Via MDI.

```

Meaning The `show lldp detail` output shows that both LLDP and LLDP-MED are configured on the `ge-0/0/2.0` interface. The end of the output shows the list of supported LLDP basic TLVs, 802.3 TLVs, and LLDP-MED TLVs that are supported.

Verifying Authentication for the Desktop PC

Purpose Display the 802.1X configuration for the desktop PC connected to the VoIP interface through the IP phone.

Action user@switch> `show dot1x interface ge-0/0/2.0 detail`

```
ge-0/0/2.0
  Role: Authenticator
  Administrative state: Auto
  Supplicant mode: Multiple
  Number of retries: 3
  Quiet period: 60 seconds
  Transmit period: 30 seconds
  Mac Radius: Disabled
  Mac Radius Restrict: Disabled
  Reauthentication: Enabled
  Configured Reauthentication interval: 3600 seconds
  Supplicant timeout: 30 seconds
  Server timeout: 30 seconds
  Maximum EAPOL requests: 2
  Guest VLAN member: <not configured>
  Number of connected supplicants: 1
    Supplicant: user101, 00:04:0f:fd:ac:fe
      Operational state: Authenticated
      Authentication method: Radius
      Authenticated VLAN: vo11
      Dynamic Filter: match source-dot1q-tag 10 action deny
      Session Reauth interval: 60 seconds
      Reauthentication due in 50 seconds
```

Meaning The field **Role** shows that the **ge-0/0/2.0** interface is in the authenticator state. The **Supplicant** field shows that the interface is configured in multiple supplicant mode, permitting multiple supplicants to be authenticated on this interface. The MAC addresses of the supplicants currently connected are displayed at the bottom of the output.

Verifying the VLAN Association with the Interface

Purpose Display the interface state and VLAN membership.

Action user@switch> [show ethernet-switching interfaces](#)

Ethernet-switching table: 0 entries, 0 learned

```
user@switch> show ethernet-switching interfaces
Interface  State  VLAN members  Blocking
ge-0/0/0.0 down  default       unblocked
ge-0/0/1.0 down  employee-vlan unblocked
ge-0/0/5.0 down  employee-vlan unblocked
ge-0/0/3.0 down  employee-vlan unblocked
ge-0/0/8.0 down  employee-vlan unblocked
ge-0/0/10.0 down default       unblocked
ge-0/0/11.0 down employee-vlan unblocked
ge-0/0/23.0 down default       unblocked
ge-0/0/2.0 up    voice-vlan    unblocked
                data-vlan     unblocked
```

Meaning The field **VLAN members** shows that the **ge-0/0/2.0** interface supports both the **data-vlan** VLAN and **voice-vlan** VLAN. The **State** field shows that the interface is up.

- Related Documentation**
- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
 - [Example: Configuring VoIP on an EX Series Switch Without Including LLDP-MED Support on page 463](#)
 - [Understanding 802.1X and VoIP on EX Series Switches on page 451](#)
 - [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)

Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch with ELS Support



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: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch” on page 455](#). For ELS details, see *Using the Enhanced Layer 2 Software CLI*.

You can configure VoIP on an EX Series switch to support IP telephones. The Link Layer Discovery Protocol—Media Endpoint Discovery (LLDP-MED) protocol forwards VoIP parameters from the switch to the phone. You also configure 802.1X authentication to allow the telephone access to the LAN. Authentication is done through a backend RADIUS server.

This example describes how to configure VoIP on an EX Series switch to support an Avaya IP phone, as well as how to configure the LLDP-MED protocol and 802.1X authentication:

- [Requirements on page 476](#)
- [Overview and Topology on page 477](#)
- [Configuration on page 479](#)
- [Verification on page 481](#)

Requirements

This example uses the following software and hardware components:



NOTE: This example also applies to QFX5100 switches.

- Junos OS Release 13.2X50 or later for EX Series switches
- One EX Series switch with support for ELS acting as an authenticator port access entity (PAE). The interfaces on the authenticator PAE form a control gate that blocks all traffic to and from supplicants until they are authenticated.
- An Avaya IP telephone that supports LLDP-MED and 802.1X

Before you configure VoIP, be sure you have:

- Installed your EX Series switch. See the installation information for your switch.
- Performed the initial switch configuration. See *Connecting and Configuring an EX Series Switch (CLI Procedure)*.
- Performed basic bridging and VLAN configuration on the switch. See *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch with ELS Support* or *Example: Setting Up Basic Bridging and a VLAN on Switches*.
- Configured the RADIUS server for 802.1X authentication and set up the access profile. See [“Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch” on page 378](#).
- (Optional) Configured the interface ge-0/0/2 for Power over Ethernet (PoE). The PoE configuration is not necessary if the VoIP supplicant uses a power adapter. For information about configuring PoE, see *Configuring PoE on EX Series Switches (CLI Procedure)*.



NOTE: If the IP address is not configured on the Avaya IP phone, the phone exchanges LLDP-MED information to get the VLAN ID for the voice VLAN. You must configure the `voip` statement on the interface to designate the interface as a VoIP interface and allow the switch to forward the VLAN name and VLAN ID for the voice VLAN to the IP telephone. The IP telephone then uses the voice VLAN (that is, it references the voice VLAN's ID) to send a DHCP discover request and exchange information with the DHCP server (voice gateway).

Overview and Topology

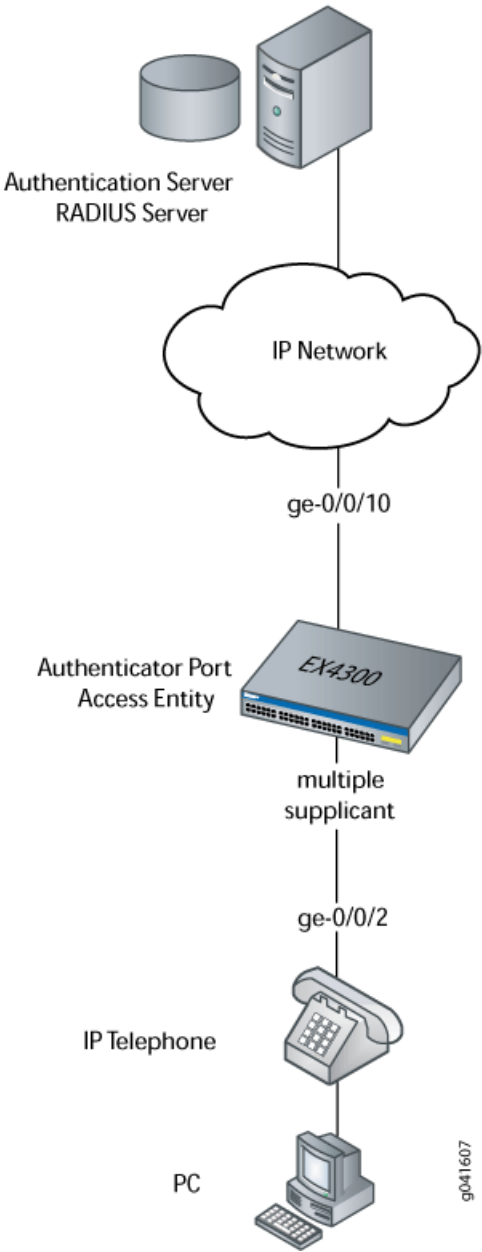
Instead of using a regular telephone, you connect an IP telephone directly to the switch. An IP phone has all the hardware and software needed to handle VoIP. You also can power an IP telephone by connecting it to one of the Power over Ethernet (PoE) interfaces on the switch.

In this example, the access interface ge-0/0/2 on the EX Series switch is connected to an Avaya IP telephone. Avaya phones have a built-in bridge that enables you to connect a desktop PC to the phone, so the desktop and phone in a single office require only one interface on the switch. The EX Series switch is connected to a RADIUS server on the ge-0/0/10 interface (see [Figure 23 on page 457](#)).



NOTE: This figure also applies to QFX5100 switches.

Figure 24: VoIP Topology



In this example, you configure VoIP parameters and specify the forwarding class **assured-forward** for voice traffic to provide the highest quality of service.

[Table 39 on page 458](#) describes the components used in this VoIP configuration example.

Table 40: Components of the VoIP Configuration Topology

Property	Settings
Switch hardware	EX Series switch with support for ELS.

Table 40: Components of the VoIP Configuration Topology (continued)

Property	Settings
VLAN names and IDs	data-vlan, 77 voice-vlan, 99
Connection to Avaya phone—with integrated hub, to connect phone and desktop PC to a single interface (requires PoE)	ge-0/0/2
One RADIUS server	Provides backend database connected to the switch through interface ge-0/0/10.

Besides configuring a VoIP for interface ge-0/0/2, you configure:

- 802.1X authentication. Authentication is set to **multiple** supplicant mode to support more than one supplicant's access to the LAN through interface ge-0/0/2.
- LLDP-MED protocol information. The switch uses LLDP-MED to forward VoIP parameters to the phone. Using LLDP-MED ensures that voice traffic gets tagged and prioritized with the correct values at the source itself. For example, 802.1p class of service and 802.1Q tag information can be sent to the IP telephone.



NOTE: A PoE configuration is not necessary if an IP telephone uses a power adapter.

Configuration

CLI Quick Configuration

To quickly configure VoIP, LLDP-MED, and 802.1X, copy the following commands and paste them into the switch terminal window:

```
[edit]
set vlans data-vlan vlan-id 77
set vlans voice-vlan vlan-id 99
set vlans data-vlan switch-options interface ge-0/0/2.0
set interfaces ge-0/0/2 unit 0 family ethernet-switching interface-mode access
set interfaces ge-0/0/2 unit 0 family ethernet-switching vlan members data-vlan
set switch-options voip interface ge-0/0/2.0 vlan voice-vlan
set switch-options voip interface ge-0/0/2.0 forwarding-class assured-forwarding
set protocols lldp-med interface ge-0/0/2
set protocols dot1x authenticator interface ge-0/0/2.0 supplicant multiple
```

Step-by-Step Procedure

To configure VoIP with LLDP-MED and 802.1X:

1. Configure the VLANs for voice and data:

```
[edit vlans]
user@switch# set data-vlan vlan-id 77
user@switch# set voice-vlan vlan-id 99
```

2. Associate the VLAN **data-vlan** with the interface:

```
[edit vlans]
user@switch# set data-vlan switch-options interface ge-0/0/2.0
```

3. Configure the interface as an access interface, configure support for Ethernet switching, and add the interface as a member of the **data-vlan** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/2 unit 0 family ethernet-switching interface-mode access
user@switch# set ge-0/0/2 unit 0 family ethernet-switching vlan members data-vlan
```

4. Configure VoIP on the interface and specify the **assured-forwarding** forwarding class to provide the most dependable class of service:

```
[edit switch-options]
user@switch# set voip interface ge-0/0/2.0 vlan voice-vlan
user@switch# set voip interface ge-0/0/2.0 forwarding-class assured-forwarding
```

5. Configure LLDP-MED protocol support:

```
[edit protocols]
user@switch# set lldp-med interface ge-0/0/2
```

6. To authenticate an IP phone and a PC connected to the IP phone on the interface, configure 802.1X authentication support and specify **multiple** supplicant mode:



NOTE: If you do not want to authenticate any device, skip the 802.1X configuration on this interface.

```
[edit protocols]
user@switch# set dot1x authenticator interface ge-0/0/2.0 supplicant multiple
```

Results Display the results of the configuration:

```
[edit]
user@switch# show configuration
interfaces {
  ge-0/0/2 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
        vlan {
          members data-vlan;
        }
      }
    }
  }
}
protocols {
  lldp-med {
    interface ge-0/0/2;
```

```
}
dot1x {
  authenticator {
    interface {
      ge-0/0/2.0 {
        supplicant multiple;
      }
    }
  }
}
}
vllans {
  data-vlan {
    vlan-id 77;
    switch-options {
      interface ge-0/0/2.0;
    }
  }
  voice-vlan {
    vlan-id 99;
  }
}
switch-options {
  voip {
    interface ge-0/0/2.0 {
      vlan voice-vlan;
      forwarding-class assured-forwarding;
    }
  }
}
}
```

Verification

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

- [Verifying LLDP-MED Configuration on page 481](#)
- [Verifying 802.1X Authentication for IP Phone and Desktop PC on page 482](#)
- [Verifying the VLAN Association with the Interface on page 483](#)

Verifying LLDP-MED Configuration

Purpose Verify that LLDP-MED is enabled on the interface.

Action user@switch> `show lldp detail`

```

LLDP : Enabled
Advertisement interval : 30 seconds
Transmit delay : 2 seconds
Hold timer : 120 seconds
Notification interval : 0 Second(s)
Config Trap Interval : 0 seconds
Connection Hold timer : 300 seconds

LLDP MED : Enabled
MED fast start count : 3 Packets

Port ID TLV subtype : locally-assigned

Interface      Parent Interface  LLDP      LLDP-MED    Power Negotiation
Neighbor count
all            -                Enabled    Enabled      Enabled
0
ge-0/0/2       -                -          Enabled      -
0

Interface      Parent Interface  Vlan-id    Vlan-name
ge-0/0/0       -                1          vlan-1
ge-0/0/1       -                1          vlan-1
ge-0/0/2       -                77         vlan-77
ge-0/0/2       -                99         vlan-99
ge-0/0/3       -                1          vlan-1
ge-0/0/4       -                1          vlan-1
ge-0/0/5       -                1          vlan-1
ge-0/0/6       -                1          vlan-1
ge-0/0/7       -                1          vlan-1
ge-0/0/8       -                1          vlan-1
ge-0/0/9       -                1          vlan-1
ge-0/0/10      -                1          vlan-1

Basic Management TLVs supported:
End Of LLDPDU, Chassis ID, Port ID, Time To Live, Port Description, System Name,
System Description, System Capabilities, Management Address

Organizationally Specific TLVs supported:
MAC/PHY configuration/status, Power via MDI, Link aggregation, Maximum Frame Size,
Port VLAN tag, Port VLAN name.

```

Meaning The `show lldp detail` output shows that both **LLDP** and **LLDP-MED** are configured on the **ge-0/0/2** interface. The end of the output shows the list of supported LLDP basic management TLVs and organizationally specific TLVs that are supported.

Verifying 802.1X Authentication for IP Phone and Desktop PC

Purpose Display the 802.1X configuration to confirm that the VoIP interface has access to the LAN.

Action user@switch> **show dot1x** interface ge-0/0/2.0 detail

```

ge-0/0/2.0
  Role: Authenticator
  Administrative state: Auto
  Supplicant mode: Multiple
  Number of retries: 3
  Quiet period: 60 seconds
  Transmit period: 30 seconds
  Mac Radius: Disabled
  Mac Radius Restrict: Disabled
  Reauthentication: Enabled
  Configured Reauthentication interval: 3600 seconds
  Supplicant timeout: 30 seconds
  Server timeout: 30 seconds
  Maximum EAPOL requests: 2
  Guest VLAN member: <not configured>
  Number of connected supplicants: 1
    Supplicant: user101, 00:04:0f:fd:ac:fe
      Operational state: Authenticated
      Authentication method: Radius
      Authenticated VLAN: vo11
      Dynamic Filter: match source-dot1q-tag 10 action deny
      Session Reauth interval: 60 seconds
      Reauthentication due in 50 seconds

```

Meaning The field **Role** shows that the **ge-0/0/2.0** interface is in the authenticator state. The **Supplicant mode** field shows that the interface is configured in **multiple** supplicant mode, permitting multiple supplicants to be authenticated on this interface. The MAC addresses of the supplicants currently connected are displayed at the bottom of the output.

Verifying the VLAN Association with the Interface

Purpose Display the interface's VLAN membership.

Action user@switch> **show ethernet-switching** interface ge-0/0/2.0

```

Routing Instance Name : default-switch
Logical Interface flags (DL - disable learning, AD - packet action drop,
                        LH - MAC limit hit, DN - interface down )
Logical   Vlan    TAG   MAC    STP      Logical      Tagging
interface members limit state  interface flags
ge-0/0/2.0
           voice-vlan 99
                        65535
                        65535   Discarding
           data-vlan  77
                        65535   Discarding

```

Meaning The field **VLAN members** shows that the **ge-0/0/2.0** interface supports both the **data-vlan** VLAN and **voice-vlan** VLAN.

- Related Documentation**
- [Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378](#)
 - [Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch on page 367](#)
 - [Defining CoS Forwarding Classes \(CLI Procedure\)](#)
 - [Defining CoS Forwarding Classes \(J-Web Procedure\)](#)
 - [Configuring LLDP-MED \(CLI Procedure\) on page 566](#)

Example: Configuring VoIP on an EX Series Switch with ELS Support Without Including 802.1X Authentication



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 VoIP on an EX Series Switch Without Including 802.1X Authentication” on page 468](#). For ELS details, see *Using the Enhanced Layer 2 Software CLI*.

You can configure voice over IP (VoIP) on an EX Series switch to support IP telephones.

To configure VoIP on an EX Series switch to support an IP phone that does not support 802.1X authentication, you must either add the MAC address of the phone to the static MAC bypass list or enable MAC RADIUS authentication on the switch.

This example describes how to configure VoIP on an EX Series switch without 802.1X authentication by using static MAC bypass of authentication:

- [Requirements on page 484](#)
- [Overview on page 485](#)
- [Configuration on page 485](#)
- [Verification on page 488](#)

Requirements

This example uses the following hardware and software components:



NOTE: This figure also applies to QFX5100 switches.

- One EX Series switch with support for ELS
- Junos OS Release 13.2 or later for EX Series switches
- An Avaya IP telephone

Before you configure VoIP, be sure you have:

- Installed your EX Series switch. See the installation information for your switch.
- Performed the initial switch configuration. See *Connecting and Configuring an EX Series Switch (CLI Procedure)*.
- Performed basic bridging and VLAN configuration on the switch. See *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch with ELS Support* or *Example: Setting Up Basic Bridging and a VLAN on Switches*.
- Configured the RADIUS server for 802.1X authentication and set up the access profile. See [“Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch” on page 378](#).
- (Optional) Configured the interface ge-0/0/2 for Power over Ethernet (PoE). The PoE configuration is not necessary if the VoIP supplicant uses a power adapter. For information about configuring PoE, see *Configuring PoE on EX Series Switches (CLI Procedure)*.



NOTE: If the IP address is not configured on the Avaya IP phone, the phone exchanges LLDP-MED information to get the VLAN ID for the voice VLAN. You must configure the `voip` statement on the interface to designate the interface as a VoIP interface and allow the switch to forward the VLAN name and VLAN ID for the voice VLAN to the IP telephone. The IP telephone then uses the voice VLAN (that is, it references the voice VLAN's ID) to send a DHCP discover request and exchange information with the DHCP server (voice gateway).

Overview

Instead of using a regular telephone, you connect an IP telephone directly to the switch. An IP phone has all the hardware and software needed to handle VoIP. You also can power an IP telephone by connecting it to one of the Power over Ethernet (PoE) interfaces on the switch.

In this example, the access interface ge-0/0/2 on the EX Series switch is connected to a non-802.1X IP phone.

To configure VoIP on an EX Series switch to support an IP phone that does not support 802.1X authentication, add the MAC address of the phone as a static entry in the authenticator database and set the supplicant mode to multiple.

Configuration

CLI Quick Configuration

To quickly configure VoIP without using 802.1X authentication, copy the following commands and paste them into the switch terminal window:

```
[edit]
set vlans data-vlan vlan-id 77
set vlans voice-vlan vlan-id 99
set vlans data-vlan switch-options interface ge-0/0/2.0
set interfaces ge-0/0/2 unit 0 family ethernet-switching interface-mode access
```

```
set interfaces ge-0/0/2 unit 0 family ethernet-switching vlan members data-vlan
set switch-options voip interface ge-0/0/2.0 vlan voice-vlan
set switch-options voip interface ge-0/0/2.0 forwarding-class assured-forwarding
set protocols lldp-med interface ge-0/0/2
set protocols dot1x authenticator authentication-profile-name auth-profile
set protocols dot1x authenticator static 00:04:f2:11:aa:a7
set protocols dot1x authenticator interface ge-0/0/2.0 supplicant multiple
```

**Step-by-Step
Procedure**

To configure VoIP without 802.1X authentication:

1. Configure the VLANs for voice and data:

```
[edit vlans]
user@switch# set data-vlan vlan-id 77
user@switch# set voice-vlan vlan-id 99
```

2. Associate the VLAN **data-vlan** with the interface:

```
[edit vlans]
user@switch# set data-vlan switch-options interface ge-0/0/2.0
```

3. Configure the interface as an access interface, configure support for Ethernet switching, and add the interface as a member of the **data-vlan** VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/2 unit 0 family ethernet-switching interface-mode access
user@switch# set ge-0/0/2 unit 0 family ethernet-switching vlan members data-vlan
```

4. Configure VoIP on the interface and specify the **assured-forwarding** forwarding class to provide the most dependable class of service:

```
[edit switch-options]
user@switch# set voip interface ge-0/0/2.0 vlan voice-vlan
user@switch# set voip interface ge-0/0/2.0 forwarding-class assured-forwarding
```

5. Configure LLDP-MED protocol support:

```
[edit protocols]
user@switch# set lldp-med interface ge-0/0/2
```

6. Set the authentication profile with the name **auth-profile** (see [“Configuring 802.1X Interface Settings \(CLI Procedure\)”](#) on page 357 and [“Configuring 802.1X RADIUS Accounting \(CLI Procedure\)”](#) on page 386):

```
[edit protocols]
user@switch# set dot1x authenticator authentication-profile-name auth-profile
```

7. Add the MAC address of the phone to the static MAC bypass list:

```
[edit protocols]
user@switch# set dot1x authenticator static 00:04:f2:11:aa:a7
```

8. Set the supplicant mode to multiple:

```
[edit protocols]
```

```
user@switch# set dot1x authenticator interface ge-0/0/2.0 supplicant multiple
```

Results Display the results of the configuration:

```
[edit]
user@switch# show configuration
interfaces {
  ge-0/0/2 {
    unit 0 {
      family ethernet-switching {
        interface-mode access;
        vlan {
          members data-vlan;
        }
      }
    }
  }
}
protocols {
  lldp-med {
    interface ge-0/0/2;
  }
  dot1x {
    authenticator {
      authentication-profile-name auth-profile;
      static {
        00:04:f2:11:aa:a7;
      }
    }
    interface {
      ge-0/0/2.0 {
        supplicant multiple;
      }
    }
  }
}
vlangs {
  data-vlan {
    vlan-id 77;
    switch-options {
      interface ge-0/0/2.0;
    }
  }
  voice-vlan {
    vlan-id 99;
  }
}
switch-options {
  voip {
    interface ge-0/0/2.0 {
      vlan voice-vlan;
      forwarding-class assured-forwarding;
    }
  }
}
```

```
}  
}
```

Verification

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

- [Verifying LLDP-MED Configuration on page 488](#)
- [Verifying Authentication for the Desktop PC on page 489](#)
- [Verifying the VLAN Association with the Interface on page 490](#)

Verifying LLDP-MED Configuration

Purpose Verify that LLDP-MED is enabled on the interface.

Action user@switch> `show lldp detail`

```

LLDP                               : Enabled
Advertisement interval             : 30 seconds
Transmit delay                     : 2 seconds
Hold timer                        : 120 seconds
Notification interval              : 0 Second(s)
Config Trap Interval               : 0 seconds
Connection Hold timer              : 300 seconds

LLDP MED                           : Enabled
MED fast start count               : 3 Packets

Port ID TLV subtype                : locally-assigned

Interface      Parent Interface    LLDP      LLDP-MED    Power Negotiation
Neighbor count
all            -                   Enabled    Enabled      Enabled
0
ge-0/0/2      -                   -          Enabled      -
0

Interface      Parent Interface    Vlan-id    Vlan-name
ge-0/0/0       -                   1          vlan-1
ge-0/0/1       -                   1          vlan-1
ge-0/0/2       -                   77         vlan-77
ge-0/0/2       -                   99         vlan-99
ge-0/0/3       -                   1          vlan-1
ge-0/0/4       -                   1          vlan-1
ge-0/0/5       -                   1          vlan-1
ge-0/0/6       -                   1          vlan-1
ge-0/0/7       -                   1          vlan-1
ge-0/0/8       -                   1          vlan-1
ge-0/0/9       -                   1          vlan-1
ge-0/0/10      -                   1          vlan-1

Basic Management TLVs supported:
End Of LLDPDU, Chassis ID, Port ID, Time To Live, Port Description, System Name,
System Description, System Capabilities, Management Address

Organizationally Specific TLVs supported:
MAC/PHY configuration/status, Power via MDI, Link aggregation, Maximum Frame Size,
Port VLAN tag, Port VLAN name.

```

Meaning The `show lldp detail` command output shows that both LLDP and LLDP-MED are configured on the `ge-0/0/2` interface. The end of the output shows the list of supported LLDP basic management TLVs and organizationally specific TLVs that are supported.

Verifying Authentication for the Desktop PC

Purpose Display the 802.1X configuration for the desktop PC connected to the VoIP interface through the IP phone.

Action user@switch> **show dot1x** interface ge-0/0/2.0 detail

```

ge-0/0/2.0
  Role: Authenticator
  Administrative state: Auto
  Supplicant mode: Multiple
  Number of retries: 3
  Quiet period: 60 seconds
  Transmit period: 30 seconds
  Mac Radius: Disabled
  Mac Radius Restrict: Disabled
  Reauthentication: Enabled
  Configured Reauthentication interval: 3600 seconds
  Supplicant timeout: 30 seconds
  Server timeout: 30 seconds
  Maximum EAPOL requests: 2
  Guest VLAN member: <not configured>
  Number of connected supplicants: 1
    Supplicant: user101, 00:04:0f:fd:ac:fe
      Operational state: Authenticated
      Authentication method: Radius
      Authenticated VLAN: vo11
      Dynamic Filter: match source-dot1q-tag 10 action deny
      Session Reauth interval: 60 seconds
      Reauthentication due in 50 seconds

```

Meaning The field **Role** shows that the **ge-0/0/2.0** interface is in the authenticator role. The **Supplicant Mode** field shows that the interface is configured in **multiple** supplicant mode, permitting multiple supplicants to be authenticated on this interface. The MAC addresses of the supplicants currently connected are displayed at the bottom of the output.

Verifying the VLAN Association with the Interface

Purpose Display the interface's VLAN membership.

Action user@switch> **show ethernet-switching** interface ge-0/0/2.0

```

Routing Instance Name : default-switch
Logical Interface flags (DL - disable learning, AD - packet action drop,
                        LH - MAC limit hit, DN - interface down )
Logical   Vlan    TAG   MAC    STP      Logical   Tagging
interface members          limit   state   interface flags
ge-0/0/2.0
          voice-vlan 99
          data-vlan  77
                    65535   Discarding
                    65535   Discarding

```

Meaning The **Vlan members** field shows that the **ge-0/0/2.0** interface supports both the **data-vlan** VLAN and **voice-vlan** VLAN.

- Related Documentation**
- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch with ELS Support on page 475](#)
 - [Understanding 802.1X and VoIP on EX Series Switches on page 451](#)
 - [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)

Example: Configuring VoIP on an EX Series Switch Without Including LLDP-MED Support

You can configure voice over IP (VoIP) on an EX Series switch to support IP telephones. The Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED) protocol is sometimes used with IP phones to forward VoIP parameters from the switch to the phone. However, not all IP phones support LLDP-MED.

This example describes how to configure VoIP on an EX Series switch without using LLDP-MED:

- [Requirements on page 491](#)
- [Overview on page 492](#)
- [Configuring VoIP Without LLDP-MED by Using a Voice VLAN on an Access Port on page 492](#)
- [Configuring VoIP Without LLDP-MED by Using a Trunk Port with Native VLAN Option on page 494](#)
- [Verification on page 495](#)

Requirements

This example uses the following hardware and software components:

- One EX Series switch with support for ELS acting as an authenticator port access entity (PAE). The interfaces on the authenticator PAE form a control gate that blocks all traffic to and from supplicants until they are authenticated.
- An IP phone that does not support LLDP-MED.
- Junos OS Release 13.2X50 or later for EX Series switches.

Before you configure VoIP, be sure you have:

- Performed basic bridging and VLAN configuration on the switch. See *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch with ELS Support*.
- Configured the IP phone as a member of the voice VLAN.
- (Optional) Configured interface ge-0/0/2 for Power over Ethernet (PoE). The PoE configuration is not necessary if the VoIP supplicant is using a power adapter. See *Configuring PoE on EX Series Switches (CLI Procedure)*.

Overview

Instead of using a regular telephone, you connect an IP telephone directly to the switch. An IP phone has all the hardware and software needed to handle VoIP. You can also power an IP telephone by connecting it to one of the Power over Ethernet (PoE) interfaces on the switch.

EX Series switches can accommodate an IP telephone and end host connected to a single switch port. In such a scenario, voice and data traffic must be separated into different broadcast domains, or VLANs. One method for accomplishing this is by configuring a voice VLAN, which enables access ports to accept untagged data traffic as well as tagged voice traffic from IP phones, and associate each type of traffic with separate and distinct VLANs. Voice traffic (tagged) can then be treated differently, generally with a higher priority than data traffic (untagged).

The voice VLAN delivers the greatest benefit when used with IP phones that support LLDP-MED, but it is flexible enough that IP phones that do not support LLDP-MED can also use it effectively. However, in the absence of LLDP-MED, the voice VLAN ID must be set manually on the IP phone because LLDP-MED is not available to accomplish this dynamically. For information about setting up a voice VLAN for IP phones that support LLDP-MED, see [“Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch with ELS Support”](#) on page 475.

Another method to separate voice (tagged) and data (untagged) traffic into different VLANs is to use a trunk port with the native VLAN ID option. The trunk port is added as a member of the voice VLAN, and processes only tagged voice traffic from that VLAN. The trunk port must also be configured with the native VLAN ID for the data VLAN so that it can process untagged data traffic from the data VLAN. This configuration also requires that the voice VLAN ID be set manually on the IP phone.

This example illustrates both methods. In this example, the interface ge-0/0/2 on the switch is connected to a non-LLDP-MED IP phone.



NOTE: The implementation of a voice VLAN on an IP telephone is vendor-specific. Consult the documentation that came with your IP telephone for instructions on configuring a voice VLAN. For example, on an Avaya phone, you can ensure that the phone gets the correct VoIP VLAN ID even in the absence of LLDP-MED by enabling DHCP option 176.

Configuring VoIP Without LLDP-MED by Using a Voice VLAN on an Access Port

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

```
[edit]
set vlans data-vlan vlan-id 77
set vlans voice-vlan vlan-id 99
set vlans data-vlan switch-options interface ge-0/0/2.0
set interfaces ge-0/0/2 unit 0 family ethernet-switching port-mode access
```



```
set interfaces ge-0/0/2 unit 0 family ethernet-switching vlan members data-vlan
set switch-options voip interface ge-0/0/2.0 vlan voice-vlan
set switch-options voip interface ge-0/0/2.0 forwarding-class assured-forwarding
```

Step-by-Step Procedure

1. Configure two VLANs: one for data traffic and one for voice traffic:

```
[edit vlans]
user@switch# set data-vlan vlan-id 77
user@switch# set voice-vlan vlan-id 99
```



NOTE: The voice VLAN ID must be set manually on the IP phone.

2. Associate the VLAN **data-vlan** with the interface ge-0/0/2:

```
[edit vlans]
user@switch# set data-vlan switch-options interface ge-0/0/2.0
```

3. Configure the interface ge-0/0/2 as an access port belonging to the data VLAN:

```
[edit interfaces]
user@switch# set ge-0/0/2 unit 0 family ethernet-switching port-mode access
user@switch# set ge-0/0/2 unit 0 family ethernet-switching vlan member data-vlan
```

4. Configure VoIP on the interface ge-0/0/2 and add this interface to the voice VLAN:

```
[edit switch-options]
user@switch# set voip interface ge-0/0/2.0 vlan voice-vlan
```

5. Specify the assured-forwarding forwarding class to provide the most dependable class of service:

```
[edit switch-options]
user@switch# set voip interface ge-0/0/2.0 forwarding-class assured-forwarding
```

Results Display the results of the configuration:

```
[edit]
user@switch> show configuration
interfaces {
  ge-0/0/2 {
    unit 0 {
      family ethernet-switching {
        port-mode access;
        vlan {
          members data-vlan;
        }
      }
    }
  }
}
```

```

}
vllans {
  data-vlan {
    vlan-id 77;
    interface {
      ge-0/0/2.0;
    }
  }
  voice-vlan {
    vlan-id 99;
  }
}
ethernet-switching options {
  voip {
    interface ge-0/0/2.0 {
      vlan voice-vlan;
      forwarding-class assured-forwarding;
    }
  }
}
}

```

Configuring VoIP Without LLDP-MED by Using a Trunk Port with Native VLAN Option

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

```

[edit]
set vllans data-vlan vlan-id 77
set vllans voice-vlan vlan-id 99
set interfaces ge-0/0/2 unit 0 family ethernet-switching port-mode trunk
set interfaces ge-0/0/2 unit 0 family ethernet-switching vlan members voice-vlan
set interfaces ge-0/0/2 unit 0 family ethernet-switching native-vlan-id data-vlan

```

Step-by-Step Procedure

1. Configure two VLANs: one for data traffic and one for voice traffic:

```

[edit vllans]
user@switch# set data-vlan vlan-id 77
user@switch# set voice-vlan vlan-id 99

```



NOTE: The voice VLAN ID must be set manually on the IP phone.

2. Configure interface ge-0/0/2 as a trunk port that includes only the voice VLAN:

```

[edit interfaces]
user@switch# set ge-0/0/2 unit 0 family ethernet-switching port-mode trunk
user@switch# set ge-0/0/2 unit 0 family ethernet-switching vlan member voice-vlan

```

3. Configure the native VLAN ID for the data VLAN on the trunk port:

```
[edit interfaces]
user@switch# set ge-0/0/2 unit 0 family ethernet-switching native-vlan-id data-vlan
```

Results Display the results of the configuration:

```
[edit]
user@switch> show configuration
interfaces {
  ge-0/0/2 {
    unit 0 {
      family ethernet-switching {
        port-mode trunk;
        vlan {
          members voice-vlan;
        }
        native-vlan-id data-vlan;
      }
    }
  }
}
vlands {
  data-vlan {
    vlan-id 77;
  }
  voice-vlan {
    vlan-id 99;
  }
}
```

Verification

To confirm that the configuration is working properly, perform the following task:

- [Verifying the VLAN Association With the Interface on page 495](#)

Verifying the VLAN Association With the Interface

Purpose Display the interface state and VLAN membership.

Action user@switch> [show ethernet-switching interfaces](#)

```
Ethernet-switching table: 0 entries, 0 learned
```

```
user@switch> show ethernet-switching interfaces
Interface  State  VLAN members  Blocking
ge-0/0/0.0 down  default       unblocked
ge-0/0/1.0 down  employee-vlan unblocked
ge-0/0/5.0 down  employee-vlan unblocked
ge-0/0/3.0 down  employee-vlan unblocked
ge-0/0/8.0 down  employee-vlan unblocked
ge-0/0/10.0 down default       unblocked
ge-0/0/11.0 down employee-vlan unblocked
ge-0/0/23.0 down default       unblocked
ge-0/0/2.0 up    voice-vlan    unblocked
                data-vlan     unblocked
```

Meaning The field **VLAN members** shows that the ge-0/0/2.0 interface supports both the data VLAN, data-vlan, and the voice VLAN, voice-vlan. The **State** field shows that the interface is up.

- Related Documentation**
- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
 - [Example: Configuring VoIP on an EX Series Switch Without Including 802.1X Authentication on page 468](#)
 - [Understanding 802.1X and VoIP on EX Series Switches on page 451](#)
 - [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)

Configuring EAPoL Block to Maintain an Existing Authentication Session

When a switch acting as an 802.1X authenticator receives an EAP-Start message from an authenticated client, the switch tries to re-authenticate the client using the 802.1X method and typically returns an EAP-Request message, and waits for a response. If the client fails to respond, the switch attempts to re-authenticate the client using MAC RADIUS or captive portal method if these methods were configured. Clients that have been authenticated using MAC RADIUS or captive portal authentication are non-responsive, and traffic is dropped on the interface as the switch attempts re-authentication.

If you have configured flexible authentication order on the interface so that MAC RADIUS is the first method used to authenticate a client, the switch still reverts to using 802.1X for re-authentication if the client sends an EAP-Start message, even if the client was successfully authenticated using MAC RADIUS authentication. You can configure an EAPoL block with either a fixed or flexible authentication order. If you do not configure the **authentication-order** statement, the order is fixed by default. The **eapol-block** statement can be configured with or without configuring the **authentication-order** statement.

You can configure a switch to ignore EAP-Start messages sent from a client that has been authenticated using MAC RADIUS authentication or captive portal authentication using the **eapol-block** statement. With a block of EAPoL messages in effect, if the switch receives an EAP-Start message from the client, it does not return an EAP-Request message, and the existing authentication session is maintained.



NOTE: If the endpoint has not been authenticated with MAC RADIUS authentication or captive portal authentication, the EAPoL block does not take effect. The endpoint can authenticate using 802.1X authentication.

If **eapol-block** is configured with the **mac-radius** option, then once the client is authenticated with MAC RADIUS authentication or CWA (Central Web Authentication), the client remains in authenticated state even if it sends an EAP-Start message. If **eapol-block** is configured with the **captive-portal** option, then once the client is authenticated with captive portal, the client remains in authenticated state even if it sends an EAP-Start message.



NOTE: This feature is supported on EX4300 and EX9200 switches.

To configure a block of EAPoL messages to maintain an existing authentication session:

- To configure EAPoL block for a client authenticated using MAC RADIUS authentication:

```
[edit]
user@switch# set protocols dot1x authenticator interface interface-name eapol-block
mac-radius
```

- To configure EAPoL block for a client authenticated using captive portal authentication:

```
[edit]
user@switch# set protocols dot1x authenticator interface interface-name eapol-block
captive-portal
```

Related Documentation

- [Understanding Authentication on Switches on page 348](#)
- [Configuring Flexible Authentication Order on page 514](#)

CHAPTER 17

Configuring MAC RADIUS Authentication to Control Network Access on Switches

- [Specifying RADIUS Server Connections on Switches \(CLI Procedure\) on page 500](#)
- [Configuring MAC RADIUS Authentication \(CLI Procedure\) on page 501](#)
- [Example: Configuring MAC RADIUS Authentication on an EX Series Switch on page 502](#)
- [Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication \(CLI Procedure\) on page 508](#)
- [Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch on page 509](#)
- [Configuring MS-CHAPv2 to Provide Password-Change Support \(CLI Procedure\) on page 513](#)
- [Configuring Flexible Authentication Order on page 514](#)
- [Understanding Authentication Session Timeout on page 516](#)
- [Controlling Authentication Session Timeouts \(CLI Procedure\) on page 517](#)
- [Configuring an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control \(CLI Procedure\) on page 519](#)
- [Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service \(CLI Procedure\) on page 522](#)

Specifying RADIUS Server Connections on Switches (CLI Procedure)

IEEE 802.1X and MAC RADIUS authentication both provide network edge security, protecting Ethernet LANs from unauthorized user access by blocking all traffic to and from devices at the interface until the supplicant's credentials or MAC address are presented and matched on the *authentication server* (a RADIUS server). When the supplicant is authenticated, the switch stops blocking access and opens the interface to the supplicant.

To use 802.1X or MAC RADIUS authentication, you must specify the connections on the switch for each RADIUS server to which you will connect.

To configure a RADIUS server on the switch:

1. Define the IP address of the RADIUS server, the RADIUS server authentication port number, and the secret password. You can define more than one RADIUS server. The secret password on the switch must match the secret password on the server:

```
[edit access]
user@switch# set radius-server server-address port 1812 secret password
```



NOTE: Specifying the authentication port is optional, and port 1812 is the default. However, we recommend that you configure it in order to avoid confusion as some RADIUS servers might refer to an older default.

2. (Optional) Specify the IP address by which the switch is identified by the RADIUS server. If you do not specify the IP address, the RADIUS server uses the address of the interface that sends the RADIUS request. We recommend that you specify this IP address because if the request gets diverted on an alternate route to the RADIUS server, the interface relaying the request might not be an interface on the switch.

```
[edit access]
user@switch# set access radius-server source-address source-address
```

3. Configure the authentication order, making **radius** the first method of authentication:

```
[edit access]
user@switch# set profile profile-name authentication-order (Access Profile) radius
```

4. Create a profile and specify the list of RADIUS servers to be associated with the profile. For example, you might choose to group your RADIUS servers geographically by city. This feature enables easy modification whenever you want to change to a different set of authentication servers.

```
[edit access profile profile-name]
user@switch# set radius authentication-server server-address server-address
```

5. Specify the group of servers to be used for 802.1X or MAC RADIUS authentication by identifying the profile name:


```
[edit]
user@switch# set protocols dot1x authenticator authentication-profile-name
access-profile-name
```

6. Configure the IP address of the switch in the list of clients on the RADIUS server. For information about configuring the RADIUS server, consult the documentation for your server.

Related Documentation

- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)
- [Configuring 802.1X Authentication \(J-Web Procedure\) on page 358](#)
- [Configuring MAC RADIUS Authentication \(CLI Procedure\) on page 501](#)
- [Configuring 802.1X RADIUS Accounting \(CLI Procedure\) on page 386](#)

Configuring MAC RADIUS Authentication (CLI Procedure)

You can permit devices that are not 802.1X-enabled LAN access by configuring MAC RADIUS authentication on the switch interfaces to which the hosts are connected.



NOTE: You can also allow non-802.1X-enabled devices to access the LAN by configuring their MAC address for static MAC bypass of authentication.

You can configure MAC RADIUS authentication on an interface that also allows 802.1X authentication, or you can configure either authentication method alone.

If both MAC RADIUS and 802.1X authentication are enabled on the interface, the switch first sends the host three EAPoL requests to the host. If there is no response from the host, the switch sends the host's MAC address to the RADIUS server to check whether it is a permitted MAC address. If the MAC address is configured as permitted on the RADIUS server, the RADIUS server sends a message to the switch that the MAC address is a permitted address, and the switch opens LAN access to the nonresponsive host on the interface to which it is connected.

If MAC RADIUS authentication is configured on the interface but 802.1X authentication is not (by using the **mac-radius restrict** option), the switch attempts to authenticate the MAC address with the RADIUS server without delaying by attempting 802.1X authentication first.

Before you configure MAC RADIUS authentication, be sure you have:

- Configured basic access between the switch and the RADIUS server. See [“Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch” on page 378](#).

To configure MAC RADIUS authentication by using the CLI:

- On the switch, configure the interfaces to which the nonresponsive hosts are attached for MAC RADIUS authentication, and add the **restrict** qualifier for interface **ge-0/0/20** to have it use only MAC RADIUS authentication:

```
[edit]
user@switch# set protocols dot1x authenticator interface ge-0/0/19 mac-radius
user@switch# set protocols dot1x authenticator interface ge-0/0/20 mac-radius restrict
```

- On a RADIUS authentication server, create user profiles for each nonresponsive host using the MAC address (without colons) of the nonresponsive host as the username and password (here, the MAC addresses are **00:04:0f:fd:ac:fe** and **00:04:ae:cd:23:5f**):

```
[root@freeradius]#
edit /etc/raddb
vi users
00040ffdacfe Auth-type:=Local, User-Password = "00040ffdacfe"
0004aecdc235f Auth-type:=Local, User-Password = "0004aecdc235f"
```

Related Documentation

- [Example: Configuring MAC RADIUS Authentication on an EX Series Switch on page 502](#)
- [Verifying 802.1X Authentication on page 440](#)
- [Understanding Authentication on Switches on page 348](#)

Example: Configuring MAC RADIUS Authentication on an EX Series Switch

To permit hosts that are not 802.1X-enabled to access a LAN, you can configure MAC RADIUS authentication on the switch interfaces to which the non-802.1X-enabled hosts are connected. When MAC RADIUS authentication is configured, the switch will attempt to authenticate the host with the RADIUS server by using the host's MAC address.

This example describes how to configure MAC RADIUS authentication for two non-802.1X-enabled hosts:

- [Requirements on page 503](#)
- [Overview and Topology on page 503](#)
- [Configuration on page 505](#)
- [Verification on page 506](#)

Requirements

This example uses the following software and hardware components:



NOTE: This example also applies to QFX5100 switches.

- Junos OS Release 9.3 or later for EX Series switches.
- An EX Series switch acting as an authenticator port access entity (PAE). The ports on the authenticator PAE form a control gate that blocks all traffic to and from supplicants until they are authenticated.
- A RADIUS authentication server. The authentication server acts as the backend database and contains credential information for hosts (supplicants) that have permission to connect to the network.

Before you configure MAC RADIUS authentication, be sure you have:

- Configured basic access between the EX Series switch and the RADIUS server. See [“Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch” on page 378](#).
- Performed basic bridging and VLAN configuration on the switch. See the documentation that describes setting up basic bridging and a VLAN for your switch. If you are using a switch that supports the Enhanced Layer 2 Software (ELS) configuration style, see *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch with ELS Support* or *Example: Setting Up Basic Bridging and a VLAN on Switches*. For all other switches, see *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch*.



NOTE: For more about ELS, see: *Using the Enhanced Layer 2 Software CLI*

- Performed basic 802.1X configuration. See [“Configuring 802.1X Interface Settings \(CLI Procedure\)” on page 357](#).

Overview and Topology

IEEE 802.1X port-based network access control (PNAC) authenticates and permits devices access to a LAN if the devices can communicate with the switch by using the 802.1X protocol (that is, the devices are 802.1X-enabled). To permit non-802.1X-enabled end devices to access the LAN, you can configure MAC RADIUS authentication on the interfaces to which the end devices are connected. When the MAC address of the end device appears on the interface, the switch consults the RADIUS server to check whether it is a permitted MAC address. If the MAC address of the end device is configured as permitted on the RADIUS server, the switch opens LAN access to the end device.

You can configure both MAC RADIUS authentication and 802.1X authentication methods on an interface configured for multiple supplicants. Additionally, if an interface is connected only to a non-802.1X-enabled host, you can enable MAC RADIUS and not enable 802.1X authentication by using the **mac-radius restrict** option, and thus avoid the

delay that occurs while the switch determines that the device is does not respond to EAP messages.

Figure 25 on page 504 shows the two printers connected to the switch.

i NOTE: This figure also applies to QFX5100 switches.

Figure 25: Topology for MAC RADIUS Authentication Configuration

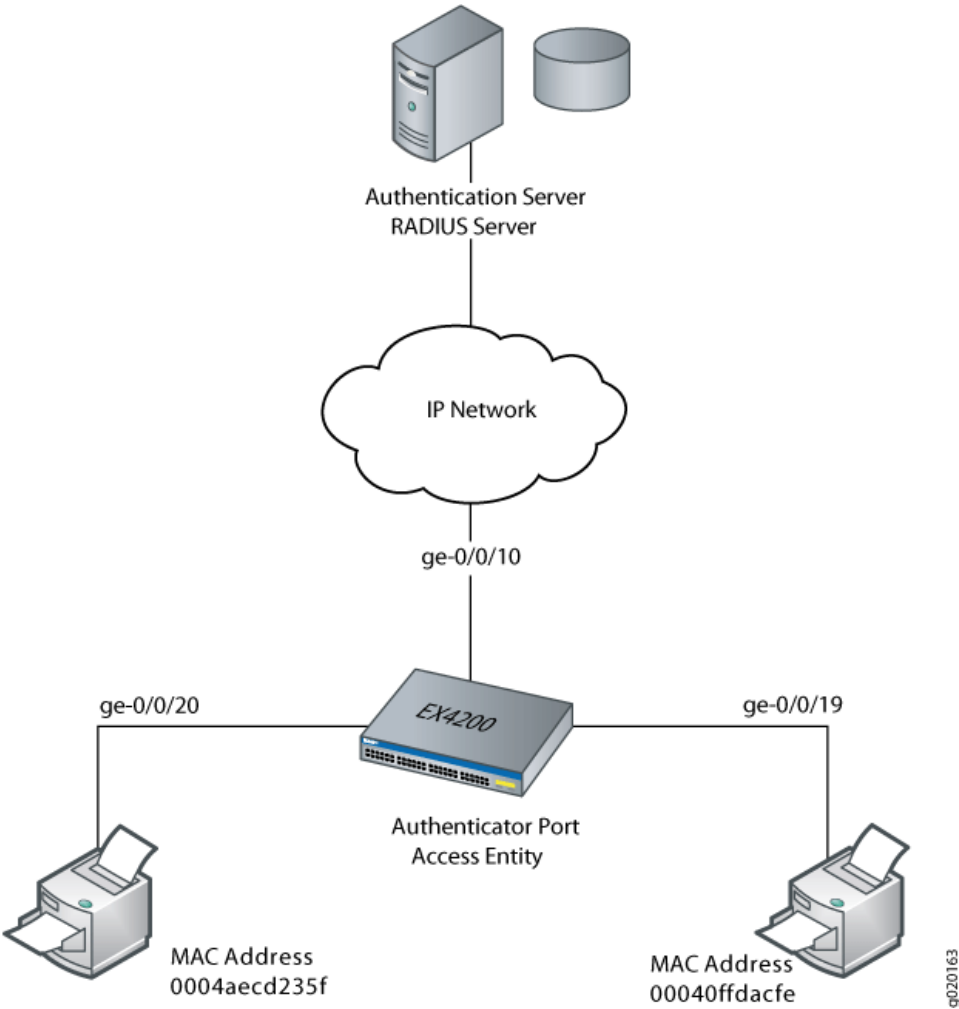


Table 41 on page 504 shows the components in the example for MAC RADIUS authentication.

Table 41: Components of the MAC RADIUS Authentication Configuration Topology

Property	Settings
Switch hardware	EX4200 ports (ge-0/0/0 through ge-0/0/23)
VLAN name	sales

Table 41: Components of the MAC RADIUS Authentication Configuration Topology (continued)

Property	Settings
Connections to printers (no PoE required)	ge-0/0/19, MAC address 00040ffdacfe ge-0/0/20, MAC address 0004aecd235f
RADIUS server	Connected to the switch on interface ge-0/0/10

The printer with the MAC address 00040ffdacfe is connected to access interface ge-0/0/19. A second printer with the MAC address 0004aecd235f is connected to access interface ge-0/0/20. In this example, both interfaces are configured for MAC RADIUS authentication on the switch, and the MAC addresses (without colons) of both printers are configured on the RADIUS server. Interface ge-0/0/20 is configured to eliminate the normal delay while the switch attempts 802.1X authentication; MAC RADIUS authentication is enabled and 802.1X authentication is disabled using the **mac radius restrict** option.

Configuration

CLI Quick Configuration

To quickly configure MAC RADIUS authentication, copy the following commands and paste them into the switch terminal window:

```
[edit]
set protocols dot1x authenticator interface ge-0/0/19 mac-radius
set protocols dot1x authenticator interface ge-0/0/20 mac-radius restrict
```



NOTE: You must also configure the two MAC addresses as usernames and passwords on the RADIUS server, as is done in step 2 of the Step-by-Step Procedure.

Step-by-Step Procedure

Configure MAC RADIUS authentication on the switch and on the RADIUS server:

1. On the switch, configure the interfaces to which the printers are attached for MAC RADIUS authentication, and configure the restrict option on interface ge-0/0/20, so that only MAC RADIUS authentication is used:

```
[edit]
user@switch# set protocols dot1x authenticator interface ge-0/0/19 mac-radius
user@switch# set protocols dot1x authenticator interface ge-0/0/20 mac-radius restrict
```

2. On the RADIUS server, configure the MAC addresses 00040ffdacfe and 0004aecd235f as usernames and passwords:

```
[root@freeradius]#
edit /etc/raddb
vi users
00040ffdacfe Auth-type:=EAP, User-Password = "00040ffdacfe"
0004aecd235f Auth-type:=EAP, User-Password = "0004aecd235f"
```

Results Display the results of the configuration on the switch:

```
user@switch> show configuration
protocols {
  dot1x {
    authenticator {
      authentication-profile-name profile52;
    }
    interface {
      ge-0/0/19.0 {
        mac-radius;
      }
      ge-0/0/20.0 {
        mac-radius {
          restrict;
        }
      }
    }
  }
}
```

Verification

Verify that the supplicants are authenticated:

- [Verifying That the Supplicants Are Authenticated on page 506](#)

Verifying That the Supplicants Are Authenticated

Purpose After supplicants are configured for MAC RADIUS authentication on the switch and on the RADIUS server, verify that they are authenticated and display the method of authentication.

Action Display information about the 802.1X-configured interfaces ge-0/0/19 and ge-0/0/20:

```
user@switch> show dot1x interface ge-0/0/19.0 detail
```

```
ge-0/0/19.0
  Role: Authenticator
  Administrative state: Auto
  Supplicant mode: Single
  Number of retries: 3
  Quiet period: 60 seconds
  Transmit period: 30 seconds
  Mac Radius: Enabled
  Mac Radius Restrict: Disabled
  Reauthentication: Enabled
  Configured Reauthentication interval: 3600 seconds
  Supplicant timeout: 30 seconds
  Server timeout: 30 seconds
  Maximum EAPOL requests: 2
  Guest VLAN member: <not configured>
  Number of connected supplicants: 1
    Supplicant: user101, 00:04:0f:fd:ac:fe
      Operational state: Authenticated
      Authentication method: Radius
      Authenticated VLAN: vo11
      Dynamic Filter: match source-dot1q-tag 10 action deny
      Session Reauth interval: 60 seconds
      Reauthentication due in 50 seconds
```

```
user@switch> show dot1x interface ge-0/0/20.0 detail
```

```
ge-0/0/20.0
  Role: Authenticator
  Administrative state: Auto
  Supplicant mode: Single
  Number of retries: 3
  Quiet period: 60 seconds
  Transmit period: 30 seconds
  Mac Radius: Enabled
  Mac Radius Restrict: Enabled
  Reauthentication: Enabled
  Configured Reauthentication interval: 3600 seconds
  Supplicant timeout: 30 seconds
  Server timeout: 30 seconds
  Maximum EAPOL requests: 2
  Guest VLAN member: <not configured>
  Number of connected supplicants: 1
    Supplicant: user102, 00:04:ae:cd:23:5f
      Operational state: Authenticated
      Authentication method: Radius
      Authenticated VLAN: vo11
      Dynamic Filter: match source-dot1q-tag 10 action deny
      Session Reauth interval: 60 seconds
      Reauthentication due in 50 seconds
```

Meaning The sample output from the `show dot1x interface detail` command displays the MAC address of the connected end device in the **Supplicant** field. On interface ge-0/0/19, the MAC address is **00:04:0f:fd:ac:fe**, which is the MAC address of the first printer configured for MAC RADIUS authentication. The **Authentication method** field displays the

authentication method as **Radius**. On interface **ge-0/0/20**, the MAC address is **00:04:ae:cd:23:5f**, which is the MAC address of the second printer configured for MAC RADIUS authentication. The **Authentication method** field displays the authentication method as **Radius**.

**Related
Documentation**

- [Configuring MAC RADIUS Authentication \(CLI Procedure\) on page 501](#)
- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)
- [Configuring 802.1X Authentication \(J-Web Procedure\) on page 358](#)
- [Understanding Authentication on Switches on page 348](#)

Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication (CLI Procedure)

You can configure a static MAC bypass list (sometimes called the exclusion list) on the switch to specify MAC addresses of devices allowed access to the LAN without 802.1X or MAC RADIUS authentication requests to the RADIUS server.

To configure the static MAC bypass list:

- Specify a MAC address to bypass authentication:

```
[edit protocols dot1x]  
user@switch# set authenticator static 00:04:0f:fd:ac:fe
```

- Configure a supplicant to bypass authentication if it is connected through a particular interface:

```
[edit protocols dot1x]  
user@switch# set authenticator static 00:04:0f:fd:ac:fe interface ge-0/0/5
```

- Configure a supplicant to be moved to a specific VLAN after it is authenticated:

```
[edit protocols dot1x]  
user@switch# set authenticator static 00:04:0f:fd:ac:fe interface ge-0/0/5 vlan-assignment  
default-vlan
```

**Related
Documentation**

- [Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch on page 509](#)
- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)
- [Configuring 802.1X Authentication \(J-Web Procedure\) on page 358](#)

Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch

To allow devices to access your LAN through 802.1X-configured interfaces without authentication, you can configure a static MAC bypass list on the EX Series switch. The static MAC bypass list, also known as the *exclusion list*, specifies MAC addresses that are allowed on the switch without sending a request to an authentication server.

You can use static MAC bypass of authentication to allow connection for devices that are not 802.1X-enabled, such as printers. If a host's MAC address is compared and matched against the static MAC address list, the nonresponsive host is authenticated and an interface opened for it.

This example describes how to configure static MAC bypass of authentication for two printers:

- [Requirements on page 509](#)
- [Overview and Topology on page 510](#)
- [Configuration on page 511](#)
- [Verification on page 512](#)

Requirements

This example uses the following software and hardware components:



NOTE: This example also applies to QFX5100 switches.

- Junos OS Release 9.0 or later for EX Series switches
- One EX Series switch acting as an authenticator port access entity (PAE). The ports on the authenticator PAE form a control gate that blocks all traffic to and from supplicants until they are authenticated.

Before you configure static MAC bypass of authentication, be sure you have:

- Performed basic bridging and VLAN configuration on the switch. See the documentation that describes setting up basic bridging and a VLAN for your switch. If you are using a switch that supports the Enhanced Layer 2 Software (ELS) configuration style, see *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch with ELS Support* or *Example: Setting Up Basic Bridging and a VLAN on Switches*. For all other switches, see *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch*.

For more about ELS, see: *Using the Enhanced Layer 2 Software CLI*.

- Specified the RADIUS server connections and configured an access profile on the switch. See “[Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch](#)” on page 378.

Overview and Topology

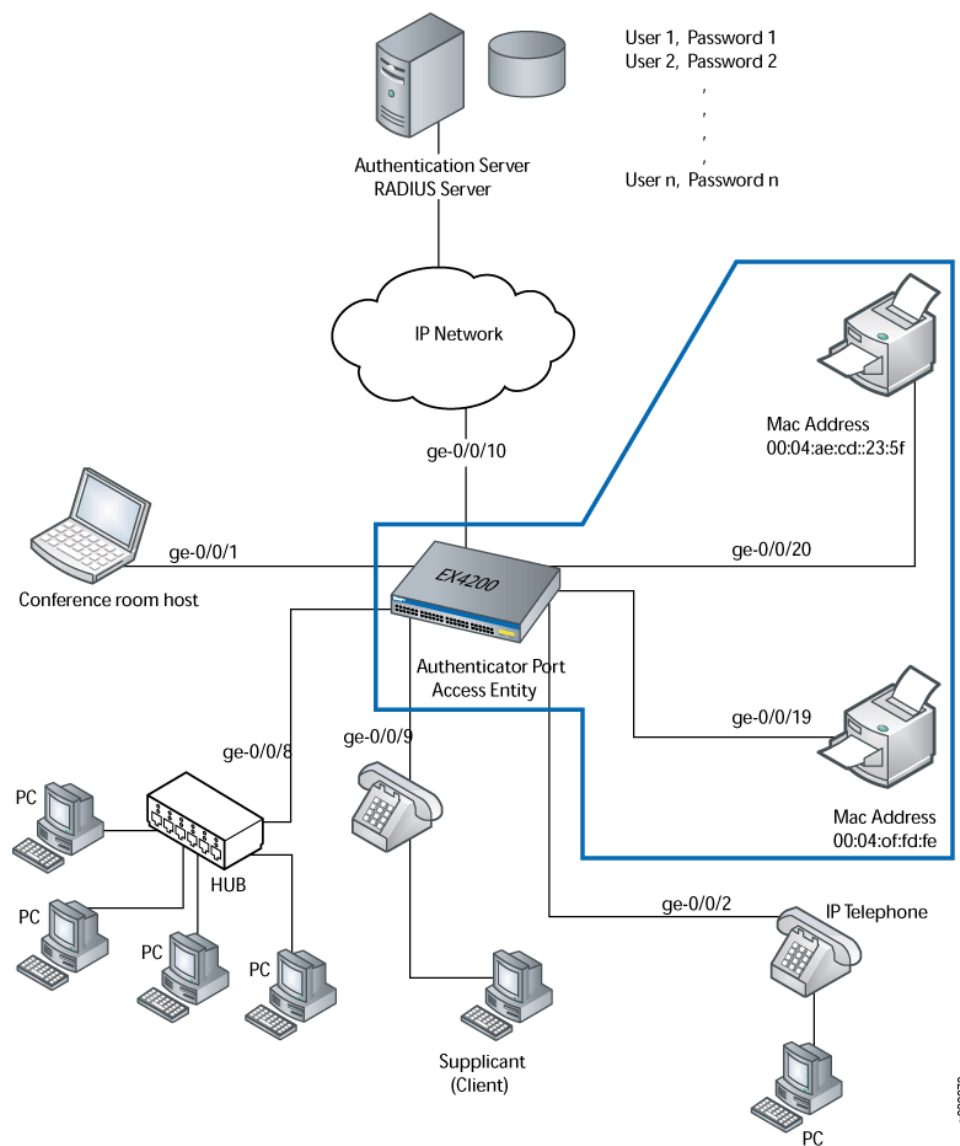
To permit printers access to the LAN, add them to the static MAC bypass list. The MAC addresses on this list are permitted access without authentication from the RADIUS server.

Figure 26 on page 510 shows the two printers connected to the EX4200.



NOTE: This figure also applies to QFX5100 switches.

Figure 26: Topology for Static MAC Bypass of Authentication Configuration



The interfaces shown in [Table 42 on page 511](#) will be configured for static MAC bypass of authentication.

Table 42: Components of the Static MAC Bypass of Authentication Configuration Topology

Property	Settings
Switch hardware	EX4200, 24 Gigabit Ethernet ports: 16 non-PoE ports and 8 PoE ports (ge-0/0/0 through ge-0/0/23)
VLAN name	default
Connections to integrated printer/fax/copier machines (no PoE required)	ge-0/0/19, MAC address 00:04:0f:fd:ac:fe ge-0/0/20, MAC address 00:04:ae:cd:23:5f

The printer with the MAC address 00:04:0f:fd:ac:fe is connected to access interface **ge-0/0/19**. A second printer with the MAC address 00:04:ae:cd:23:5f is connected to access interface **ge-0/0/20**. Both printers will be added to the static list and bypass 802.1X authentication.

Configuration

CLI Quick Configuration To quickly configure the static MAC bypass list, copy the following commands and paste them into the switch terminal window:

```
[edit]
set protocols dot1x authenticator static [00:04:0f:fd:ac:fe 00:04:ae:cd:23:5f]
set protocols dot1x authenticator interface all supplicant multiple
set protocols dot1x authenticator authentication-profile-name profile1
```

Step-by-Step Procedure Configure the static MAC bypass list:

1. Configure MAC addresses **00:04:0f:fd:ac:fe** and **00:04:ae:cd:23:5f** as static MAC addresses:

```
[edit protocols]
user@switch# set dot1x authenticator static [00:04:0f:fd:ac:fe 00:04:ae:cd:23:5f]
```

2. Configure the 802.1X authentication method:

```
[edit protocols]
user@switch# set dot1x authenticator interface all supplicant multiple
```

3. Configure the authentication profile name (access profile name) to use for authentication:

```
[edit protocols]
user@switch# set dot1x authenticator authentication-profile-name profile1
```



NOTE: Access profile configuration is required only for 802.1X clients, not for static MAC clients.

Results Display the results of the configuration:

```
user@switch> show
interfaces {
  ge-0/0/19 {
    unit 0 {
      family ethernet-switching {
        vlan members default;
      }
    }
  }
  ge-0/0/20 {
    unit 0 {
      family ethernet-switching {
        vlan members default;
      }
    }
  }
}
protocols {
  dot1x {
    authenticator {
      authentication-profile-name profile1
      static [00:04:0f:fd:ac:fe 00:04:ae:cd:23:5f];
      interface {
        all {
          supplicant multiple;
        }
      }
    }
  }
}
```

Verification

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

- [Verifying Static MAC Bypass of Authentication on page 512](#)

Verifying Static MAC Bypass of Authentication

Purpose Verify that the MAC addresses of both printers are configured and associated with the correct interfaces.

Action Issue the operational mode command:

```
user@switch> show dot1x static-mac-address
```

MAC address	VLAN-Assignment	Interface
00:04:0f:fd:ac:fe	default	ge-0/0/19.0
00:04:ae:cd:23:5f	default	ge-0/0/20.0

Meaning The output field **MAC address** shows the MAC addresses of the two printers.

The output field **Interface** shows that the MAC address **00:04:0f:fd:ac:fe** can connect to the LAN through interface **ge-0/0/19.0** and that the MAC address **00:04:ae:cd:23:5f** can connect to the LAN through interface **ge-0/0/20.0**.

Related Documentation

- [Configuring 802.1X Authentication \(J-Web Procedure\) on page 358](#)
- [Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication \(CLI Procedure\) on page 508](#)
- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)
- [Understanding Authentication on Switches on page 348](#)

Configuring MS-CHAPv2 to Provide Password-Change Support (CLI Procedure)

Junos OS for EX Series switches enables you to configure the Microsoft Corporation implementation of the Challenge Handshake Authentication Protocol version 2 (MS-CHAPv2) on the switch to provide password-change support. Configuring MS-CHAPv2 on the switch provides users accessing a switch the option of changing the password when the password expires, is reset, or is configured to be changed at next login.

See RFC 2433, *Microsoft PPP CHAP Extensions*, for information about MS-CHAP.

Before you configure MS-CHAPv2 to provide password-change support, ensure that you have:

- Configured RADIUS server authentication. Configure users on the authentication server and set the first-tried option in the authentication order to radius. See [“Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch” on page 378](#).

To configure MS-CHAPv2, specify the following:

```
[edit system radius-options]
user@switch# set password-protocol mschap-v2
```

You must have the required access permission on the switch in order to change your password.

- Related Documentation**
- [Managing Users \(J-Web Procedure\) on page 103](#)
 - For more about configuring user access, see the [Junos OS Access Privilege Configuration Guide](#).

Configuring Flexible Authentication Order

You can use the flexible authentication order feature to specify the order of authentication methods that the switch uses when attempting to authenticate a client. If multiple authentication methods are configured on a single interface, when one authentication method fails, the switch falls back to another method.

By default, the switch attempts to authenticate a client by using 802.1X authentication first. If 802.1X authentication fails because there is no response from the client, and MAC RADIUS authentication is configured on the interface, the switch will attempt authentication using MAC RADIUS. If MAC RADIUS fails, and captive portal is configured on the interface, the switch attempts authentication using captive portal.

With a flexible authentication order, the sequence of authentication method used can be changed based on the type of clients connected to the interface. You can configure the **authentication-order** statement to specify whether 802.1X authentication or MAC RADIUS authentication must be the first authentication method tried. Captive portal is always the last authentication method tried.

If MAC RADIUS authentication is configured as the first authentication method in the order, then on receiving data from any client, the switch attempts to authenticate the client by using MAC RADIUS authentication. If MAC RADIUS authentication fails, then the switch uses 802.1X authentication to authenticate the client. If 802.1X authentication fails, and captive portal is configured on the interface, the switch attempts authentication using captive portal.



NOTE: If 802.1X authentication and MAC RADIUS authentication fail, and captive portal is not configured on the interface, the client is denied access to the LAN unless a server fail fallback method is configured. See [“Configuring RADIUS Server Fail Fallback \(CLI Procedure\)” on page 437](#) for more information.

Different authentication methods can be used in parallel on an interface that is configured in multiple-suplicant mode. Therefore, if an end device is authenticated on the interface by using captive portal, another end device connected to that interface can still be authenticated using 802.1X or MAC RADIUS authentication.

Before you configure the flexible authentication order on an interface, make sure that the authentication methods are configured on that interface. The switch does not attempt authentication using a method that is not configured on the interface, even if that method is included in the authentication order; the switch ignores that method and attempts the next method in the authentication order that is enabled on that interface.

Use the following guidelines when configuring the **authentication-order** statement:

- The authentication order must include at least two methods of authentication.
- 802.1X authentication must be one of the methods included in the authentication order.
- If captive portal is included in the authentication order, it must be the last method in the order.
- If **mac-radius-restrict** is configured on an interface then the authentication order cannot be configured on that interface.

To configure a flexible authentication order, use one of the following valid combinations:



NOTE: The authentication order can be configured globally using the **interface all** option as well as locally using the individual interface name. If the authentication order is configured both for an individual interface and for all interfaces, the local configuration for that interface overrides the global configuration.

- To configure 802.1X authentication as the first authentication method, followed by MAC RADIUS authentication, and then captive portal:

```
[edit]
user@switch# set protocols dot1x authenticator interface interface-name authentication-order
[dot1x mac-radius captive-portal]
```

- To configure 802.1X authentication as the first authentication method, followed by captive portal:

```
[edit]
user@switch# set protocols dot1x authenticator interface interface-name authentication-order
[dot1x captive-portal]
```

- To configure 802.1X authentication as the first authentication method, followed by MAC RADIUS authentication:

```
[edit]
user@switch# set protocols dot1x authenticator interface interface-name authentication-order
[dot1x mac-radius]
```

- To configure MAC RADIUS authentication as the first authentication method, followed by 802.1X, followed by captive portal:

```
[edit]
user@switch# set protocols dot1x authenticator interface interface-name authentication-order
[mac-radius dot1x captive-portal]
```

After you configure the authentication order, you must use the **insert** command to make any modifications to the authentication order. Using the **set** command does not change the configured order.

To change the authentication order after initial configuration:

```
[edit]
user@switch# insert protocols dot1x authenticator interface interface-name authentication-order
authentication-method before authentication-method
```

For example, to change the order from [mac-radius dot1x captive portal] to [dot1x mac-radius captive portal]:

```
[edit]
user@switch# insert protocols dot1x authenticator interface interface-name authentication-order
dot1x before mac-radius
```

**Related
Documentation**

- [Understanding Authentication on Switches on page 348](#)
- [Example: Configuring MAC RADIUS Authentication on an EX Series Switch on page 502](#)

Understanding Authentication Session Timeout

Information about authentication sessions—including the associated interfaces and VLANs for each MAC address that is authenticated—is stored in the authentication session table. The authentication session table is tied to the Ethernet switching table (also called the MAC table). Each time the switch detects traffic from a MAC address, it updates the timestamp for that network node in the Ethernet switching table. A timer on the switch periodically checks the timestamp and if its value exceeds the user-configured **mac-table-aging-time** value, the MAC address is removed from the Ethernet switching table. When a MAC address ages out of the Ethernet switching table, the entry for that MAC address is also removed from the authentication session table, with the result that the session ends.

When the authentication session ends due to MAC address aging, the host must re-attempt authentication. To limit the downtime resulting from re-authentication, you can control the timeout of authentication sessions in the following ways:

- For 802.1X and MAC RADIUS authentication sessions, disassociate the authentication session table from the Ethernet switching table by using the **no-mac-table-binding** statement. This setting prevents the termination of the authentication session when the associated MAC address ages out of the Ethernet switching table.
- For captive portal authentication sessions, configure a keep-alive timer using the **user-keepalive** statement. With this option configured, when the associated MAC address ages out of the Ethernet switching table, the keep-alive timer is started. If traffic is received within the keep-alive timeout period, the timer is deleted. If there is no traffic within the keep-alive timeout period, the session is deleted.

You can also specify timeout values for authentication sessions to end the session before the MAC aging timer expires. After the session times out, the host must re-attempt authentication.

- For 802.1X and MAC RADIUS authentication sessions, the duration of the session before timeout depends on the value of the **reauthentication** statement. If the MAC aging

timer expires before the session times out, and the **no-mac-table-binding** statement is not configured, the session is ended, and the host must re-authenticate.

- For captive portal authentication sessions, the duration of the session depends on the value configured for the **session-expiry** statement. If the MAC aging timer expires before the session times out, and the **user-keepalive** statement is not configured, the session is ended, and the host must re-authenticate.



NOTE: If the authentication server sends an authentication session timeout to the client, this takes priority over the value configured locally using either the **reauthentication** statement of the **session-expiry** statement. The session timeout value is sent from the server to the client as an attribute of the RADIUS Access-Accept message. For information about configuring the authentication server to send an authentication session timeout, see the documentation for your server.

Related Documentation

- [Understanding Authentication on Switches on page 348](#)
- [Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch on page 367](#)
- [Controlling Authentication Session Timeouts \(CLI Procedure\) on page 517](#)
- [Configuring MAC Table Aging on Switches](#)

Controlling Authentication Session Timeouts (CLI Procedure)

The expiration of an authentication session can result in downtime because the host must re-attempt authentication. You can limit this downtime by controlling the timeout period for authentication sessions.

An authentication session can end when the MAC address associated with the authenticated host ages out of the Ethernet switching table. When the MAC address is cleared from the Ethernet switching table, the authenticated session for that host ends, and the host must re-attempt authentication.

To prevent the authentication session from ending when the MAC address ages out of the Ethernet switching table:

- For sessions authenticated using 802.1X or MAC RADIUS authentication, you can prevent authentication session timeouts due to MAC address aging by disassociating the authentication session table from the Ethernet switching table using the **no-mac-table-binding** statement:

```
[edit]
user@switch# set protocols dot1x authenticator no-mac-table-binding;
```

- For sessions authenticated using captive portal authentication, you can prevent authentication session timeouts due to MAC address aging by extending the timeout period using the `user-keepalive` statement:

```
[edit]
user@switch# set services captive-portal interface interface-name user-keepalive minutes;
```

You can also configure timeout values for authentication sessions to end an authenticated session before the MAC aging timer expires.



NOTE: Configuring the session timeout for an authentication session does not extend the session after the MAC aging timer expires. You must configure either the `no-mac-table-binding` statement for 802.1X and MAC RADIUS authentication, or the `user-keepalive` statement for captive portal authentication, to prevent session timeout due to MAC aging.

For 802.1X and MAC RADIUS authentication sessions, configure the timeout value using the `reauthentication` statement.

- To configure the timeout value on a single interface:

```
[edit]
user@switch# set protocols dot1x authenticator interface interface-name reauthentication seconds;
```

- To configure the timeout value on all interfaces:

```
[edit]
user@switch# set protocols dot1x authenticator interface all reauthentication seconds;
```

For captive portal authentication sessions, configure the timeout value using the `session-expiry` statement.

- To configure the timeout value on a single interface:

```
[edit]
user@switch# set services captive-portal interface interface-name session-expiry minutes;
```

- To configure the timeout value on all interfaces:

```
[edit]
user@switch# set services captive-portal interface all session-expiry minutes;
```



NOTE: If the authentication server sends an authentication session timeout to the client, this takes priority over the value configured using the `reauthentication` statement or the `session-expiry` statement. The session timeout value is sent from the server to the client as an attribute of the RADIUS Access-Accept message.

- Related Documentation**
- [Configuring MAC Table Aging on Switches](#)
 - [Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch on page 367](#)
 - [Understanding Authentication on Switches on page 348](#)
 - [Understanding Authentication Session Timeout on page 516](#)

Configuring an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control (CLI Procedure)

You can connect the switch to Junos Pulse Access Control Service to set up a centralized, end-to-end network access control (NAC) system, which allows you to control who is admitted to the network and what resources those users are allowed to access.

The Access Control Service functions both as an *authentication server* (RADIUS server) and as a *centralized policy management server*.

Before you begin configuring the switch to connect to the Access Control Service:

- Configure a resource access policy.
- Obtain the password of the Access Control Service.
- Obtain the IP address of the Access Control Service.



NOTE: Specify the same IP address for the authentication server, the RADIUS server, and the infranet controller (NAC device). These components refer to the same Access Control Service.

To configure the switch to work with the Access Control Service:

1. Configure the switch to use the Access Control Service for authentication and authorization:

```
[edit ethernet-switching-options]
user@switch# set uac-policy
```

2. Configure the access profile to specify the Access Control Service. The access profile contains the authentication and authorization configuration that aids in handling authentication and authorization requests, including the authentication method and sequence, and the Access Control Service address:

- a. Configure **radius** as the authentication method to be used when attempting to authenticate a user. For each login attempt, the software tries the authentication methods in order, starting with the first one, until the password matches:

```
[edit access profile]
user@switch# set profile-name authentication-order radius
```

- b. Specify the IP address of the authentication server:



NOTE: Specify the same IP address that you use for the RADIUS server and the NAC device.

```
[edit access profile]
user@switch# set profile-name radius authentication-server ip-address
```

3. Configure the RADIUS server to use the same IP address that you specified for the authentication server:

```
[edit access]
user@switch# set radius-server ip-address
```

4. Configure the password to use for connecting the switch with the RADIUS server:



NOTE: The password specified here is used for RADIUS communications between the switch and the Access Control Service. It does not need to match the password that is specified on the Access Control Service through the administrative interface on the Access Control Service.

```
[edit access]
user@switch# set radius-server secret password
```

5. Configure the address of the Access Control Service MAG Series or the IC Series NAC device:



NOTE: Specify the hostname and IP address of the NAC device. This is the same IP address that you used for specifying the authentication server.

```
[edit services united-access-control infranet-controller hostname]
user@switch# set address ip-address
```

6. Configure the switch's management Ethernet interface for the NAC device:

```
[edit services united-access-control infranet-controller hostname]
user@switch# set interface me0.0
```

7. Configure the password for connecting the switch to the Access Control Service NAC device:



NOTE: This password must match the password specified on the Access Control Service through its administrative interface. It is used for Junos UAC Enforcer Protocol (JUEP) communications between the switch and the Access Control Service.

```
[edit services united-access-control infranet-controller hostname]
user@switch# set password password
```

8. Configure the amount of time that switch waits to receive a response from the Access Control Service:

```
[edit services united-access-control]
user@switch# set timeout seconds
```

9. Specify the time between continuity-check messages for the switch's connection with the Access Control Service:

```
[edit services united-access-control]
user@switch# set interval seconds
```

10. Specify an action for the switch to take if a timeout occurs for the connection between the switch and the Access Control Service:

```
[edit services united-access-control]
user@switch# set timeout-action action
```

11. Specify the name of the access profile to use for 802.1X, MAC RADIUS, or captive portal authentication:



NOTE: Use the same access profile that you configured previously (step 2).

```
[edit protocols dot1x]
user@switch# set authenticator authentication-profile-name profile-name
```

12. Configure the 802.1X interface that the switch will use for communicating with the Access Control Service:

```
[edit protocols dot1x]
user@switch# set authenticator interface interface-name
```

Related Documentation

- [Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service \(CLI Procedure\) on page 522](#)
- [Understanding Centralized Network Access Control and EX Series Switches on page 545](#)

Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service (CLI Procedure)

If you have connected the EX Series switch to the Junos Pulse Access Control Service and you want to use the captive portal user authentication feature, configure the Access Control Service network access control (NAC) device as an external captive portal server. The captive portal feature is required only for user authentication. Unmanaged devices, such as printers or phones, can be authenticated through 802.1X and MAC address authentication.

When users try to access a protected network resource that is connected to the switch, the user must first sign in to the Access Control Service for authentication and endpoint security checking. The captive portal redirects the user to a login page located on the Access Control Service.

When the sign-in page for the Access Control Service is displayed, the user signs in and the Access Control Service examines the endpoint for compliance with security policies. If the endpoint passes the security check, access is granted to the protected resource.

Before you begin, be sure you have:

- Configured access between the switch and the Access Control Service. See [“Configuring an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control \(CLI Procedure\)”](#) on page 519.
- Designed your captive portal login page on the Access Control Service.

To configure the switch to use the Access Control Service for captive portal:

1. Configure captive portal to authenticate clients connected to the switch for access to use the authentication profile that directs the client to the Access Control Service:



NOTE: The access profile name specified here must match the access profile name that you specified for the Access Control Service in [“Configuring an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control \(CLI Procedure\)”](#) on page 519.

[edit]

```
user@switch# set services captive-portal authentication-profile-name access-profile-name
```

2. Enable an interface for use with captive portal authentication:

[edit]

```
user@switch# set services captive-portal interface interface-name supplicant multiple
```

3. (Optional) Specify which clients are to bypass captive portal authentication:

[edit]

```
user@switch# set ethernet-switching-options authentication-whitelist mac-address
```



NOTE: You can use `set ethernet-switching-options authentication-whitelist mac-address interface interface-name` to limit the scope to the interface.



NOTE: If the client is already attached to the switch, you must clear its MAC address from captive portal authentication by using the `clear captive-portal mac-address mac-address` command after adding its MAC address to the authentication whitelist. Otherwise the new entry for the MAC address will not be added to the Ethernet switching table and the authentication bypass will not be allowed.

**Related
Documentation**

- [Understanding Centralized Network Access Control and EX Series Switches on page 545](#)
- [Understanding Authentication on Switches on page 348](#)

CHAPTER 18

Configuring NetBIOS Snooping EX Series Switches

- [Understanding NetBIOS Snooping on page 525](#)
- [Configuring NetBIOS Snooping \(CLI Procedure\) on page 526](#)

Understanding NetBIOS Snooping

NetBIOS snooping allows Juniper Networks EX Series Ethernet Switches to discover NetBIOS hosts that are connected to the switch.

- [What Is a NetBIOS Name? on page 525](#)
- [How NetBIOS Snooping Works on page 525](#)

What Is a NetBIOS Name?

A NetBIOS name is a key element in communications between NetBIOS resources. A NetBIOS name identifies a NetBIOS resource on the network. A NetBIOS name is either a unique (exclusive) name or a group (nonexclusive) name. When a NetBIOS resource communicates with one other NetBIOS resource, a unique name is used in that communication. When a NetBIOS resource communicates with multiple resources, a group name is used.

The NetBIOS name of each NetBIOS resource is stored on the NetBIOS Name Server (NBNS). The NetBIOS name of a NetBIOS resource is mapped to its IP address.

A NetBIOS name is a 16-byte address. The first 15 bytes contain the name and the last byte contains the name type.

The NetBIOS name service is supported over UDP port 137.

How NetBIOS Snooping Works

You can enable NetBIOS snooping on the switch so that the switch can identify NetBIOS resources that are connected to it.

When a host connected to the switch initializes itself, it attempts to register its NetBIOS name by sending a NetBIOS name registration request message. The host can opt for either a unique or a group NetBIOS name. For a unique NetBIOS name, the host either broadcasts a NetBIOS name query message on the local network or unicasts it to the

NBNS to check whether the requested name is already being used by another host. If so, the host that previously registered the name or the NBNS responds with a negative name registration response. If the host receives no negative response, it broadcasts the NetBIOS name registration packet to confirm the name. For a NetBIOS group name, the host sends a NetBIOS name registration packet, which generates no responses from other hosts because multiple hosts can use the same group name at the same time.

The NetBIOS snooping-enabled switch extracts the host details from the NetBIOS name registration packet and stores the details in the LLDP neighbor database.

**Related
Documentation**

- [Configuring NetBIOS Snooping \(CLI Procedure\) on page 526](#)
- [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)

Configuring NetBIOS Snooping (CLI Procedure)

NetBIOS snooping enables an EX Series switch to learn information about NetBIOS hosts that are connected to the switch.

This topic describes:

- [Enabling NetBIOS Snooping on page 526](#)
- [Disabling NetBIOS Snooping on page 526](#)

Enabling NetBIOS Snooping

To enable NetBIOS snooping:

```
[edit protocols lldp]  
user@switch# set netbios-snooping
```

Disabling NetBIOS Snooping

To disable NetBIOS snooping:

```
[edit protocols lldp]  
user@switch# delete netbios-snooping
```

**Related
Documentation**

- [show lldp neighbors on page 2123](#)
- [Understanding NetBIOS Snooping on page 525](#)

CHAPTER 19

Configuring Captive Portal Authentication to Control Network Access on EX Series Switches

- [Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527](#)
- [Configuring Captive Portal Authentication \(CLI Procedure\) on page 532](#)
- [Designing a Captive Portal Authentication Login Page on Switches on page 535](#)
- [Configuring Captive Portal Authentication \(CLI Procedure\) on an EX Series Switch with ELS Support on page 537](#)
- [Example: Setting Up Captive Portal Authentication on an EX Series Switch with ELS Support on page 539](#)

Example: Setting Up Captive Portal Authentication on an EX Series Switch

You can set up captive portal authentication (hereafter referred to as captive portal) on a switch to redirect Web browser requests to a login page that requires the user to input a username and password. Upon successful authentication, the user is allowed to continue with the original page request and subsequent access to the network.

This example describes how to set up captive portal on an EX Series switch:

- [Requirements on page 527](#)
- [Overview and Topology on page 528](#)
- [Configuration on page 528](#)
- [Verification on page 531](#)
- [Troubleshooting on page 532](#)

Requirements

This example uses the following hardware and software components:

- An EX Series switch that supports captive portal
- Junos OS Release 10.1 or later for EX Series switches

Before you begin, be sure you have:

- Performed basic bridging and VLAN configuration on the switch. See *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch*.
- Generated an SSL certificate and installed it on the switch. See [“Generating SSL Certificates to Be Used for Secure Web Access \(EX Series Switch\)”](#) on page 331.
- Designed your captive portal login page. See [“Designing a Captive Portal Authentication Login Page on Switches”](#) on page 535.

Overview and Topology

This example shows the configuration required on the switch to enable captive portal on an interface. To permit a printer connected to the captive portal interface to access the LAN without going through captive portal, add its MAC address to the authentication whitelist. The MAC addresses in this list are permitted access on the interface without captive portal.

The topology for this example consists of one EX Series switch connected to a RADIUS authentication server. One interface on the switch is configured for captive portal. In this example, the interface is configured in multiple supplicant mode.

Configuration

To configure captive portal on your switch:

CLI Quick Configuration

To quickly configure captive portal on the switch after completing the tasks in the Requirements section, copy the following commands and paste them into the switch terminal window:

```
[edit]
set access radius-server 10.204.96.165 port 1812
set access radius-server 10.204.96.165 secret "ABC123"
set access profile profile1 authentication-order radius
set access profile profile1 radius authentication-server 10.204.96.165
set system services web-management http
set system services web-management https local-certificate my-signed-cert
set services captive-portal secure-authentication https
set services captive-portal interface ge-0/0/10.0 supplicant multiple
set services captive-portal authentication-profile-name profile1
set ethernet-switching-options authentication-whitelist 00:10:12:e0:28:22
set services captive-portal custom-options post-authentication-url
http://www.my-home-page.com
```

Step-by-Step Procedure

To configure captive portal on the switch:

1. Define the server IP address, the server authentication port number, and configure the secret password. The secret password on the switch must match the secret password on the server:

```
[edit]
user@switch# set access radius-server 10.204.96.165 port 1812
[edit]
user@switch# set access radius-server 10.204.96.165 secret "ABC123"
```

2. Configure the authentication order, making **radius** the first method of authentication:

```
[edit]
user@switch# set access profile profile1 authentication-order radius
```

3. Configure the server IP address to be tried in order to authenticate the supplicant:

```
[edit]
user@switch# set access profile profile1 radius authentication-server 10.204.96.165
```

4. Enable HTTP access on the switch:

```
[edit]
user@switch# set system services web-management http
```

5. To create a secure channel for Web access to the switch, configure captive portal for HTTPS:



NOTE: You can enable HTTP without enabling HTTPS, but we recommend HTTPS for security purposes.

- a. Associate the security certificate with the Web server and enable HTTPS access on the switch:

```
[edit]
user@switch# set system services web-management https local-certificate my-signed-cert
```

- b. Configure captive portal to use HTTPS:

```
[edit]
user@switch# set services captive-portal secure-authentication https
```

6. Enable an interface for captive portal:

```
[edit]
user@switch# set services captive-portal interface ge-0/0/10 supplicant multiple
```

7. Specify the name of the access profile to be used for captive portal authentication:

```
[edit]
user@switch# set services captive-portal authentication-profile-name profile1
```

8. (Optional) Allow specific clients to bypass captive portal:



NOTE: If the client is already attached to the switch, you must clear its MAC address from the captive portal authentication by using the `clear captive-portal mac-address mac-address` command after adding its MAC address to the whitelist. Otherwise the new entry for the MAC address will not be added to the Ethernet switching table and authentication bypass will not be allowed.

[edit]

```
user@switch# set ethernet-switching-options authentication-whitelist 00:10:12:e0:28:22
```



NOTE: Optionally, you can use `set ethernet-switching-options authentication-whitelist 00:10:12:e0:28:22 interface ge-0/0/10.0` to limit the scope to the interface.

9. (Optional) To redirect clients to a specified page rather than the page they originally requested, configure the post-authentication URL:

[edit]

```
user@switch# set services captive-portal custom-options post-authentication-url
http://www.my-home-page.com
```

Results Display the results of the configuration:

```
[edit]
user@switch> show
system {
  services {
    web-management {
      http;
      https {
        local-certificate my-signed-cert;
      }
    }
  }
}
security {
  certificates {
    local {
      my-signed-cert {
        "-----BEGIN RSA PRIVATE KEY-----ABC123
        ...
        ABC123-----END CERTIFICATE-----\n"; ## SECRET-DATA
      }
    }
  }
}
```

```

    }
  }
}
services {
  captive-portal {
    interface {
      ge-0/0/10.0 {
        supplicant multiple;
      }
    }
    secure-authentication https;
  }
}
ethernet-switching-options {
  authentication-whitelist {
    00:10:12:e0:28:22/48;
  }
}
}

```

Verification

To confirm that captive portal is configured and working properly, perform these tasks:

- [Verifying That Captive Portal Is Enabled on the Interface on page 531](#)
- [Verify That Captive Portal Is Working Correctly on page 531](#)

Verifying That Captive Portal Is Enabled on the Interface

Purpose Verify that captive portal is configured on interface ge-0/0/10.

Action Use the operational mode command **show captive-portal interface *interface-name* detail**:

```

user@switch> show captive-portal interface ge-0/0/10.0 detail
ge-0/0/10.0
  Supplicant mode: Multiple
  Number of retries: 3
  Quiet period: 60 seconds
  Configured CP session timeout: 3600 seconds
  Server timeout: 15 seconds

```

Meaning The output confirms that captive portal is configured on interface ge-0/0/10 with the default settings for number of retries, quiet period, CP session timeout, and server timeout.

Verify That Captive Portal Is Working Correctly

Purpose Verify that captive portal is working on the switch.

- Action** Connect a client to interface ge-0/0/10. From the client, open a Web browser and request a webpage. The captive portal login page that you designed should be displayed. After you enter your login information and are authenticated against the RADIUS server, the Web browser should display either the page you requested or the post-authentication URL that you configured.

Troubleshooting

To troubleshoot captive portal, perform these tasks:

- [Troubleshooting Captive Portal on page 532](#)

Troubleshooting Captive Portal

- Problem** The switch does not return the captive portal login page when a user connected to a captive portal interface on the switch requests a Web page.

- Solution** You can examine the ARP, DHCP, HTTPS, and DNS counters—if one or more of these counters are not incrementing, this provides an indication of where the problem lies. For example, if the client cannot get an IP address, check the switch interface to determine whether the DHCP counter is incrementing—if the counter increments, the DHCP packet was received by the switch.

```
user@switch> show captive-portal firewall ge-0/0/10.0
```

```
ge-0/0/10.0
  Filter name: dot1x_ge-0/0/10
Counters:
Name                               Bytes      Packets
dot1x_ge-0/0/10_CP_arp             7616       119
dot1x_ge-0/0/10_CP_dhcp              0           0
dot1x_ge-0/0/10_CP_http              0           0
dot1x_ge-0/0/10_CP_https              0           0
dot1x_ge-0/0/10_CP_t_dns              0           0
dot1x_ge-0/0/10_CP_u_dns              0           0
```

- Related Documentation**
- [Configuring Captive Portal Authentication \(CLI Procedure\) on page 532](#)
 - [Designing a Captive Portal Authentication Login Page on Switches on page 535](#)

Configuring Captive Portal Authentication (CLI Procedure)

Configure captive portal authentication (hereafter referred to as captive portal) on an EX Series switch so that users connected to the switch are authenticated before being allowed to access the network. When the user requests a webpage, a login page is displayed that requires the user to input a username and password. Upon successful authentication, the user is allowed to continue with the original page request and subsequent access to the network.

Before you begin, be sure you have:

- Performed basic bridging and VLAN configuration on the switch. See *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch*.
- Generated an SSL certificate and installed it on the switch. See “[Generating SSL Certificates to Be Used for Secure Web Access \(EX Series Switch\)](#)” on page 331.
- Configured basic access between the EX Series switch and the RADIUS server. See “[Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch](#)” on page 378.
- Designed your captive portal login page. See “[Designing a Captive Portal Authentication Login Page on Switches](#)” on page 535.

This topic includes the following tasks:

- [Configuring Secure Access for Captive Portal on page 533](#)
- [Enabling an Interface for Captive Portal on page 533](#)
- [Configuring Bypass of Captive Portal Authentication on page 534](#)

Configuring Secure Access for Captive Portal

To configure secure access for captive portal:

1. Enable HTTP access on the switch:

```
[edit]
user@switch# set system services web-management http
```

2. Associate the security certificate with the Web server and enable HTTPS access on the switch:

```
[edit]
user@switch# set system services web-management https local-certificate my-signed-cert
```



NOTE: You can enable HTTP without HTTPS, but we recommend HTTPS for security purposes.

3. Configure captive portal to use HTTPS:

```
[edit]
user@switch# set services captive-portal secure-authentication https
```

Enabling an Interface for Captive Portal

To enable an interface for captive portal:

```
[edit]
user@switch# set services captive-portal interface interface-name
```

For example, to enable captive portal on the interface ge-0/0/10:

```
[edit]
user@switch# set services captive-portal interface ge-0/0/10
```

Configuring Bypass of Captive Portal Authentication

To allow specific clients to bypass captive portal:

```
[edit]
user@switch# set ethernet-switching-options authentication-whitelist mac-address
```

For example, to allow specific clients to bypass captive portal:

```
[edit]
user@switch# set ethernet-switching-options authentication-whitelist 00:10:12:e0:28:22
```



NOTE: Optionally, you can use `set ethernet-switching-options authentication-whitelist 00:10:12:e0:28:22 interface ge-0/0/10.0` to limit the scope to the interface.



NOTE: If the client is already attached to the switch, you must clear its MAC address from the captive portal authentication by using the `clear captive-portal mac-address mac-address` command after adding its MAC address to the whitelist. Otherwise the new entry for the MAC address will not be added to the Ethernet switching table and authentication bypass will not be allowed.

Related Documentation

- [Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527](#)
- [Understanding Authentication on Switches on page 348](#)

Designing a Captive Portal Authentication Login Page on Switches

You can set up captive portal authentication on your switch to redirect all Web browser requests to a login page that requires users to input a username and password before they are allowed access. Upon successful authentication, users are allowed access to the network and redirected to the original page requested.

Junos OS provides a customizable template for the captive portal window that allows you to easily design and modify the look of the captive portal login page. You can modify the design elements of the template to change the look of your captive portal login page and to add instructions or information to the page. You can also modify any of the design elements of a captive portal login page.

The first screen displayed before the captive login page requires the user to read the terms and conditions of use. By clicking the Agree button, the user can access the captive portal login page.

Figure 27 on page 535 shows an example of a captive portal login page:

Figure 27: Example of a Captive Portal Login Page

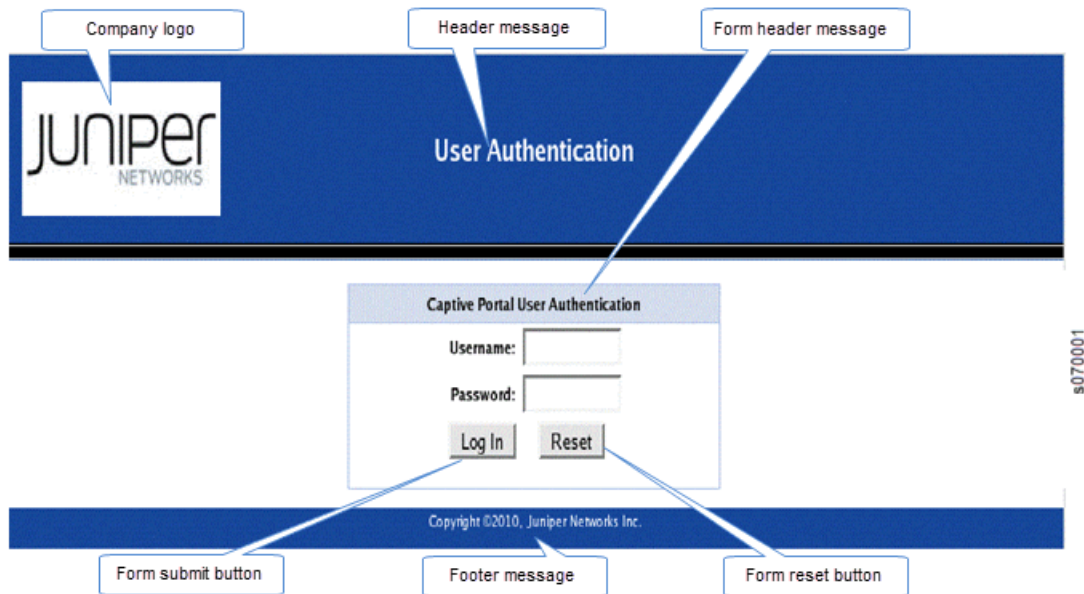


Table 43 on page 535 summarizes the configurable elements of a captive portal login page.

Table 43: Configurable Elements of a Captive Portal Login Page

Element	CLI Statement	Description
Footer background color	footer-bgcolor <i>hex-color</i>	The HTML hexadecimal code for the background color of the captive portal login page footer.

Table 43: Configurable Elements of a Captive Portal Login Page (continued)

Element	CLI Statement	Description
Footer message	footer-message <i>text-string</i>	Text displayed in the footer of the captive portal login page. You can include copyright information, links, and additional information such as help instructions, legal notices, or a privacy policy. The default text shown in the footer is Copyright @2010, Juniper Networks Inc.
Footer text color	footer- text-color <i>color</i>	Color of the text in the footer. The default color is white.
Form header background color	form-header-bgcolor <i>hex-color</i>	The HTML hexadecimal code for the background color of the header bar across the top of the form area of the captive portal login page.
Form header message	form-header-message <i>text-string</i>	Text displayed in the header of the captive portal login page. The default text is Captive Portal User Authentication .
Form header text color	form-header- text- color <i>color</i>	Color of the text in the form header. The default color is black.
Form reset button label	form-reset-label <i>label-name</i>	Using the Reset button, the user can clear the username and password fields on the form.
Form submit button label	form-submit-label <i>label-name</i>	Using the Login button, the user can submit the login information.
Header background color	header-bgcolor <i>hex-color</i>	The HTML hexadecimal code for the background color of the captive portal login page header.
Header logo	header-logo <i>filename</i>	Filename of the file containing the image of the logo that you want to appear in the header of the captive portal login page. The image file can be in GIF, JPEG, or PNG format. You can upload a logo image file to the switch. Copy the logo to the /var/tmp directory on the switch (during commit, the files are saved to persistent locations). If you do not specify a logo image, the Juniper Networks logo is displayed.
Header message	header-message <i>text-string</i>	Text displayed in the page header. The default text is User Authentication .
Header text color	header-text- color <i>color</i>	Color of the text in the header. The default color is white.
Post-authentication URL	post-authentication-url <i>url</i>	URL to which the users are directed on successful authentication. By default, users are directed to the page they had originally requested.

To design the captive portal login page:

1. (Optional) Upload your logo image file to the switch:

```
user@switch> file copy ftp://username:prompt@ftp.hostname.net/var/tmp/my-logo.jpeg
```

2. Configure the custom options to specify the background colors and text displayed in the captive portal page:

```
[edit system services captive-portal]
user@switch# set custom-options header-bgcolor #006600
set custom-options header-message "Welcome to Our Network"
set custom-options banner-message "Please enter your username and password".The banner
displays the message "XXXXXXX" by default. The user can modify this message.
set custom-options footer-message "Copyright ©2010, Our Network"
```

Now you can commit the configuration.



NOTE: For the custom options that you do not specify, the default value is used.

Related Documentation

- [Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527](#)
- [Understanding Authentication on Switches on page 348](#)
- [captive-portal on page 1218](#)

Configuring Captive Portal Authentication (CLI Procedure) on an EX Series Switch with ELS Support



NOTE: This task uses Junos OS for switches with support for the Enhanced Layer 2 Software (ELS) configuration style. If your switch runs software that does not support ELS, see [“Configuring Captive Portal Authentication \(CLI Procedure\)” on page 532](#). For ELS details, see *Using the Enhanced Layer 2 Software CLI*.

Configure captive portal authentication (hereafter referred to as captive portal) on a switch so that users connected to the switch are authenticated before being allowed to access the network. When the user requests a webpage, a login page is displayed that requires the user to input a username and password. Upon successful authentication, the user is allowed to continue with the original page request and subsequent access to the network.

Before you begin, be sure you have:

- Performed basic bridging and VLAN configuration on the switch. See *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch with ELS Support*.
- Generated an SSL certificate and installed it on the switch. See [“Generating SSL Certificates to Be Used for Secure Web Access \(EX Series Switch\)” on page 331](#).

- Configured basic access between the switch and the RADIUS server. See [“Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch”](#) on page 378.
- Designed your captive portal login page. See [“Designing a Captive Portal Authentication Login Page on Switches”](#) on page 535.

This topic includes the following tasks:

- [Configuring Secure Access for Captive Portal](#) on page 538
- [Enabling an Interface for Captive Portal](#) on page 538
- [Configuring Bypass of Captive Portal Authentication](#) on page 538

Configuring Secure Access for Captive Portal

To configure secure access for captive portal:

1. Associate the security certificate with the Web server and enable HTTPS on the switch:

```
[edit]
user@switch# set system services web-management https local-certificate certificate-name
```



NOTE: You can enable HTTP instead of HTTPS, but we recommend HTTPS for security purposes.

2. Configure captive portal to use HTTPS:

```
[edit]
user@switch# set services captive-portal secure-authentication https
```

Enabling an Interface for Captive Portal

To enable an interface for use with captive portal authentication:

```
[edit]
user@switch# set services captive-portal interface interface-name
```

Configuring Bypass of Captive Portal Authentication

You can allow specific clients to bypass captive portal authentication:

```
[edit]
user@switch# set switch-options authentication-whitelist mac-address
```



NOTE: Optionally, you can use `set switch-options authentication-whitelist mac-address interface interface-name` to limit the scope to the interface.



NOTE: If the client is already attached to the switch, you must clear its MAC address from the captive portal authentication by using the `clear captive-portal mac-address session-mac-addr` command after adding its MAC address to the whitelist. Otherwise, the new entry for the MAC address is not added to the Ethernet switching table and the authentication bypass is not allowed.

Related Documentation

- [Example: Setting Up Captive Portal Authentication on an EX Series Switch with ELS Support on page 539](#)
- [Understanding Authentication on Switches on page 348](#)

Example: Setting Up Captive Portal Authentication on an EX Series Switch with ELS Support



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: Setting Up Captive Portal Authentication on an EX Series Switch” on page 527](#). For ELS details, see *Using the Enhanced Layer 2 Software CLI*.

You can set up captive portal authentication (hereafter referred to as captive portal) on a switch to redirect Web browser requests to a login page that requires the user to input a username and password. Upon successful authentication, the user is allowed to continue with the original page request and subsequent access to the network.

This example describes how to set up captive portal on an EX Series switch:

- [Requirements on page 539](#)
- [Overview and Topology on page 540](#)
- [Configuration on page 540](#)
- [Verification on page 542](#)
- [Troubleshooting on page 543](#)

Requirements

This example uses the following software and hardware components:

- Junos OS Release 13.2X50 or later for EX Series switches
- An EX Series switch with support for ELS

Before you begin, be sure you have:

- Performed basic bridging and VLAN configuration on the switch. See *Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch with ELS Support*.
- Generated an SSL certificate and installed it on the switch. See “[Generating SSL Certificates to Be Used for Secure Web Access \(EX Series Switch\)](#)” on page 331.
- Configured basic access between the EX Series switch and the RADIUS server. See “[Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch](#)” on page 378.
- Designed your captive portal login page. See “[Designing a Captive Portal Authentication Login Page on Switches](#)” on page 535.

Overview and Topology

This example shows the configuration required on the switch to enable captive portal on an interface. To permit a printer connected to the captive portal interface to access the LAN, add its MAC address to the authentication whitelist and assign it to a VLAN, vlan1. The MAC addresses on this list are permitted access on the interface without captive portal authentication.

The topology for this example consists of one EX Series switch connected to a RADIUS authentication server. One interface on the switch is configured for captive portal. In this example, the interface is configured in multiple supplicant mode.

Configuration

To configure captive portal on your switch:

CLI Quick Configuration

To quickly configure captive portal on the switch after completing the tasks in the Requirements section, copy the following commands and paste them into the switch terminal window:

```
[edit]
set system services web-management https local-certificate my-signed-cert
set services captive-portal secure-authentication https
set services captive-portal interface ge-0/0/10.0 supplicant multiple
set switch-options authentication-whitelist 00:10:12:e0:28:22 vlan-assignment vlan1
set custom-options post-authentication-url http://www.my-home-page.com
```

Step-by-Step Procedure

1. To create a secure channel for Web access to the switch, configure captive portal for HTTPS:
 - a. Associate the security certificate with the Web server and enable HTTPS on the switch:

```
[edit]
user@switch# set system services web-management https local-certificate
my-signed-cert
```




NOTE: You can enable HTTP instead of HTTPS, but we recommend that you enable HTTPS for security purposes.

- b. Configure captive portal to use HTTPS:

```
[edit]
user@switch# set services captive-portal secure-authentication https
```

2. Enable an interface for captive portal:

```
[edit]
user@switch# set services captive-portal interface ge-0/0/10 supplicant multiple
```

3. (Optional) Allow specific clients to bypass captive portal authentication:



NOTE: If the client is already attached to the switch, you must clear its MAC address from the captive portal authentication by using the `clear captive-portal mac-address mac-address` command after adding its MAC address to the whitelist. Otherwise, the new entry for the MAC address will not be added to the Ethernet switching table and the authentication bypass will not be allowed.

```
[edit]
user@switch# set switch-options authentication-whitelist 00:10:12:e0:28:22
vlan-assignment vlan1
```



NOTE: Optionally, you can use `set switch-options authentication-whitelist 00:10:12:e0:28:22 vlan-assignment vlan1 interface ge-0/0/10.0` to limit the scope to the interface.

4. (Optional) To redirect clients to a specified page rather than the page they originally requested, configure the post-authentication URL:

```
[edit services captive-portal]
user@switch# set custom-options post-authentication-url http://www.my-home-page.com
```

Results Display the results of the configuration:

```
[edit]
user@switch# show
system {
```

```
services {
  web-management {
    https {
      local-certificate my-signed-cert;
    }
  }
}
security {
  certificates {
    local {
      my-signed-cert {
        "-----BEGIN RSA PRIVATE KEY-----\ABC123
        ABC123ABC123ABC123 ... ABC123
        ----END CERTIFICATE-----\n"; ## SECRET-DATA
      }
    }
  }
}
services {
  captive-portal {
    interface {
      ge-0/0/10.0 {
        supplicant multiple;
      }
    }
    secure-authentication https;
    custom-options {
      post-authentication-url http://www.my-home-page.com;
    }
  }
}
switch-options {
  authentication-whitelist {
    00:10:12:e0:28:22/48 {
      vlan-assignment vlan1;
    }
  }
}
```

Verification

To confirm that captive portal authentication is configured and working properly, perform these tasks:

- [Verifying That Captive Portal Is Enabled on the Interface on page 542](#)
- [Verify That Captive Portal Is Working Correctly on page 543](#)

Verifying That Captive Portal Is Enabled on the Interface

Purpose Verify that captive portal is configured on the interface ge-0/0/10.

Action Use the operational mode command **show captive-portal interface *interface-name* detail**:

```
user@switch> show captive-portal interface ge-0/0/10.0 detail

ge-0/0/10.0
  Supplicant mode: Multiple
  Number of retries: 3
  Quiet period: 60 seconds
  Configured CP session timeout: 3600 seconds
  Server timeout: 15 seconds
```

Meaning The output confirms that captive portal is configured on the interface **ge-0/0/10**, with the default settings for number of retries, quiet period, CP session timeout, and server timeout.

Verify That Captive Portal Is Working Correctly

Purpose Verify that captive portal is working on the switch.

Action Connect a client to the interface ge-0/0/10. From the client, open a Web browser and request a webpage. The captive portal login page that you designed should be displayed. After you enter your login information and are authenticated against the RADIUS server, the Web browser should display either the page you requested or the post-authentication URL that you configured.

Troubleshooting

To troubleshoot captive portal, perform this task:

- [Troubleshooting Captive Portal on page 543](#)

Troubleshooting Captive Portal

Problem The switch does not return the captive portal login page when a user connected to a captive portal interface on the switch requests a webpage.

Solution You can examine the ARP, DHCP, HTTPS, and DNS counters—if one or more of these counters are not incrementing, this provides an indication of where the problem lies. For example, if the client cannot get an IP address, you might check the switch interface to determine whether the DHCP counter is incrementing—if the counter increments, the DHCP packet was received by the switch.

```
user@switch> show captive-portal firewall ge-0/0/10.0

ge-0/0/10.0
  Filter name: dot1x_ge-0/0/10
  Counters:
  Name                               Bytes      Packets
  dot1x_ge-0/0/10_CP_arp             7616       119
```

dot1x_ge-0/0/10_CP_dhcp	0	0
dot1x_ge-0/0/10_CP_http	0	0
dot1x_ge-0/0/10_CP_https	0	0
dot1x_ge-0/0/10_CP_t_dns	0	0
dot1x_ge-0/0/10_CP_u_dns	0	0

**Related
Documentation**

- [Configuring Captive Portal Authentication \(CLI Procedure\) on an EX Series Switches with ELS Support on page 537](#)
- [Designing a Captive Portal Authentication Login Page on Switches on page 535](#)

CHAPTER 20

Configuring Central Web Authentication on EX Series Switches

- [Understanding Centralized Network Access Control and EX Series Switches on page 545](#)
- [Understanding Central Web Authentication on page 547](#)
- [Configuring Central Web Authentication on page 550](#)

Understanding Centralized Network Access Control and EX Series Switches

Network access control (NAC) allows you to control who is admitted to the network and what resources—servers, applications, and stored data—those users are allowed to access. These controls include:

- Authentication—Pre-admission controls
- Authorization—Post-admission controls

You can use different methods to implement NAC on Juniper Networks EX Series Ethernet Switches.

This topic describes:

- [NAC Using Any RADIUS Server and Access Policies Defined on the Local Switch on page 545](#)
- [Centralized NAC Using Junos Pulse Access Control Service on page 546](#)
- [Captive Portal Authentication on page 547](#)

NAC Using Any RADIUS Server and Access Policies Defined on the Local Switch

For pre-admission controls, you can use the switch in combination with any RADIUS server as the *authentication server*. For additional information, see [“Understanding Authentication on Switches” on page 348](#).

For post-admission controls, you can configure firewall filters to limit access to specific resources. For additional information, see [Firewall Filters for EX Series Switches Overview](#).

Centralized NAC Using Junos Pulse Access Control Service

You can use Junos Pulse Access Control Service and the switches for a centralized end-to-end NAC system, including both pre-admission *authentication* and post-admission *authorization*.

When you configure such a system, the Juniper Networks MAG Series Junos Pulse Gateways or the Juniper Networks IC Series Unified Access Control Appliances NAC device functions as the authentication server. For messages relating to IEEE 802.1X and MAC RADIUS authentication, the NAC device communicates with the switch using the RADIUS protocol.

The Access Control Service also performs additional functions. It eliminates the need to configure firewall filters on each switch. Instead, you define resource access policies centrally on the NAC device. This centralized method is particularly helpful when you have multiple switches in your network.

The resource access policy on the Access Control Service defines which network resources are allowed and denied for a user, based upon the user's role. The NAC device distributes these policies to all connected switches. The NAC device thus functions as a centralized policy management server. For messages relating to access policies, the NAC device communicates with the switch using the Junos UAC Enforcer Protocol (JUEP). The switch converts the resource access policies into filter definitions and applies these to the appropriate port.



NOTE: With this solution, the EX Series switch serves as an *Infranet Enforcer*, that is, a policy enforcement point for the Access Control Service. The Access Control Service sends auth table entries and resource access policies when an endpoint successfully completes 802.1X authentication or MAC authentication (unmanaged devices). Access for any endpoint is governed by the resource access policies that you configure on the Access Control Service. Because resource access policies are employed, firewall filters are not required for the switch configuration.

This integrated solution of Access Control Service and EX Series switches is easier to implement and much more efficient than previous versions of Access Control Service and the switches. As soon the switch connects to the MAG Series or IC Series NAC device, the Access Control Service pushes the role-based policies to the switch via JUEP. This enables the user to access the network more quickly than previous implementations, because the policy is already available on the switch and does not need to be pushed from the centralized device at the time of user authentication. Moreover, the policy push happens only once, which utilizes network bandwidth efficiently and makes this implementation suitable for scaled environments.

If you change policies, the Access Control Service automatically pushes the updated policies to the connected switch. The switch applies the policies dynamically without taking users through another authentication transaction.



NOTE: Do not configure firewall filters on the switch and do not use RADIUS server attributes for firewall filters if you are configuring the switch to use the Access Control Service. Instead, specify or deny access to resources by using the Access Control Service resource access policies.

You create policies on the NAC device's administrative interface to control access to resources and services. Access is based on successful authentication, the user's assigned role, and the security compliance of the endpoint device. For example, you can provide full access to protected resources employee role and limited access for a contractor role.

Captive Portal Authentication

Captive portal authentication allows you to authenticate users on the switches by redirecting Web browser requests to a login page that requires users to input a username and password before they are allowed access to the network. The details of configuring captive portal authentication differ depending on whether you are using the Access Control Service:

- If you have connected the switch to the Access Control Service, use the Access Control Service NAC device as an external captive portal server for redirecting Web browser requests. When users try to access a protected network resource that is connected to the switch, the user must first sign in to the Access Control Service for authentication and endpoint security checking. The captive portal redirects the user to a login page located on the Access Control Service. When the sign-in page for the Access Control Service is displayed, the user signs in and the Access Control Service examines the endpoint for compliance with security policies. If the endpoint passes the security check, access is granted to the protected resource.

See [“Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service \(CLI Procedure\)” on page 522](#). You can use the same Access Control Service as the external captive portal server for more than one switch.

- If you are not using the Access Control Service, you can use captive portal to redirect users to a login page that you configure on the local switch. See [“Designing a Captive Portal Authentication Login Page on Switches” on page 535](#) for information about designing a login page on your switch.

Related Documentation

- [Example: Configuring Centralized Access Control to Network Resources, with an EX Series Switch Connected to Junos Pulse Access Control Service on page 415](#)

Understanding Central Web Authentication

Web authentication redirects Web browser requests to a login page that requires the user to input a username and password. Upon successful authentication, the user is allowed access to the network. Web authentication is useful for providing network access to temporary users, such as visitors to a corporate site, who try to access the network using devices that are not 802.1X-enabled. Web authentication can also be used as a

fallback authentication method for regular network users who have 802.1X-enabled devices, but fail authentication because of other issues, such as expired network credentials.

Web authentication can be done locally on the switch using captive portal, but this requires that the Web portal pages be configured on each switch used as a network access device. Central Web authentication (CWA) provides efficiency and scaling benefits by redirecting the client's Web browser to a central Web authentication server (CWA server), which handles the complete login process.

- [Central Web Authentication Process on page 548](#)
- [Dynamic Firewall Filters for Central Web Authentication on page 549](#)
- [Redirect URL for Central Web Authentication on page 550](#)

Central Web Authentication Process

Central Web authentication is invoked after a host has failed MAC RADIUS authentication. The host can attempt authentication using 802.1X authentication first, but must then attempt MAC RADIUS authentication before attempting central Web authentication. The switch, operating as the authenticator, exchanges RADIUS messages with the authentication, authorization, and accounting (AAA) server. After MAC RADIUS authentication fails, the switch receives an Access-Accept message from the AAA server. This message includes a dynamic firewall filter and a redirect URL for central Web authentication. The switch applies the filter, which allows the host to receive an IP address, and uses the URL to redirect the host to the Web authentication page.

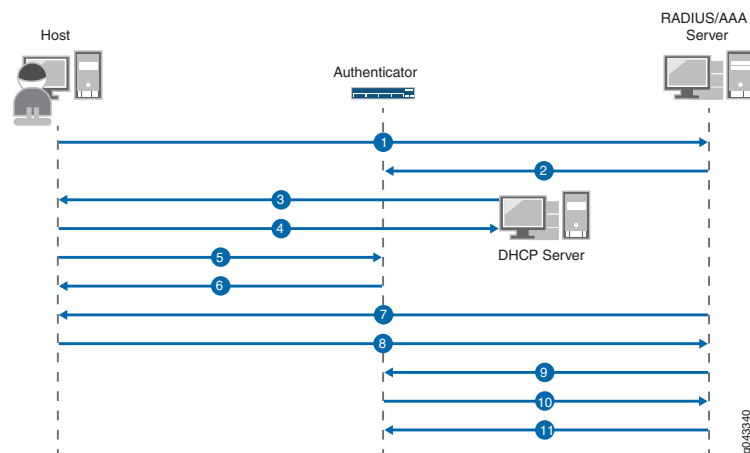
The host is prompted for login credentials and might also be asked to agree to an acceptable use policy. If Web authentication is successful, the AAA server sends a Change of Authorization (CoA) message, which updates the terms of the authorized session in progress. This enables the authenticator to update the filter or VLAN assignment applied to the controlled port, to allow the host to access the LAN.

The sequence of events in central Web authentication is as follows (see [Figure 28 on page 549](#)):

1. A host connected to the switch (authenticator) initiates MAC RADIUS authentication.
2. MAC RADIUS authentication fails. Instead of sending an Access-Reject message to the switch, the AAA server sends an Access-Accept message that includes a dynamic firewall filter and a CWA redirect URL.
3. The host is allowed by the terms of the filter to send DHCP requests.
4. The host receives an IP address and DNS information from the DHCP server. The AAA server initiates a new session that has a unique session ID.
5. The host opens a Web browser.

6. The authenticator sends the CWA redirect URL to the host.
7. The host is redirected to the CWA server and is prompted for login credentials.
8. The host provides the username and password.
9. After successful Web authentication, the AAA server sends a CoA message to update the filter or VLAN assignment applied on the controlled port, allowing the host to access the LAN.
10. The authenticator responds with a CoA-ACK message and sends a MAC RADIUS authentication request to the AAA server.
11. The AAA server matches the session ID to the appropriate access policy and sends an Access-Accept message to authenticate the host.

Figure 28: Central Web Authentication Process



Dynamic Firewall Filters for Central Web Authentication

Central Web authentication uses dynamic firewall filters, which are centrally defined on the AAA server and dynamically applied to supplicants that request authentication through that server. The filter allows the host to get an IP address dynamically using DHCP. You define the filters by using RADIUS attributes, which are included in the Access-Accept messages sent from the server. Filters can be defined using either the Juniper-Switching-Filter attribute, which is a vendor-specific attribute (VSA), or the Filter-ID attribute, which is an IETF RADIUS attribute.

To use the Juniper-Switching-Filter VSA for central Web authentication, you must configure the filter with the correct terms that allow the destination IP address of the CWA server. This configuration is done directly on the AAA server. To use the Filter-ID attribute for central web authentication, enter the value as JNPR_RSVD_FILTER_CWA on the AAA server. The filter terms for this attribute are internally defined for central Web

authentication, because of which no additional configuration is required. For more information about configuring dynamic firewall filters for central web authentication, see [“Configuring Central Web Authentication” on page 550](#).

Redirect URL for Central Web Authentication

In central Web authentication, the authenticator redirects the host's Web browser request to the CWA server by using a redirect URL. After redirection, the CWA server completes the login process. The redirect URL for central web authentication can be configured on the AAA server or on the authenticator. The redirect URL, along with the dynamic firewall filter, must be present to trigger the central web authentication process after the failure of MAC RADIUS authentication.

The redirect URL can be centrally defined on the AAA server by using the Juniper-CWA-Redirect VSA, which is attribute number 50 in the Juniper RADIUS dictionary. The URL is forwarded from the AAA server to the switch in the same RADIUS Access-Accept message that contains the dynamic firewall filter. You can also configure the redirect URL locally on the host interface by using the CLI statement **redirect-url** at the `[edit protocols dot1x authenticator interface interface-name]` hierarchy level. For more information about configuring the redirect URL, see [“Configuring Central Web Authentication” on page 550](#).

Related Documentation

- [Understanding Dynamic Filters Based on RADIUS Attributes on page 373](#)
- [Understanding Dynamic VLAN Assignment Using RADIUS Attributes on page 374](#)
- [Filtering 802.1X Supplicants by Using RADIUS Server Attributes on page 388](#)
- [Configuring Central Web Authentication with EX Series Switches and Aruba ClearPass](#)

Configuring Central Web Authentication

Central Web authentication is a fallback method of authentication in which the host's Web browser is redirected to a central Web authentication (CWA) server. The CWA server provides a web portal where the user can enter a username and password. If these credentials are validated by the CWA server, the user is authenticated and is allowed access to the network.

Central Web authentication is invoked after a host has failed MAC RADIUS authentication. The switch, operating as the authenticator, receives a RADIUS Access-Accept message from the AAA server that includes a dynamic firewall filter and a redirect URL for central Web authentication. The dynamic firewall filter and the redirect URL must both be present for the central Web authentication process to be triggered.

- [Configuring Dynamic Firewall Filters for Central Web Authentication on page 551](#)
- [Configuring the Redirect URL for Central Web Authentication on page 551](#)
- [Guidelines for Configuring Central Web Authentication on page 552](#)

Configuring Dynamic Firewall Filters for Central Web Authentication

Dynamic firewall filters are used in central Web authentication to enable the host to get an IP address from a DHCP server, which allows the host to access the network. The filters are defined on the AAA server using RADIUS attributes, which are sent to the authenticator in an Access-Accept message. You can define the filter using either the Juniper-Switching-Filter attribute, which is a vendor-specific attribute (VSA), or the Filter-ID attribute, which is an IETF RADIUS attribute.

- To use the Juniper-Switching-Filter VSA for central Web authentication, you must configure the filter terms directly on the AAA server. The filter must include a term to match the destination IP address of the CWA server with the action **allow**.

For example:

```
001122334455 Auth-Type := EAP, Cleartext-Password := "001122334455"
    Session-Timeout = "300",
    Juniper-CWA-Redirect-URL = "https://10.10.10.10",
    Juniper-Switching-Filter = "Match Destination-ip 10.10.10.10 Action
allow, Match ip-protocol 17 Action allow, Match Destination-mac 00:01:02:33:44:55
Action deny"
```



NOTE: The switch does not resolve the DNS queries for the redirect URL. You must configure the Juniper-Switching-Filter attribute to allow the destination IP address of the CWA server.

- To use the Filter-ID attribute for central Web authentication, enter JNPR_RSVD_FILTER_CWA as the value for the attribute on the AAA server. The filter terms for this attribute are internally defined for central Web authentication, because of which no additional configuration is required.

For example:

```
001122334455 Auth-Type := EAP, Cleartext-Password := "001122334455"
    Session-Timeout = "300",
    Juniper-CWA-Redirect-URL = "https://10.10.10.10",
    Filter-Id = "JNPR_RSVD_FILTER_CWA",
```

For more information about configuring dynamic firewall filters on the AAA server, see the documentation for your AAA server.

Configuring the Redirect URL for Central Web Authentication

In central Web authentication, the authenticator redirects the host's Web browser request to the CWA server by using a redirect URL. The redirect URL for central Web authentication can be configured on the AAA server or locally on the host interface.

- To configure the redirect URL on the AAA server, use the Juniper-CWA-Redirect VSA, which is attribute number 50 in the Juniper RADIUS dictionary. The URL is forwarded

from the AAA server to the switch in the same RADIUS Access-Accept message that contains the dynamic firewall filter.

For example:

```
001122334455 Auth-Type := EAP, Cleartext-Password := "001122334455"
    Session-Timeout = "300",
    Juniper-CWA-Redirect-URL = "https://10.10.10.10",
    Filter-Id = "JNPR_RSVD_FILTER_CWA",
```



NOTE: When the special Filter-ID attribute JNPR_RSVD_FILTER_CWA is used for the dynamic firewall filter, the redirect URL must include the IP address of the AAA server, for example, <https://10.10.10.10>.

- To configure the redirect URL locally on the host interface, use the following CLI statement:

```
[edit]
user@switch# set protocols dot1x authenticator interface interface-name redirect-url
```

For example:

```
user@switch# show protocols dot1x
authenticator {
  authentication-name-profile auth1;
  interface {
    ge-0/0/1.0 {
      supplicant single;
      mac-radius;
      redirect-url https://10.10.10.10;
    }
  }
}
```

Guidelines for Configuring Central Web Authentication

Central Web authentication is triggered after the failure of MAC RADIUS authentication when the redirect URL and dynamic firewall filter are both present. The redirect URL and dynamic firewall filter can be configured in any of the following combinations:

1. The AAA server sends both the CWA redirect URL and dynamic firewall filter to the authenticator. The redirect URL is configured on the AAA server by using the Juniper-CWA-Redirect VSA and the dynamic firewall filter is configured on the AAA server by using the Juniper-Switching-Filter VSA. The filter must be configured to allow the destination IP address of the CWA server in this case.
2. The AAA server sends the dynamic firewall filter to the authenticator and the redirect URL is configured locally on the host port. The redirect URL is configured on the authenticator by using the **redirect-url** CLI statement and the dynamic firewall filter is configured on the AAA server by using the Juniper-Switching-Filter VSA. The filter must be configured to allow the destination IP address of the CWA server in this case.

3. The AAA server sends both the CWA redirect URL and dynamic firewall filter to the authenticator. The redirect URL is configured on the AAA server by using the Juniper-CWA-Redirect VSA and the dynamic firewall filter is configured on the AAA server by using the Filter-ID attribute with the value JNPR_RSVD_FILTER_CWA. The redirect URL must contain the IP address of the CWA server in this case.
4. The AAA server sends the dynamic firewall filter to the authenticator and the redirect URL is configured locally on the host port. The redirect URL is configured on the authenticator by using the **redirect-url** CLI statement and the dynamic firewall filter is configured on the AAA server by using the Filter-ID attribute with the value JNPR_RSVD_FILTER_CWA. The redirect URL must contain the IP address of the CWA server in this case.

**Related
Documentation**

- [Understanding Central Web Authentication on page 547](#)
- [Configuring Central Web Authentication with EX Series Switches and Aruba ClearPass](#)

Configuring Device Discovery Using LLDP and LLDP-MED on Switches

- [Understanding LLDP on page 555](#)
- [Configuring LLDP \(CLI Procedure\) on page 556](#)
- [Configuring LLDP \(J-Web Procedure\) on page 561](#)
- [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)
- [Configuring LLDP-MED \(CLI Procedure\) on page 566](#)

Understanding LLDP

The device uses Link Layer Discovery Protocol (LLDP) to learn and distribute device information on network links. The information enables the switch to identify a variety of devices quickly. This quick identification results in a LAN that interoperates smoothly and efficiently.

LLDP-capable devices transmit information in type, length, and value (TLV) messages to neighbor devices. Device information can include specifics, such as chassis and port identification and system name and system capabilities. The TLVs leverage this information from parameters that have already been configured in Junos OS.

The device supports the following basic TLVs:

- **Chassis Identifier**—The MAC address associated with the local system.
- **Port Identifier**—The port identification for the specified port in the local system.
- **Port Description**—The user-configured port description. The port description can be a maximum of 256 characters.
- **System Name**—The user-configured name of the local system. The system name can be a maximum of 256 characters.
- **System Description**—The system description containing information about the software and current image running on the system. This information cannot be configured, but is taken from the software.

- **System Capabilities**—The primary function performed by the system. The capabilities that system supports are defined; for example, bridge or router. This information cannot be configured, but is based on the model of the product.
- **Management Address**—The IP management address of the local system.

The device supports the following 802.3 TLVs:

- **Power via MDI**—A TLV that advertises media dependent interface (MDI) power support, power source equipment (PSE) power pair, and power class information.
- **MAC/PHY Configuration Status**—A TLV that advertises information about the physical interface, such as autonegotiation status and support and MAU type. The information cannot be configured, but is based on the physical interface structure.
- **Link Aggregation**—A TLV that advertises whether the port is aggregated and its aggregated port ID.
- **Maximum Frame Size**—A TLV that advertises the Maximum Transmission Unit (MTU) of the interface sending LLDP frames.
- **Port Vlan**—A TLV that advertises the VLAN name configured on the interface.

Configuring LLDP (CLI Procedure)

Devices use Link Layer Discovery Protocol (LLDP) and Link Layer Discovery Protocol—Media Endpoint Discovery (LLDP-MED) to learn and distribute device information on network links. The information enables the device to quickly identify a variety of other devices, resulting in a LAN that interoperates smoothly and efficiently.

This topic describes:

- [Enabling LLDP on Interfaces on page 556](#)
- [Adjusting LLDP Advertisement Settings on page 557](#)
- [Adjusting SNMP Notification Settings of LLDP Changes on page 558](#)
- [Specifying a Management Address for the LLDP Management TLV on page 559](#)
- [Configuring LLDP Power Negotiation on page 559](#)
- [Disabling LLDP TLVs on page 560](#)

Enabling LLDP on Interfaces

LLDP is enabled on all interfaces by default. If it is disabled, you can enable LLDP by configuring it on all interfaces or on specific interfaces.

- To configure LLDP on all interfaces:

```
[edit protocols lldp]  
user@switch# set interface all
```

- To configure LLDP on a specific interface:

```
[edit protocols lldp]
```



```
user@switch# set interface interface-name
```



NOTE: On EX4300 and QFX5100 switches, LLDP cannot be configured on the me0 or vme interface. Issuing the `set protocols lldp interface me0` command generates the following error message:

```
error: name: 'me0': Invalid interface
error: statement creation failed: interface
```

Issuing the `set protocols lldp interface vme` command generates the following error message:

```
error: name: 'vme': Invalid interface
error: statement creation failed: interface
```

Adjusting LLDP Advertisement Settings

You can adjust the following settings for LLDP advertisements for troubleshooting or verification purposes. The default values are applied when LLDP is enabled. For normal operations, we recommend that you do not change the default values.

- To specify the frequency at which LLDP advertisements are sent (in seconds):

```
[edit protocols lldp]
user@switch# set advertisement-interval seconds
```

For example, using the default value:

```
[edit protocols lldp]
user@switch# set advertisement-interval 45
```

- To specify the number of seconds that LLDP information is held before it is discarded (the multiplier value is used in combination with the **advertisement-interval** value):

```
[edit protocols lldp]
user@switch# set hold-multiplier seconds
```

For example, using the default value:

```
[edit protocols lldp]
user@switch# set hold-multiplier 5
```

- To specify the number of seconds the device waits before sending advertisements to neighbors after a change is made in a TLV (type, length, or value) element in LLDP or in the state of the local system, such as a change in hostname or management address, set the transmit delay. The transmit delay is enabled by default on switches to reduce the delay in notifying neighbors of a change in the local system. The default value is 2 seconds (if the **advertisement-interval** value is set to 8 seconds or more) or 1 second (if the **advertisement-interval** value is set to less than 8 seconds).

```
[edit protocols lldp]
user@switch# set transmit-delay seconds
```

For example:

```
[edit protocols lldp]
user@switch# set transmit-delay 2
```



NOTE: The advertisement-interval value must be greater than or equal to four times the transmit-delay value; otherwise, an error is returned when you attempt to commit the configuration.

Adjusting SNMP Notification Settings of LLDP Changes

You can adjust the following settings for SNMP notifications of LLDP changes. If the values are not specified or if the interval values are set to 0, the notifications are disabled.

- To specify the frequency at which LLDP database changes are sent (in seconds):

```
[edit protocols lldp]
user@switch# set lldp-configuration-notification-interval seconds
```

For example:

```
[edit protocols lldp]
user@switch# set lldp-configuration-notification-interval 600
```

- To configure the time interval for SNMP trap notifications to wait for topology changes (in seconds):

```
[edit protocols lldp]
user@switch# set ptopo-configuration-trap-interval seconds
```

For example:

```
[edit protocols lldp]
user@switch# set ptopo-configuration-trap-interval 600
```

- To specify the holding time (used in combination with the **ptopo-configuration-trap-interval** value) to maintain dynamic topology entries (in seconds):

```
[edit protocols lldp]
user@switch# set ptopo-configuration-maximum-hold-time seconds
```

For example:

```
[edit protocols lldp]
user@switch# set ptopo-configuration-maximum-hold-time 2147483647
```

Specifying a Management Address for the LLDP Management TLV

You can configure an IPv4 or IPv6 management address to be used in the LLDP Management Address type, length, and value (TLV) messages. Only an out-of-band management address must be used as the value for the **management-address** statement.

To configure the management address:

```
[edit protocols lldp]
user@switch# set management-address ip-address
```



NOTE: Ensure that the interface with the configured management address has LLDP enabled using the `set protocols lldp interface` command. If you configure a customized management address for LLDP on an interface that has LLDP disabled, the `show lldp local-information` command output does not display the correct interface information.

Configuring LLDP Power Negotiation

LLDP power negotiation enables the switch's Power over Ethernet (PoE) controller to dynamically allocate PoE power to PoE interfaces, based on the needs of the powered device, by negotiating with LLDP-enabled powered devices.



NOTE: LLDP power negotiation is not supported on EX3200 or EX4200 switches (except for the EX4200-PX models).

LLDP power negotiation is supported on switches running PoE controller software version 4.04 or later. For information about upgrading the PoE controller software, see *Upgrading the PoE Controller Software*.

LLDP power negotiation is automatically enabled when the PoE management mode is set to **class**:

- [edit poe]
user@switch# **set management class**

To disable LLDP power negotiation:

- On switch interfaces:

```
[edit protocols lldp interface all power-negotiation]
user@switch# disable
```

- On a specific switch interface:

```
[edit protocols lldp interface interface-name power-negotiation]
user@switch# disable
```

Disabling LLDP TLVs

LLDP sends TLV messages by default. You can configure LLDP to disable non-mandatory TLVs. Mandatory TLVs are: chassis-id, port-id, and time-to-live. In this procedure, any reference to disabling all TLVs means disabling all non-mandatory TLVs.

There are two options for disabling TLVs:

- **tlv-select**—Select which TLVs are allowed to be advertised by LLDP. This approach is useful if you want to allow only a few TLVs and nothing else.
- **tlv-filter**—Filter the TLVs that should not be advertised by LLDP. This approach is useful if you want to filter only few TLVs, and allow everything else.



NOTE: The **tlv-select** and **tlv-filter** are mutually exclusive and cannot be used on the same configuration stanza at the same time.

You can disable TLVs on a specific interfaces or on all interfaces. The configuration under the interface configuration stanza takes precedence over global the global configuration.

To select which TLVs are allowed to be advertised by LLDP:

- On all interfaces:

```
[edit protocols lldp]
user@switch# set tlv-select tlv-name
```

- On a specific interface:

```
[edit protocols lldp]
user@switch# set interface interface-name tlv-select tlv-name
```

To filter TLVs that should not be advertised by LLDP:

- On all interfaces:

```
[edit protocols lldp]
user@switch# set tlv-filter tlv-name
```

- On a specific interface:

```
[edit protocols lldp]
user@switch# set interface interface-name tlv-filter tlv-name
```

The following example disables all TLVs except port-description:

```
[edit protocols lldp]
user@switch# set tlv-select port-description
```

The following example disables the system-description TLV on ge-2/1/1 interface:

```
[edit protocols lldp]
user@switch# set interface ge-2/1/1 tlv-filter system-description
```

The following example disables all TLVs except port-description and system-description on all interfaces except on the ge-0/0/1 interface, where it disables only the system-name TLV:

```
[edit protocols lldp]
user@switch# set tlv-select [port-description system-description]
user@switch# set interface ge-0/0/1 tlv-filter system-name
```

You can also disable TLVs for the LLDP Media Endpoint Discovery (LLDP-MED) protocol. See [“Configuring LLDP-MED \(CLI Procedure\)” on page 566](#) for more information.

Related Documentation

- [Configuring LLDP-MED \(CLI Procedure\) on page 566](#)
- [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)

Configuring LLDP (J-Web Procedure)



NOTE: This topic applies only to the J-Web Application package.

Use the LLDP Configuration page to configure LLDP global and port settings for an EX Series switch on the J-Web interface.

To configure LLDP:

1. Select **Configure > Switching > LLDP**.

The LLDP Configuration page displays LLDP Global Settings and Port Settings.

The second half of the screen displays operational details for the selected port.



NOTE: After you make changes to the configuration on this page, you must commit the changes for them to take effect. To commit all changes to the active configuration, select **Commit Options > Commit**. See [Using the Commit Options to Commit Configuration Changes](#) for details about all commit options.

2. For an EX8200 Virtual Chassis configuration, select the member and the slot (FPC) from the list.
3. To modify LLDP Global Settings, click **Global Settings**.

Enter information as described in [Table 44 on page 562](#).

4. To modify Port Settings, click **Edit** in the Port Settings section.

Enter information as described in [Table 45 on page 562](#).

Table 44: Global Settings

Field	Function	Your Action
Advertising interval	Specifies the frequency of outbound LLDP advertisements. You can increase or decrease this interval.	Type the number of seconds.
Hold multiplier	Specifies the multiplier factor to be used by an LLDP-enabled switch to calculate the time-to-live (TTL) value for the LLDP advertisements it generates and transmits to LLDP neighbors.	Type the required number in the field.
Fast start count	Specifies the number of LLDP advertisements sent in the first second after the device connects. The default is 3. Increasing this number results in the port initially advertising LLDP-MED at a faster rate for a limited time.	Type the Fast start count.

Table 45: Edit Port Settings

Field	Function	Your Action
LLDP Status	Specifies whether LLDP has been enabled on the port.	Select one: Enabled , Disabled , or None .
LLDP-MED Status	Specifies whether LLDP-MED has been enabled on the port.	Select Enable from the list.

Related Documentation

- [Configuring LLDP \(CLI Procedure\) on page 556](#)
- [Configuring LLDP-MED \(CLI Procedure\) on page 566](#)
- [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)

Understanding LLDP and LLDP-MED on EX Series Switches

EX Series Ethernet Switches use Link Layer Discovery Protocol (LLDP) and Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED) to learn and distribute device information on network links. The information enables the switch to quickly identify a variety of devices, resulting in a LAN that interoperates smoothly and efficiently.

- [Benefits of LLDP and LLDP-MED on page 563](#)
- [LLDP and LLDP-MED Overview on page 563](#)
- [Supported LLDP TLVs on page 563](#)
- [Supported LLDP-MED TLVs on page 565](#)
- [Disabling TLVs on page 565](#)

Benefits of LLDP and LLDP-MED

- Enables the switch to quickly identify a variety of devices.
- Provides PoE power management capabilities.
- Ensures that voice traffic gets tagged and prioritized with the correct values at the source itself.

LLDP and LLDP-MED Overview

LLDP-capable devices transmit information in type, length, and value (TLV) messages to neighbor devices. Device information can include information such as chassis and port identification and system name and system capabilities. The TLVs leverage this information from parameters that have already been configured in the Junos operating system (Junos OS).

LLDP-MED goes one step further than LLDP, exchanging IP-telephony messages between the switch and the IP telephone.



NOTE: If your IP telephone is configured for VoIP (VoIP), the switch automatically detects the configuration and assigns the telephone to the voice VLAN. The implementation of a voice VLAN on an IP telephone is vendor-specific. Consult the documentation that came with your IP telephone for instructions on configuring a voice VLAN. For example, on an Avaya phone, you can ensure that the phone gets the correct VoIP VLAN ID even in the absence of LLDP-MED by enabling DHCP option 176.

LLDP and LLDP-MED also provide PoE power management capabilities. LLDP power negotiation allows the switch to manage PoE power by negotiating with LLDP-enabled powered devices to dynamically allocate PoE power as needed. LLDP power priority allows an LLDP-enabled powered device to set the PoE power priority on the switch interface to which it connects.

The switch also uses these protocols to ensure that voice traffic gets tagged and prioritized with the correct values at the source itself. For example, 802.1p CoS and 802.1Q tag information can be sent to the IP telephone.

Supported LLDP TLVs

EX Series switches and QFX5100 switches support the following basic management TLVs:

- Chassis ID—The MAC address associated with the local system.



NOTE: The Chassis ID TLV has a subtype for the network address family. LLDP frames are validated only if this subtype has a value of 1 (IPv4) or 2 (IPv6). For any other value, the transmitting device is detected by LLDP as a neighbor and displayed in the output of the `show lldp neighbors` command, but is not assigned to the VLAN.

- Port ID—The port identification for the specified port in the local system.
- Time to Live—The length of time that the received information should remain valid.
- Port Description—Textual description of the interface or the logical unit. The description for the logical unit is used, if available; otherwise, the Port Description TLV contains the description configured on the physical interface. For example, LAG member interfaces do not contain a logical unit; therefore, only the description configured on the physical interface can be used.
- System Name—The user-configured name of the local system. The system name can be a maximum of 256 characters. The system name field contains the host name and the domain name in the following format: *host-name.domain-name*.
- System Description—The system description that contains information about the software and current image running on the system. This information is not configurable, but taken from the software.
- System Capabilities—The primary function performed by the system. The capabilities that the system supports—for example, bridge or router. This information is not configurable, but based on the model of the product.
- Management Address—The IPv4 or IPv6 management address of the local system.

EX Series switches and QFX5100 switches support the following organizationally defined TLVs:

- Power via MDI—A TLV that advertises MDI (media dependent interface) power support, PSE (power sourcing equipment) power pair, and power class information.
- MAC/PHY Configuration Status—A TLV that advertises information about the physical interface, such as autonegotiation status and support and MAU (medium attachment unit) type. The information is not configurable, but based on the physical interface structure.



NOTE: The MAC/PHY Configuration Status TLV has a subtype for the PMD Auto-Negotiation Advertised Capability field. This field contains a value of **other** or **unknown** if the LLDP packet is transmitted from a 10-gigabit SFP+ port.

- Link Aggregation—A TLV that advertises whether the port is aggregated and its aggregated port ID.

- Maximum Frame Size—A TLV that advertises the maximum transmission unit (MTU) of the interface sending LLDP frames.
- Port Vlan—A TLV that advertises the VLAN name configured on the interface.

Supported LLDP-MED TLVs

EX Series switches and QFX5100 switches support the following LLDP-MED TLVs:

- LLDP MED Capabilities—A TLV that advertises the primary function of the port. The values of capabilities range from 0 through 15:
 - 0—Capabilities
 - 1—Network Policy
 - 2—Location Identification
 - 3—Extended Power via MDI-PSE
 - 4—Inventory
 - 5-15—Reserved
- LLDP-MED Device Class Values—Categorizes media endpoint devices into classes:
 - 0—Class not defined
 - 1—Class 1 (generic endpoints). This class definition is applicable to all endpoints that require the base LLDP discovery services.
 - 2—Class 2 (media endpoints). This class includes endpoints that have IP media capabilities.
 - 3—Class 3 (communication endpoints). Devices acting as end user communication appliances
 - 4—Network Connectivity Device
 - 5-255—Reserved
- Network Policy—A TLV that advertises the port VLAN configuration and associated Layer 2 and Layer 3 attributes. Attributes include the policy identifier, application types, such as voice or streaming video, 802.1Q VLAN tagging, and 802.1p priority bits and Diffserv code points.
- Endpoint Location—A TLV that advertises the physical location of the endpoint.
- Extended Power via MDI—A TLV that advertises the power type, power source, power priority, and power value of the port. It is the responsibility of the PSE device (network connectivity device) to advertise the power priority on a port.

Disabling TLVs

In multi-vendor networks, it might not be desirable to send TLV messages because they can contain sensitive information about a network device. You can configure LLDP or LLDP-MED to disable any non-mandatory TLV message. Mandatory TLVs are: chassis-id, port-id, and time-to-live. All other TLVs can be disabled, either on specific interfaces or

on a global basis. See [“Configuring LLDP \(CLI Procedure\)” on page 556](#) and [“Configuring LLDP-MED \(CLI Procedure\)” on page 566](#) for more information.

**Related
Documentation**

- [Configuring LLDP \(CLI Procedure\) on page 556](#)
- [Configuring LLDP-MED \(CLI Procedure\) on page 566](#)
- [Understanding PoE on EX Series Switches](#)

Configuring LLDP-MED (CLI Procedure)

Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED) is an extension of LLDP. The EX Series switch uses LLDP-MED to support device discovery of VoIP telephones and to create location databases for these telephone locations.

LLDP-MED is enabled by default on EX Series switches.

This topic describes:

- [Enabling LLDP-MED on Interfaces on page 566](#)
- [Configuring Location Information Advertised by the Switch on page 566](#)
- [Configuring a Fast Start for LLDP-MED on page 567](#)
- [Disabling LLDP-MED TLVs on page 567](#)

Enabling LLDP-MED on Interfaces

LLDP-MED is enabled on all interfaces by default. If it is disabled, you can enable LLDP-MED by configuring it on all interfaces or on specific interfaces.



NOTE: On switches running Junos OS for EX Series switches with support for the Enhanced Layer 2 Software (ELS) configuration style, configure LLDP-MED on the physical interface—for example, on ge-0/0/2. For more about ELS, see *Using the Enhanced Layer 2 Software CLI*.

To configure LLDP-MED on all interfaces or on a specific interface:

```
[edit protocols lldp-med]
user@switch# set interface interface-name
```

Configuring Location Information Advertised by the Switch

You can configure the location information that is advertised from the switch to the LLDP-MED device. You can specify a civic-based location (geographic location) or a location based on an ELIN (Emergency Location Identification Number):

- To specify a location by geography:

```
[edit protocols lldp-med]
user@switch# set interface ge-0/0/2.0 location civic-based country-code country-code
user@switch# set interface ge-0/0/2.0 location civic-based ca-type ca-type ca-value ca-value
```

- To specify a location by using an **elin** string:

```
[edit protocols lldp-med]
user@switch# set interface ge-0/0/2.0 location elin 4085551212
```

Configuring a Fast Start for LLDP-MED

When the switch detects an LLDP-MED capable device, it begins to send LLDP advertisements from the port connected to the device. The fast start count indicates how many advertisements will be sent in the first second after the switch detects the LLDP-MED device. The default is 3; to set it to another value:

```
[edit protocols lldp-med]
user@switch# set fast-start seconds
```

For example:

```
[edit protocols lldp-med]
user@switch# set fast-start 6
```



NOTE: If an interface is configured as a VoIP interface, then the switch does not wait for an attached phone to identify itself as an LLDP-MED device before it performs an LLDP-MED fast start after a graceful Routing Engine switchover (GRES) or a reboot. Instead, it immediately performs an LLDP-MED fast start after a GRES or reboot. This behavior prevents certain models of IP phones from resetting after a GRES.

Disabling LLDP-MED TLVs

LLDP-MED sends TLV messages by default. You can configure LLDP-MED to disable non-mandatory TLVs. Mandatory TLVs are: chassis-id, port-id, and time-to-live. In this procedure, any reference to disabling all TLVs means disabling all non-mandatory TLVs.

There are two options for disabling TLVs:

- **tlv-select**—Select which TLVs are allowed to be advertised by LLDP. This approach is useful if you want to allow only a few TLVs and nothing else.
- **tlv-filter**—Filter the TLVs that should not be advertised by LLDP. This approach is useful if you want to filter only a few TLVs, and allow everything else.



NOTE: The **tlv-select** and **tlv-filter** are mutually exclusive and cannot be used on the same configuration stanza at the same time.

You can disable TLVs on a specific interfaces or on all interfaces. The configuration under the interface configuration stanza takes precedence over global the global configuration.

To select which TLVs are allowed to be advertised by LLDP-MED:

- On all interfaces:

```
[edit protocols lldp-med]
user@switch# set tlv-select tlv-name
```

- On a specific interface:

```
[edit protocols lldp-med]
user@switch# set interface interface-name tlv-select tlv-name
```

To filter TLVs that should not be advertised by LLDP-MED:

- On all interfaces:

```
[edit protocols lldp-med]
user@switch# set tlv-filter tlv-name
```

- On a specific interface:

```
[edit protocols lldp-med]
user@switch# set interface interface-name tlv-filter tlv-name
```

The following example disables all TLVs except location-id:

```
[edit protocols lldp-med]
user@switch# set tlv-select location-id
```

The following example disables the ext-power-via-mdi TLV on ge-2/1/1 interface:

```
[edit protocols lldp-med]
user@switch# set interface ge-2/1/1 tlv-filter ext-power-via-mdi
```

The following example disables all TLVs except location-id and ext-power-via-mdi on all interfaces except on the ge-0/0/1 interface, where it disables only the network-policy TLV:

```
[edit protocols lldp-med]
user@switch# set tlv-select [location-id ext-power-via-mdi]
user@switch# set interface ge-0/0/1 tlv-filter network-policy
```

You can also disable TLVs for the LLDP protocol. See [“Configuring LLDP \(CLI Procedure\)” on page 556](#) for more information.

Related Documentation

- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch with ELS Support on page 475](#)
- [Configuring LLDP \(CLI Procedure\) on page 556](#)
- [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)

CHAPTER 22

Configuring DHCP Access Service on Routers

- [DHCP Access Service Overview on page 570](#)
- [DHCP Statement Hierarchy and Inheritance on page 573](#)
- [Configuring Address Pools for DHCP Dynamic Bindings on page 575](#)
- [Configuring Manual \(Static\) DHCP Bindings Between a Fixed IP Address and a Client MAC Address on page 577](#)
- [Specifying DHCP Lease Times for IP Address Assignments on page 578](#)
- [Configuring a DHCP Boot File and DHCP Boot Server on page 579](#)
- [Configuring a Static IP Address as DHCP Server Identifier on page 580](#)
- [Configuring a Domain Name and Domain Search List for a DHCP Server Host on page 580](#)
- [Configuring Routers Available to the DHCP Client on page 581](#)
- [Creating User-Defined DHCP Options Not Included in the Default Junos Implementation of the DHCP Server on page 582](#)
- [Example: Complete DHCP Server Configuration on page 583](#)
- [Example: Viewing DHCP Bindings on page 584](#)
- [Example: Viewing DHCP Address Pools on page 585](#)
- [Example: Viewing and Clearing DHCP Conflicts on page 585](#)
- [Configuring Tracing Operations for DHCP Processes on page 586](#)
- [DHCP Processes Tracing Flags on page 588](#)
- [Configuring the Router as an Extended DHCP Local Server on page 590](#)
- [Interaction Among the DHCP Client, Extended DHCP Local Server, and Address-Assignment Pools on page 592](#)
- [Extended DHCP Local Server and Address-Assignment Pools on page 592](#)
- [Methods Used by the Extended DHCP Local Server to Determine Which Address-Assignment Pool to Use on page 593](#)
- [Default Options Provided by the Extended DHCP Server for the DHCP Client on page 594](#)
- [Using External AAA Authentication Services to Authenticate DHCP Clients on page 594](#)
- [Client Configuration Information Exchanged Between the External Authentication Server, DHCP Application, and DHCP Client on page 599](#)

- [Example: Configuring the Minimum Extended DHCP Local Server Configuration on page 600](#)
- [Example: Extended DHCP Local Server Configuration with Optional Pool Matching on page 600](#)
- [Verifying and Managing the DHCP Server Configuration on page 600](#)
- [Tracing Extended DHCP Local Server Operations on page 601](#)

DHCP Access Service Overview

DHCP access service consists of two components: a protocol for delivering host-specific configuration information from a server to a client host and a method for allocating network addresses to a client host. The client sends a message to request configuration information. A DHCP server sends the configuration information back to the client.

With DHCP, clients can be assigned a network address for a fixed *lease*, enabling serial reassignment of network addresses to different clients. A DHCP server leases IP addresses for specific times to various clients. If a client does not use its assigned address for some period of time, the DHCP server can assign that IP address to another host. When assignments are made or changed, the DHCP server updates information in the DNS server. The DHCP server provides clients with their previous lease assignments whenever possible.

A DHCP server provides persistent storage of network parameters for clients. Because DHCP is an extension of BOOTP, DHCP servers can handle BOOTP requests.

The DHCP server includes IPv4 address assignment and commonly used DHCP options. The server is compatible with DHCP servers from other vendors on the network. The server does not support IPv6 address assignment, user class-specific configuration, DHCP failover protocol, dynamic DNS updates, or VPN connections. The Junos-FIPS software does not support the DHCP server.



NOTE: You cannot configure a router as a DHCP server and a BOOTP relay agent at the same time.

The following topics describe these concepts in detail:

- [Network Address Assignments \(Allocating a New Address\) on page 570](#)
- [Network Address Assignments \(Reusing a Previously Assigned Address\) on page 572](#)
- [Static and Dynamic Bindings on page 572](#)
- [Compatibility with Autoinstallation on page 573](#)
- [Conflict Detection and Resolution on page 573](#)

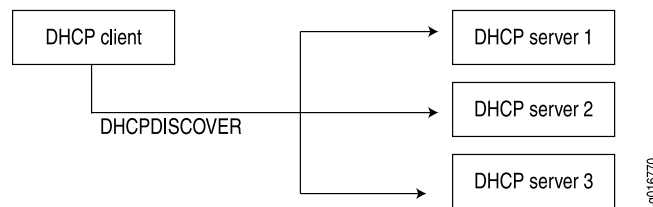
Network Address Assignments (Allocating a New Address)

To receive configuration information and a network address assignment, a DHCP client negotiates with DHCP servers in a series of messages. The following steps show the messages exchanged between a DHCP client and servers to allocate a new network

address. When allocating a new network address, the DHCP process can involve more than one server, but only one server is selected by the client.

1. When a client computer is started, it broadcasts a **DHCPDISCOVER** message on the local subnet, requesting a DHCP server. This request includes the hardware address of the requesting client.

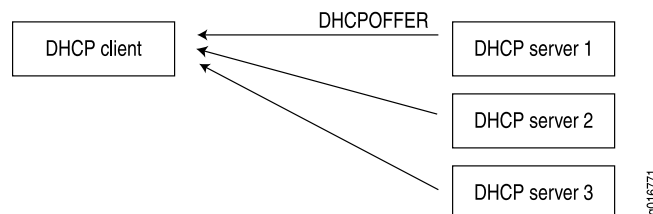
Figure 29: DHCP Discover



NOTE: For improved operation with DHCP clients that do not strictly conform to RFC 2131, the DHCP server accepts and processes **DHCPDISCOVER** messages even if the overload options in the messages are not properly terminated with an end statement.

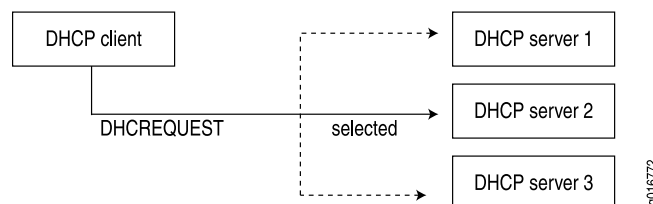
2. Each DHCP server receiving the broadcast sends a **DHCPOFFER** message to the client, offering an IP address for a set period of time, known as the lease period.

Figure 30: DHCP Offer



3. The client receives one or more **DHCPOFFER** messages from one or more servers and selects one of the offers received. Normally, a client looks for the longest lease period.
4. The client broadcasts a **DHCPREQUEST** message indicating the client has selected an offered leased IP address and identifies the selected server.

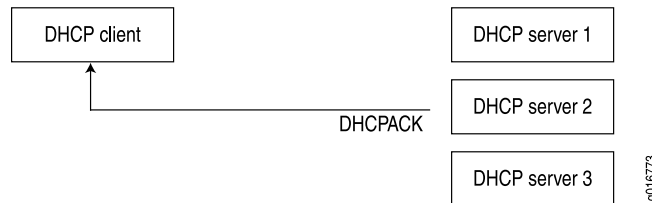
Figure 31: DHCP Request



5. Those servers not selected by the **DHCPREQUEST** message return the unselected IP addresses to the pool of available addresses.

6. The selected DHCP server sends a **DHCPACK** acknowledgment that includes configuration information such as the IP address, subnet mask, default gateway, and the lease period.

Figure 32: DHCP ACK



The information offered by the server is configurable.

7. The client receives the **DHCPACK** message with configuration information. The process is complete. The client is configured and has access to the network.
 - If the client receives a **DHCPNAK** message (for example, if the client has moved to a new subnet), the client restarts the negotiation process.
 - The client can relinquish its lease on a network address by sending a **DHCPRELEASE** message to the server (for example, when the client is restarted). When the server receives the **DHCPRELEASE** message, it marks the lease as free and the IP address becomes available again.

Figure 33: DHCP Release



Network Address Assignments (Reusing a Previously Assigned Address)

To enable reuse of a previously allocated network address, the following events occur:

1. A client that previously had a lease broadcasts a **DHCPREQUEST** message on the local subnet.
2. The server with knowledge of the client's configuration responds with a **DHCPACK** message.
3. The client verifies the DHCP configuration information sent by the server and uses this information to reestablish the lease.

Static and Dynamic Bindings

DHCP supports both dynamic and static bindings. For dynamic bindings, IP addresses are assigned to clients from a pool of addresses. Static bindings provide configuration information for a specific client and can include one or more fixed IP addresses for the

client. You can configure a DHCP server to include both address pools and static bindings. For any individual client, static bindings take priority over address pools.

Compatibility with Autoinstallation

The DHCP server is compatible with the autoinstallation feature on J Series Services Routers. The server automatically checks autoinstallation settings for conflicts and gives autoinstallation settings priority over corresponding DHCP settings. For example, an IP address set by autoinstallation takes priority over an IP address set by the DHCP server.



NOTE: The autoinstallation feature includes a fixed address pool and a fixed lease time. With DHCP, you can create address pools and modify lease times.

Conflict Detection and Resolution

When a client receives an IP address from the DHCP server, the client performs a series of ARP tests to verify that the IP address is available and no conflicts exist. If the client detects an address conflict, the client notifies the DHCP server about the conflict and may request another IP address from the DHCP server.

The DHCP server keeps a log of all conflicts and removes addresses with conflicts from the pool. These addresses remain excluded until you manually clear the conflicts list with the **clear system services dhcp conflict** command.

Related Documentation

- [DHCP Statement Hierarchy and Inheritance on page 573](#)

DHCP Statement Hierarchy and Inheritance

DHCP configuration statements are organized hierarchically. Statements at the top of the hierarchy apply to the DHCP server and network, branches contain statements that apply to address pools in a subnetwork, and leaves contain statements that apply to static bindings for individual clients. See [Table 46 on page 574](#).

The **pool** and **static-binding** statements appear at the **[edit system services dhcp]** hierarchy level. You can include the remaining statements at the following hierarchy levels:

```
[edit system services dhcp]
[edit system services dhcp pool]
[edit system services dhcp static-binding]
```

Table 46: Pool and Binding Statements

Statement	Description	Hierarchy Level
<code>pool</code>	Configure a pool of IP addresses for DHCP clients on a subnet. When a client joins the network, the DHCP server dynamically allocates an IP address from this pool.	<code>[edit system services dhcp]</code>
<code>static-binding</code>	Set static bindings for DHCP clients. A static binding is a mapping between a fixed IP address and the client's MAC address.	

To minimize configuration changes, include common configuration statements shown in [Table 47 on page 575](#) (for example, the `domain-name` statement) at the highest applicable level of the hierarchy (network or subnetwork). Configuration statements at lower levels of the hierarchy override statements inherited from a higher level. For example, if a statement appears at both the `[edit system services dhcp]` and `[edit system services dhcp pool]` hierarchy levels, the value assigned to the statement at the `[edit system services dhcp pool]` level takes priority.

Table 47: Common Configuration Statements

Statement	Description	Hierarchy Level
<code>boot-file</code>	Set the boot filename advertised to clients. The client uses the boot image stored in the boot file to complete configuration.	[edit system services dhcp] [edit system services dhcp pool] [edit system services dhcp static-binding]
<code>boot-server</code>	Set the server that contains the boot file.	
<code>default-lease-time</code>	Set the default lease time assigned to any client that does not request a specific lease time.	
<code>domain-name</code>	Configure the name of the domain in which clients will search for a DHCP server host. This is the default domain name that is appended to hostnames that are not fully qualified.	
<code>domain-search</code>	Define a domain search list.	
<code>maximum-lease-time</code>	Set the maximum lease time allowed by the server.	
<code>name-server</code>	Specify the DNS server that maintains the database of client name to IP address mappings.	
<code>option</code>	Configure user-defined DHCP options.	
<code>router</code>	Specify IP address for routers on the client's subnetwork. Routers are listed in order of preference.	
<code>server-identifier</code>	Set the IP address of the DHCP server.	

Related Documentation

- [DHCP Access Service Overview on page 570](#)

Configuring Address Pools for DHCP Dynamic Bindings

For dynamic bindings, set aside a pool of IP addresses that can be assigned to clients. Addresses in a pool must be available to clients on the same subnet.

To configure an address pool, include the following statements at the [[edit system services dhcp](#)] hierarchy level:

```
[edit system services dhcp]
pool address</prefix-length> {
  address-range {
    low address;
    high address;
  }
  exclude-address {
    address;
  }
}
```

The pool definition must include the client subnet number and prefix length (in bits). Optionally, the definition can include an address range and a list of excluded addresses.

The **address-range** statement defines the lowest and highest IP addresses in the pool that are available for dynamic address assignment. This statement is optional. If no range is specified, the pool will use all available addresses within the subnet specified. (Broadcast addresses, interface addresses, and excluded addresses are not available.)

The **exclude-address** statement specifies addresses within the range that are not used for dynamic address assignment. You can exclude one or more addresses within the range. This statement is optional.

The following is an example of a pool configuration.

```
[edit system services dhcp]
pool 10.3.3.0/24 {
  address-range low 10.3.3.2 high 10.3.3.254;
  exclude-address {
    10.3.3.33;
  }
}
```

For dynamic address assignment, configure an address pool for each client subnet the DHCP server supports. You can configure multiple address pools for a DHCP server, but only one address range per pool is supported.

DHCP maintains the state information for all pools configured. Clients are assigned addresses from pools with subnets that match the interface on which the **DHCPDISCOVER** packet is received. When more than one pool exists on the same interface, addresses are assigned on a rotating basis from all available pools.

**Related
Documentation**

- [DHCP Access Service Overview on page 570](#)
- [Configuring Manual \(Static\) DHCP Bindings Between a Fixed IP Address and a Client MAC Address on page 577](#)

Configuring Manual (Static) DHCP Bindings Between a Fixed IP Address and a Client MAC Address

Static bindings provide configuration information for specific clients. This information can include one or more fixed Internet addresses, the client hostname, and a client identifier.

To configure static bindings, include the following statements at the **[edit system services dhcp]** hierarchy level:

```
[edit system services dhcp]
static-binding mac-address {
  fixed-address {
    address;
  }
  host client-hostname;
  client-identifier (ascii client-id | hexadecimal client-id);
}
```

A static binding defines a mapping between a fixed IP address and the client's MAC address.

The *mac-address* variable specifies the MAC address of the client. This is a hardware address that uniquely identifies each client on the network.

The **fixed-address** statement specifies the fixed IP address assigned to the client. Typically a client has one address assigned, but you can assign more.

The **host** statement specifies the hostname of the client requesting the DHCP server. The name can include the local domain name. Otherwise, the name is resolved based on the **domain-name** statement.

The **client-identifier** statement is used by the DHCP server to index the database of address bindings. The client identifier is either an ASCII string or hexadecimal digits. It can include a type-value pair as specified in RFC 1700, *Assigned Numbers*. Either a client identifier or the client's MAC address must be configured to uniquely identify the client on the network.



NOTE: For each unique client-identifier *client-id* value, the DHCP server issues a unique lease and IP address from the pool. Previously, when the client provided an incorrect client-identifier *client-id* value, the DHCP server did not issue a lease.

The following is an example of a static binding configuration:

```
[edit system services dhcp]
static-binding 00:0d:56:f4:01:ab {
  fixed-address {
    10.5.5.5;
  }
}
```

```
10.6.6.6;  
}  
host-name "another-host.domain.tld";  
client-identifier hexadecimal 01001122aabbcc;  
}
```

**Related
Documentation**

- [DHCP Access Service Overview on page 570](#)
- [Specifying DHCP Lease Times for IP Address Assignments on page 578](#)

Specifying DHCP Lease Times for IP Address Assignments

For clients that do not request a specific lease time, the default lease time is one day. You can configure a maximum lease time for IP address assignments or change the default lease time.

To configure lease times, include the **maximum-lease-time** and **default-lease-time** statements:

```
maximum-lease-time;  
default-lease-time;
```

You can include these statements at the following hierarchy levels:

```
[edit system services dhcp]  
[edit system services dhcp pool]  
[edit system services dhcp static-binding]
```

Lease times defined for static bindings and address pools take priority over lease times defined at the **[edit system services dhcp]** hierarchy level.

The **maximum-lease-time** statement configures the maximum length of time in seconds for which a client can request and hold a lease. If a client requests a lease longer than the maximum specified, the lease is granted only for the maximum time configured on the server. After a lease expires, the client must request a new lease.



NOTE: Maximum lease times do not apply to dynamic BOOTP leases. These leases are not specified by the client and can exceed the maximum lease time configured.

The following example shows a configuration for maximum and default lease times:

```
[edit system services dhcp]  
maximum-lease-time 7200;  
default-lease-time 3600;
```

**Related
Documentation**

- [DHCP Access Service Overview on page 570](#)

- [Configuring a DHCP Boot File and DHCP Boot Server on page 579](#)

Configuring a DHCP Boot File and DHCP Boot Server

When a DHCP client starts, it contacts a boot server to download the boot file.

To configure a boot file and boot server, include the **boot-file** and **boot-server** statements:

```
boot-file filename;
boot-server (address | hostname);
```

You can include these statements at the following hierarchy levels:

```
[edit system services dhcp]
[edit system services dhcp pool]
[edit system services dhcp static-binding]
```

After a client receives a **DHCP OFFER** response from a DHCP server, the client can communicate directly with the boot server (instead of the DHCP server) to download the boot file. This minimizes network traffic and enables you to specify separate boot server/file pairs for each client pool or subnetwork.

The **boot-file** statement configures the name and location of the initial boot file that the DHCP client loads and executes. This file stores the boot image for the client. In most cases, the boot image is the operating system the client uses to load.

The **boot-server** statement configures the IP address of the TFTP server that contains the client's initial boot file. You must configure an IP address or a hostname for the server.

You must configure at least one boot file and boot server. Optionally, you can configure multiple boot files and boot servers. For example, you might configure two separate boot servers and files: one for static binding and one for address pools. Boot file configurations for pools or static bindings take precedence over boot file configurations at the **[edit system services dhcp]** hierarchy level.

The following example specifies a boot file and server for an address pool:

```
[edit system services dhcp]
pool 10.4.4.0/24 {
  boot-file "boot.client";
  boot-server 10.4.4.1;
}
```

Related Documentation

- [DHCP Access Service Overview on page 570](#)
- [Configuring a Static IP Address as DHCP Server Identifier on page 580](#)

Configuring a Static IP Address as DHCP Server Identifier

The host running the DHCP server must itself use a manually assigned, static IP address. It cannot send a request and receive an IP address from itself or another DHCP server.

To configure a DHCP server identifier, include the **server-identifier** statement:

```
server-identifier address;
```

You can include this statement at the following hierarchy levels:

```
[edit system services dhcp]
[edit system services dhcp pool]
[edit system services dhcp static-binding]
```

The **server-identifier** statement specifies the IP address of the DHCP server. The host must be a TFTP server that is accessible by all clients served within a range of IP addresses (based on either an address pool or static binding).

The following example shows a DHCP server identifier configured for an address pool:

```
[edit system services dhcp]
pool 10.3.3.0/24 {
  address-range low 10.3.3.2 high 10.3.3.254;
  exclude-address {
    10.3.3.33;
  }
  router {
    10.3.3.1;
  }
  server-identifier 10.3.3.1;
}
```

Related Documentation

- [DHCP Access Service Overview on page 570](#)

Configuring a Domain Name and Domain Search List for a DHCP Server Host

To configure the name of the domain in which clients search for a DHCP server host, include the **domain-name** statement:

```
domain-name domain;
```

You can include this statement at the following hierarchy levels:

```
[edit system services dhcp]
[edit system services dhcp pool]
[edit system services dhcp static-binding]
```


The **domain-name** statement sets the domain name that is appended to hostnames that are not fully qualified. This statement is optional. If you do not configure a domain name, the default is the client's current domain.

To configure a domain search list, include the **domain-search** statement:

```
domain-search [ domain-list ];
```

You can include this statement at the following hierarchy levels:

```
[edit system services dhcp]
[edit system services dhcp pool]
[edit system services dhcp static-binding]
```

The **domain-search** statement sets the order in which clients append domain names when searching for the IP address of a host. You can include one or more domain names in the list. For more information, see RFC 3397, *Dynamic Host Configuration Protocol (DHCP) Domain Search Option*.

The **domain-search** statement is optional, if you do not configure a domain search list, the default is the client's current domain.

Related Documentation

- [DHCP Access Service Overview on page 570](#)

Configuring Routers Available to the DHCP Client

After a DHCP client loads the boot image and has booted, the client sends packets to a router.

To configure routers available to the DHCP client, include the **router** statement:

```
router {
  address;
}
```

You can include this statement at the following hierarchy levels:

```
[edit system services dhcp]
[edit system services dhcp pool]
[edit system services dhcp static-binding]
```

The **router** statement specifies a list of IP addresses for routers on the client's subnet. List routers in order of preference. You must configure at least one router for each client subnet.

The following example shows routers configured at the **[edit system services dhcp]** hierarchy level:

```
[edit system services dhcp]
router {
```

```
10.6.6.1;  
10.7.7.1;  
}
```

Related Documentation

- [DHCP Access Service Overview on page 570](#)

Creating User-Defined DHCP Options Not Included in the Default Junos Implementation of the DHCP Server

You can configure one or more user-defined options that are not included in the Junos default implementation of the DHCP server. For example, if a client requests a DHCP option that is not included in the DHCP server, you can create a user-defined option that enables the server to respond to the client's request.

To configure a user-defined DHCP option, include the **option** statement:

```
option {  
  [ (id-number option-type option-value) | (id-number array option-type option-value) ];  
}
```

The **option** statement specifies the following values:

- *id-number*—Any whole number. The ID number is used to index the option and must be unique across a DHCP server.
- *option-type*—Any of the following types: **byte**, **byte-stream**, **flag**, **integer**, **ip-address**, **short**, **string**, **unsigned-integer**, **unsigned-short**.
- *array*—An option can include an array of values.
- *option-value*—Value associated with an option. The option value must be compatible with the option type (for example, an **On** or **Off** value for a **flag** type).

You can include this statement at the following hierarchy levels:

```
[edit system services dhcp]  
[edit system services dhcp pool]  
[edit system services dhcp static-binding]
```

The following example shows user-defined DHCP options:

```
[edit system services dhcp]  
option 19 flag off; # 19: "IP Forwarding" option  
option 40 string "domain.tld"; # 40: "NIS Domain" option  
option 16 ip-address 10.3.3.33; # 16: "Swap Server" option
```

User-defined options that conflict with DHCP configuration statements are ignored by the server. For example, in the following configuration, the DHCP server ignores the user-defined **option 3 router** statement and uses the **router** statement instead:

```
[edit system services dhcp]
option 3 router 10.7.7.2; # 3: "Default Router" option
router {
  10.7.7.1;
}
```

**Related
Documentation**

- [DHCP Access Service Overview on page 570](#)

Example: Complete DHCP Server Configuration

This topic shows a complete DHCP server configuration with address pools, static bindings, and user-defined options.

The following example shows statements at the **[edit interfaces]** hierarchy level. The interface's primary address (**10.3.3.1/24**) has a corresponding address pool (**10.3.3.0/24**) defined at the **[edit system services]** hierarchy level.

```
[edit interfaces]
fe-0/0/1 {
  unit 0 {
    family inet {
      address 10.3.3.1/24;
    }
  }
}
```



NOTE: You can configure a DHCP server only on an interface's primary IP address. The primary address on an interface is the address that is used by default as the local address for broadcast and multicast packets sourced locally and sent out the interface.

Statements at the **[edit system services]** hierarchy level include the following:

```
[edit system services]
dhcp {
  domain-name "domain.tld";
  maximum-lease-time 7200;
  default-lease-time 3600;
  name-server {
    10.6.6.6;
    10.6.6.7;
  }
  domain-search [ subnet1.domain.tld subnet2.domain.tld ];
  wins-server {
    10.7.7.7;
    10.7.7.9;
  }
  router {
    10.6.6.1;
  }
}
```

```

    10.7.7.1;
  }
  option 19 flag off; # 19: "IP Forwarding" option
  option 40 string "domain.tld"; # 40: "NIS Domain" option
  option 16 ip-address 10.3.3.33; # 16: "Swap Server" option
  pool 10.3.3.0/24 {
    address-range low 10.3.3.2 high 10.3.3.254;
    exclude-address {
      10.3.3.33;
    }
    router {
      10.3.3.1;
    }
    server-identifier 10.3.3.1;
  }
  pool 10.4.4.0/24 {
    boot-file "boot.client";
    boot-server 10.4.4.1;
  }
  static-binding 00:0d:56:f4:20:01 {
    fixed-address 10.4.4.4;
    host-name "host.domain.tld";
  }
  static-binding 00:0d:56:f4:01:ab {
    fixed-address {
      10.5.5.5;
      10.6.6.6;
    }
    host-name "another-host.domain.tld";
    client-identifier "01aa.001a.bc65.3e";
  }
}

```

Example: Viewing DHCP Bindings

Use the CLI command **show system services dhcp binding** to view information about DHCP address bindings, lease times, and address conflicts.

The following example shows the binding type and lease expiration times for IP addresses configured on a router that supports a DHCP server:

```
user@host> show system services dhcp binding
```

IP Address	Hardware Address	Type	Lease expires at
192.168.1.2	00:a0:12:00:12:ab	static	never
192.168.1.3	00:a0:12:00:13:02	dynamic	2004-05-03 13:01:42 PDT

Enter an IP address to show binding for a specific IP address:

```
user@host> show system services dhcp binding 192.168.1.3
```

```

DHCP binding information:
IP address      192.168.1.3

```

```

Hardware address      00:a0:12:00:12:ab
Client identifier
61 63 65 64 2d 30 30 3a 61 30 3a 31 32 3a 30 30 aced-00:a0:12:00
3a 31 33 3a 30 32
Lease information:
Type                  dynamic
Obtained at           2004-05-02 13:01:42 PDT
Expires at            2004-05-03 13:01:42 PDT

```

Use the **detail** option to show detailed binding information:

```

user@host> show system services dhcp binding detail

DHCP binding information:
IP address             192.168.1.3
Hardware address       00:a0:12:00:12:ab
Pool                   192.168.1.0/24
Interface              fe-0/0/0, relayed by 192.168.4.254
Lease information:
Type                   dynamic
Obtained at            2004-05-02 13:01:42 PDT
Expires at             2004-05-03 13:01:42 PDT
DHCP options:
name-server foo.mydomain.tld
domain-name mydomain.tld
option 19 flag off

```

Example: Viewing DHCP Address Pools

Use the CLI **show system services dhcp pool** command to view information about DHCP address pools.

The following example show address pools configured on a DHCP server:

```

user@ host> show system services dhcp pool

```

Pool name	Low address	High address	Excluded addresses
10.40.1.0/24	10.40.1.1	10.40.1.254	10.40.1.254

Example: Viewing and Clearing DHCP Conflicts

When the DHCP server provides an IP address, the client performs an ARP check to make sure the address is not being used by another client and reports any conflicts back to the server. The server keeps track of addresses with conflicts and removes them from the address pool. Use the CLI command **show system services dhcp conflict** to show conflicts.

```

user@host> show system services dhcp conflict

```

Detection time	Detection method	Address
2004-08-03 19:04:00 PDT	client	192.168.1.5
2004-08-04 04:23:12 PDT	ping	192.168.1.8

Use the **clear system services dhcp conflicts** command to clear the conflicts list and return IP addresses to the pool. The following command shows how to clear an address on the server that has a conflict:

```
user@host> clear system services dhcp conflict 192.168.1.5
```

For more information about CLI commands you can use with the DHCP server, see the [CLI Explorer](#).

Configuring Tracing Operations for DHCP Processes

DHCP tracing operations track all DHCP operations and record them to a log file. By default, no DHCP processes are traced. If you include the **traceoptions** statement at the **[edit system services dhcp]** hierarchy level, the default tracing behavior is the following:

- Important events are logged in a file called **dhcpcd** located in the **/var/log** directory.
- When the file **dhcpcd** reaches 128 kilobytes (KB), it is renamed **dhcpcd.0**, then **dhcpcd.1**, and so on, until there are three trace files. Then the oldest trace file (**dhcpcd.2** 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 configures the tracing operation.

You cannot change the directory in which trace files are located. However, you can customize the other trace file settings by including the following statements at the **[edit system services dhcp traceoptions]** hierarchy level:

```
[edit system services dhcp traceoptions]
file filename <files number> <match regex> <size size> <world-readable |
  no-world-readable>;
flag {
  all;
}
```

Tasks for configuring DHCP tracing operations are:

1. [Configuring the DHCP Processes Log Filename on page 586](#)
2. [Configuring the Number and Size of DHCP Processes Log Files on page 587](#)
3. [Configuring Access to the DHCP Log File on page 587](#)
4. [Configuring a Regular Expression for Refining the Output of DHCP Logged Events on page 587](#)
5. [Configuring DHCP Trace Operation Events on page 588](#)

Configuring the DHCP Processes Log Filename

By default, the name of the file that records trace output is **dhcpcd**. You can specify a different name by including the file statement at the **[edit system services dhcp traceoptions]** hierarchy level:

```
[edit system services dhcp traceoptions]
file filename;
```

Configuring the Number and Size of DHCP Processes 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 system services dhcp traceoptions]** hierarchy level:

```
[edit system services dhcp 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 tracking 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 10KB through 1 gigabyte (GB).

Configuring Access to the DHCP Log File

By default, log files can be accessed only by the user who configures the tracing operation.

To specify that any user can read all log files, include the **file world-readable** statement at the **[edit system services dhcp traceoptions]** hierarchy level:

```
[edit system services dhcp traceoptions]
file world-readable;
```

To set the default behavior explicitly, include the **file no-world-readable** statement at the **[edit system services dhcp traceoptions]** hierarchy level:

```
[edit system services dhcp traceoptions]
file no-world readable;
```

Configuring a Regular Expression for Refining the Output of DHCP Logged Events

By default, the trace operations output includes all lines relevant to the logged events.

You can refine the output by including the **match** statement at the **[edit system services dhcp traceoptions file filename]** hierarchy level and specifying a regular expression (regex) to be matched:

```
[edit system services dhcp traceoptions]
file filename match regex;
```

Configuring DHCP Trace Operation Events

By default, only important events are logged. You can configure the trace operations to be logged by including the following options at the `[edit system services dhcp traceoptions]` hierarchy level:

```
[edit dhcp system services dhcp traceoptions]
flag {
  all;
  binding;
  config;
  conflict;
  event;
  ifdb;
  io;
  lease;
  main;
  misc;
  packet;
  options;
  pool;
  protocol;
  rtsock;
  scope;
  signal;
  trace;
  ui;
}
```

See Also

DHCP Processes Tracing Flags

Table 48 on page 588 describes which operation or event is recorded by each DHCP tracing flag. By default, all flags are disabled.

Table 48: DHCP Processes Tracing Flags

Flag	Operation or Event
all	All operations.
binding	Binding operations.
config	Logins to the configuration database.
conflict	Client-detected conflicts for IP addresses.
event	Important events.
ifdb	Interface database operations.

Table 48: DHCP Processes Tracing Flags (continued)

Flag	Operation or Event
io	I/O operations.
lease	Lease operations.
main	Main loop operations.
misc	Miscellaneous operations.
packet	DHCP packets.
options	DHCP options.
pool	Address pool operations.
protocol	Protocol operations.
rtsock	Routing socket operations.
scope	Scope operations.
signal	DHCP signal operations.
trace	Tracing operations.
ui	User interface operations.

Configuring the Router as an Extended DHCP Local Server

You can enable the router to function as an extended DHCP local server and configure the extended DHCP local server options on the router. The extended DHCP local server provides an IP address and other configuration information in response to a client request.

The extended DHCP local server enhances traditional DHCP server operation in which the client address pool and client configuration information reside on the DHCP server. With the extended DHCP local server, the client address and configuration information reside in centralized address-assignment pools, which are managed independently of the DHCP local server and which can be shared by different client applications.

The extended DHCP local server also supports advanced pool matching and the use of named address ranges. You can also configure the local server to use DHCP option 82 information in the client PDU to determine which named address range to use for a particular client. The client configuration information, which is configured in the address-assignment pool, includes user-defined options, such as boot server, grace period, and lease time.

Configuring the DHCP environment that includes the extended DHCP local server requires two independent configuration operations, which you can complete in any order. In one operation, you configure the extended DHCP local server on the router and specify how the DHCP local server determines which address-assignment pool to use. In the other operation, you configure the address-assignment pools used by the DHCP local server. The address-assignment pools contain the IP addresses, named address ranges, and configuration information for DHCP clients. See *Address-Assignment Pool Configuration Overview* for details about creating and using address-assignment pools.



NOTE: The extended DHCP local server and the address-assignment pools used by the server must be configured in the same logical system and routing instance.

You cannot configure the extended DHCP local server and extended DHCP relay on the same interface.

To configure the extended DHCP local server on the router, include the **dhcp-local-server** statement at the **[edit system services]** hierarchy level:

```
[edit system services]
dhcp-local-server {
  authentication {
    password password-string;
    username-include {
      circuit-type;
      delimiter delimiter-character;
      domain-name domain-name-string;
      logical-system-name;
      mac-address;
      option-60;
```

```

    option-82 <circuit-id> <remote-id>;
    routing-instance-name;
    user-prefix user-prefix-string;
  }
}
group group-name {
  authentication {
    password password-string;
    username-include {
      circuit-type;
      delimiter delimiter-character;
      domain-name domain-name-string;
      logical-system-name;
      mac-address;
      option-60;
      option-82 <circuit-id> <remote-id>;
      routing-instance-name;
      user-prefix user-prefix-string;
    }
  }
}
interface interface-name <upto upto-interface-name> <exclude>;
}
pool-match-order {
  ip-address-first;
  option-82;
}
}

```

You can also include these statements at the following hierarchy levels:

- [edit logical-systems *logical-system-name* system services]
- [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services]
- [edit routing-instances *routing-instance-name* system services]

In addition, you can configure tracing for DHCP local server operations by including the **traceoptions** statement at the [edit system processes **dhcp-service**] hierarchy level:

```

[edit system processes]
traceoptions {
  file filename <files number> <match regular-expression> <size maximum-file-size>
    <world-readable | no-world-readable>;
  flag flag;
  level (all | error | info | notice | verbose | warning);
  no-remote-trace;
}

```

Related Documentation

- [Example: Configuring the Minimum Extended DHCP Local Server Configuration on page 600](#)
- [Example: Extended DHCP Local Server Configuration with Optional Pool Matching on page 600](#)

Interaction Among the DHCP Client, Extended DHCP Local Server, and Address-Assignment Pools

In a typical carrier edge network configuration, the DHCP client is on the subscriber's computer, and the DHCP local server is configured on the router. The following steps provide a high-level description of the interaction among the DHCP local server, DHCP client, and address-assignment pools:

1. The DHCP client sends a discover packet to one or more DHCP local servers in the network to obtain configuration parameters and an IP address for the subscriber.
2. Each DHCP local server that receives the discover packet then searches its address-assignment pool for the client address and configuration options. Each local server creates an entry in its internal client table to keep track of the client state, then sends a DHCP offer packet to the client.
3. On receipt of the offer packet, the DHCP client selects the DHCP local server from which to obtain configuration information and sends a request packet indicating the DHCP local server that will grant the address and configuration information.
4. The selected DHCP local server sends an acknowledgement packet to the client that contains the client address lease and configuration parameters. The server also installs the host route and ARP entry, and then monitors the lease state.

Extended DHCP Local Server and Address-Assignment Pools

The extended DHCP local server enhances traditional DHCP server operation in which the client address pool and client configuration information reside on the DHCP server. With the extended DHCP local server, the client address and configuration information reside in centralized address-assignment pools, which are managed independently of the DHCP local server and which can be shared by different client applications.

The extended DHCP local server also supports advanced pool matching and the use of named address ranges. You can also configure the local server to use DHCP option 82 information in the client PDU to determine which named address range to use for a particular client. The client configuration information, which is configured in the address-assignment pool, includes user-defined options, such as boot server, grace period, and lease time.

Configuring the DHCP environment that includes the extended DHCP local server requires two independent configuration operations, which you can complete in any order. In one operation, you configure the extended DHCP local server on the router and specify how the DHCP local server determines which address-assignment pool to use. In the other operation, you configure the address-assignment pools used by the DHCP local server. The address-assignment pools contain the IP addresses, named address ranges, and configuration information for DHCP clients. See *Address-Assignment Pool Configuration Overview* for details about creating and using address-assignment pools.



NOTE: The extended DHCP local server and the address-assignment pools used by the server must be configured in the same logical system and routing instance.

Methods Used by the Extended DHCP Local Server to Determine Which Address-Assignment Pool to Use

You can specify the method that the extended DHCP local server uses to determine which address-assignment pool provides the IP address and configuration for a DHCP client. By default, the server matches the IP address in the client DHCP request to the address of the address-assignment pool.

The following sections describe the methods used by the DHCP local server to determine which address-assignment pool to use:

- [Matching the Client IP Address to the Address-Assignment Pool on page 593](#)
- [Matching Option 82 Information to Named Address Ranges on page 593](#)

Matching the Client IP Address to the Address-Assignment Pool

In the default configuration, the server selects the address-assignment pool to use by matching the IP address in the client DHCP request with the network address of the address-assignment pool. If the client request contains the gateway IP address (giaddr), the local server matches the giaddr to the address-assignment pool's address. If there is no giaddr in the request, the DHCP local server matches the IP address of the receiving interface to the address of the address-assignment pool.

Matching Option 82 Information to Named Address Ranges

You can also configure the extended DHCP local server to match the DHCP relay agent information option (option 82) in the client DHCP packets to a named range in the address-assignment pool used for the client. Named ranges are subsets within the overall address-assignment pool address range, and are configured when you create the address-assignment pool. To use the DHCP local server option 82 matching feature, you must ensure that the **option-82** statement is included in the **dhcp-attributes** statement for the address-assignment pool.



NOTE: To enable the option 82 matching method, you must first specify the **ip-address-first** statement in the **pool-match-order** statement, and then specify the **option-82** statement.

Default Options Provided by the Extended DHCP Server for the DHCP Client

The extended DHCP local server provides a minimal configuration to the DHCP client if the client does not have DHCP option 55 configured. The server provides the subnet mask of the address-assignment pool that is selected for the client. In addition to the subnet mask, the server provides the following values to the client if the information is configured in the selected address-assignment pool:

- **router**—A router located on the client's subnet. This statement is the equivalent of DHCP option 3.
- **domain name**—The name of the domain in which the client searches for a DHCP server host. This is the default domain name that is appended to hostnames that are not fully qualified. This is equivalent to DHCP option 15.
- **domain name server**—A Domain Name System (DNS) name server that is available to the client to resolve hostname-to-client mappings. This is equivalent to DHCP option 6.

Using External AAA Authentication Services to Authenticate DHCP Clients

Both the extended DHCP local server and the extended DHCP relay agent support the use of external AAA authentication services, such as RADIUS, to authenticate DHCP clients. When the extended DHCP local server or relay agent receives a discover PDU from a client, the extended DHCP application contacts the AAA server to authenticate the DHCP client. The extended DHCP application can obtain client addresses and DHCP configuration options from the external AAA authentication server.



NOTE: This topic uses the term extended DHCP application to refer to both the extended DHCP local server and the extended DHCP relay agent.

The external authentication feature also supports AAA directed logout. If the external AAA service supports a user logout directive, the extended DHCP application honors the logout and views it as if it was requested by a CLI management command. All of the client state information and allocated resources are deleted at logout. The extended DHCP application supports directed logout using the list of configured authentication servers you specify with the **authentication-server** statement at the **[edit access profile profile-name]** hierarchy level.

Tasks for configuring External AAA authentication services are:

1. [Configuring Authentication Support for an Extended DHCP Application on page 595](#)
2. [Grouping Interfaces with Common DHCP Configurations on page 596](#)
3. [Configuring Passwords for Usernames the DHCP Application Presents to the External AAA Authentication Service on page 597](#)
4. [Creating Unique Usernames the Extended DHCP Application Passes to the External AAA Authentication Service on page 597](#)

Configuring Authentication Support for an Extended DHCP Application

To configure authentication support for an extended DHCP application, include the **authentication** statement at these hierarchy levels. You can configure either global authentication support or group-specific support.

You must configure the **username-include** statement to enable the use of authentication. The **password** statement is not required and does not cause DHCP to use authentication if the **username-include** statement is not included.

Extended DHCP local server hierarchies:

- [edit system services dhcp-local-server]
- [edit system services dhcp-local-server group *group-name*]
- [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server]
- [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server group *group-name*]
- [edit logical-systems *logical-system-name* system services dhcp-local-server]
- [edit logical-systems *logical-system-name* system services dhcp-local-server group *group-name*]
- [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server]
- [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server group *group-name*]
- [edit routing-instances *routing-instance-name* system services dhcp-local-server]
- [edit routing-instances *routing-instance-name* system services dhcp-local-server group *group-name*]

Extended DHCP relay agent hierarchies:

- [edit forwarding-options dhcp-relay]
- [edit forwarding-options dhcp-relay group *group-name*]
- [edit logical-systems *logical-system-name* forwarding-options dhcp-relay]
- [edit logical-systems *logical-system-name* forwarding-options dhcp-relay group *group-name*]
- [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* forwarding-options dhcp-relay]
- [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* forwarding-options dhcp-relay group *group-name*]

- [edit routing-instances *routing-instance-name* forwarding-options dhcp-relay]
- [edit routing-instances *routing-instance-name* forwarding-options dhcp-relay group *group-name*]

```
authentication {
  password password-string;
  username-include {
    circuit-type;
    delimiter delimiter-character;
    domain-name domain-name-string;
    logical-system-name;
    mac-address;
    option-60;
    option-82 <circuit-id> <remote-id>;
    routing-instance-name;
    user-prefix user-prefix-string;
  }
}
```

Grouping Interfaces with Common DHCP Configurations

The extended DHCP applications enable you to group together a set of interfaces and apply a common DHCP configuration to the named interface group.

To configure an interface group, use the **group** statement.

```
group group-name {
  authentication {
    password password-string;
    username-include {
      circuit-type;
      delimiter delimiter-character;
      domain-name domain-name-string;
      logical-system-name;
      mac-address;
      option-60;
      option-82 <circuit-id> <remote-id>;
      routing-instance-name;
      user-prefix user-prefix-string;
    }
  }
  interface interface-name <upto upto-interface-name> <exclude>;
}
```

You can specify the names of one or more interfaces on which the extended DHCP application is enabled. You can repeat the **interface interface-name** statement to specify multiple interfaces within a group, but you cannot specify the same interface in more than one group. For example:

```
group boston {
  interface 192.168.10.1;
  interface 192.168.15.5;
```



```
}
```

You can use the *upto* option to specify a range of interfaces on which the extended DHCP application is enabled. For example:

```
group quebec {
  interface 192.168.10.1 upto 192.168.10.255;
}
```

You can use the **exclude** option to exclude a specific interface or a specified range of interfaces from the group. For example:

```
group paris {
  interface 192.168.100.1 exclude;
  interface 192.168.100.100 upto 192.168.100.125 exclude;
}
```

Configuring Passwords for Usernames the DHCP Application Presents to the External AAA Authentication Service

You can configure an optional password that the extended DHCP application presents to the external AAA authentication service to authenticate the specified username.

To configure a password that authenticates the username, use the **password** statement. For example:

```
authentication {
  password myPassword1234;
}
```

Creating Unique Usernames the Extended DHCP Application Passes to the External AAA Authentication Service

You can configure the extended DHCP application to include additional fields in the username passed to the external AAA authentication service when the DHCP client logs in. This additional information enables you to construct usernames that uniquely identify subscribers.



NOTE: No authentication is performed if you do not include a username in the authentication configuration; however, the IP address is provided by the local pool if it is configured.

To configure unique usernames, use the **username-include** statement. You can include any or all of the additional statements.

```
authentication {
  username-include {
    circuit-type;
    delimiter delimiter-character;
```

```

domain-name domain-name-string;
logical-system-name;
mac-address;
option-60;
option-82 <circuit-id> <remote-id>;
routing-instance-name;
user-prefix user-prefix-string;
}

```

The following list describes the attributes that can be included as part of the username:

- **circuit-type**—The circuit type used by the DHCP client, for example **enet**.
- **delimiter**—The delimiter character that separates components that make up the concatenated username. The semicolon (;) is not supported as a delimiter character.
- **domain-name**—The client domain name as string. The router adds the @ delimiter to the username.
- **logical-system-name**—The name of the logical system, if the receiving interface is in a logical system.
- **mac-address**—The client MAC address, in a string of format *xxxx.xxxx.xxxx*.
- **option-60**—The portion of the option 60 payload that follows the length field.
- **option-82 <circuit-id> <remote-id>**—The specified contents of the option 82 payload.
 - **circuit-id**—The payload of the agent circuit ID suboption.
 - **remote-id**—The payload of the Agent Remote ID suboption.
 - Both **circuit-id** and **remote-id**—The payloads of both suboptions, in the format: **circuit-id[delimiter]remote-id**.
 - Neither **circuit-id** or **remote-id**—The raw payload of the option 82 from the PDU is concatenated to the username.
- **routing-instance-name**—The name of the routing instance, if the receiving interface is in a routing instance.
- **user-prefix**—A string indicating the user prefix.

The router creates the unique username by including the specified additional information in the following order, with the fields separated by a delimiter. The default delimiter is a period (.). You can specify a different delimiter; however, the semicolon character (;) is not allowed.

```

user-prefix[delimiter]mac-address[delimiter]logical-system-name[delimiter]
routing-instance-name[delimiter]circuit-type[delimiter]option-82[delimiter]
option-60@domain-name

```

The following example shows a sample configuration that creates a unique username. The username is shown after the configuration.

```
authentication {
  username-include {
    circuit-type;
    domain-name isp55.com;
    mac-address;
    user-prefix wallybrown;
  }
}
```

The resulting unique username is:

```
wallybrown.0090.1a01.1234.enet@isp55.com
```

Client Configuration Information Exchanged Between the External Authentication Server, DHCP Application, and DHCP Client

When the extended DHCP application receives a response from an external authentication server, the response might include information in addition to the IP address and subnet mask. The extended DHCP application uses the information from the authentication grant for the response the DHCP application sends to the DHCP client. The DHCP application can either send the information in its original form or the application might merge the information with local configuration specifications. For example, if the authentication grant includes an address pool name and a local configuration specifies DHCP attributes for that pool, the extended DHCP application merges the authentication results and the attributes in the reply that the server sends to the client.

A local configuration is optional—a client can be fully configured by the external authentication service. However, if the external authentication service does not provide client configuration, you must configure the local address assignment pool to provide the configuration for the client. When a local configuration specifies options, the extended DHCP application adds the local configuration options to the offer PDU the server sends to the client. If the two sets of options overlap, the options in the authentication response from the external service take precedence.

When you use RADIUS to provide the authentication, the additional information might be in the form of RADIUS attributes and Juniper Networks VSAs. The following list shows the information that RADIUS might include in the authentication grant. See *RADIUS Attributes and Juniper Networks VSAs Supported by the AAA Service Framework* for a complete list of RADIUS attributes and Juniper Networks VSAs that the extended DHCP applications supports for subscriber access management.

- Client IP address—RADIUS attribute 8, Framed-IP-Address
- Subnet mask for client IP address (DHCP option 1)—RADIUS attribute 9, Framed-IP-Netmask
- Primary domain server (DHCP option 6)—VSA 26-4, Primary-DNS
- Secondary domain server (DHCP option 6)—VSA 26-5 Secondary-DNS

- Primary WINS server (DHCP option 44)—VSA 26-6, Primary-WINS
- Secondary WINS server (DHCP option 44)—VSA 26-7, Secondary-WINS
- Address assignment pool name—RADIUS attribute 88, Framed-Pool
- Lease time—RADIUS attribute 27, Session-Timeout
- DHCP relay server—VSA 26-109, DHCP-Guided-Relay-Server

Example: Configuring the Minimum Extended DHCP Local Server Configuration

The following example shows the minimum configuration you need to use the extended DHCP local server on the router:

This example creates the server group named **group_one**, and specifies that the DHCP local server is enabled on interface **fe-0/0/2.0** within the group. The DHCP local server uses the default pool match configuration of **ip-address-first**.

```
[edit system services]
dhcp-local-server {
  group group_one {
    interface fe-0/0/2.0;
  }
}
```

Example: Extended DHCP Local Server Configuration with Optional Pool Matching

The following example shows an extended DHCP local server configuration that includes optional pool matching and interface groups. This configuration specifies that the DHCP local server uses option 82 information to match the named address range for client IP address assignment. The option 82 matching must also be included in the address-assignment pool configuration.

```
[edit system services]
dhcp-local-server {
  group group_one {
    interface fe-0/0/2.0;
    interface fe-0/0/2.1;
  }
  group group_two {
    interface fe-0/0/3.0;
    interface fe-0/0/3.1;
  }
  pool-match-order {
    ip-address-first;
    option-82;
  }
}
```

Verifying and Managing the DHCP Server Configuration

To display the client address bindings for the extended DHCP local server, use the following operational commands:

- **show dhcp server binding**
- **show dhcp server statistics**

To clear client address bindings and DHCP local server statistics, use the following operational commands:

- **clear dhcp server binding**
- **clear dhcp server statistics**

For information about using these operations commands, see the *Junos System Basics and Services Reference*.

Tracing Extended DHCP Local Server Operations

The extended DHCP tracing operations track the extended DHCP local server operations and record them in a log file. By default, no extended DHCP local server processes are traced. If you include the **traceoptions** statement at the **[edit system processes dhcp-service]** hierarchy level, the default tracing behavior is the following:

- Important extended DHCP local server events are logged in a file called **jdhcpd** located in the **/var/log** directory.
- When the file **jdhcpd** reaches 128 kilobytes (KB), it is renamed **jdhcpd.0**, then **jdhcpd.1**, and so on, until there are three trace files. Then the oldest trace file (**jdhcpd.2**) is overwritten. For more information about how log files are created, see the *Junos System Log Messages Reference*.
- Log files can be accessed only by the user who configures the tracing operation.



NOTE: In software releases earlier than Junos OS 11.4, you configured tracing statements at the **[edit system services dhcp-local-server]** and **[edit forwarding-options dhcp-relay]** hierarchy levels. Starting in Junos OS Release 11.4, these statements have been deprecated and hidden in favor of a new statement at the **[edit system processes dhcp-service]** hierarchy level. The deprecated statements may be removed from a future release; we recommend that you transition to the new statement.

To trace DHCP local server operations, include the **traceoptions** statement at the **[edit system processes dhcp-service]** hierarchy level:

```
traceoptions {
  file filename <files number> <match regular-expression> <size maximum-file-size>
    <world-readable | no-world-readable>;
  flag flag;
  level (all | error | info | notice | verbose | warning);
  no-remote-trace;
```

```
}
```

The following topics describe the tracing operation configuration statements:

1. [Configuring the Filename of the Extended DHCP Local Server Processes Log on page 602](#)
2. [Configuring the Number and Size of Extended DHCP Local Server Processes Log Files on page 602](#)
3. [Configuring Access to the Log File on page 602](#)
4. [Configuring a Regular Expression for Lines to Be Logged on page 603](#)
5. [Configuring Trace Option Flags on page 603](#)

Configuring the Filename of the Extended DHCP Local Server Processes Log

By default, the name of the file that records trace output is **jdhcpd**. You can specify a different name by including the **file** statement at the **[edit system processes dhcp-service traceoptions]** hierarchy level:

```
[edit system processes dhcp-service traceoptions]  
file filename;
```

Configuring the Number and Size of Extended DHCP Local Server Processes Log Files

By default, when the trace file reaches 128 kilobytes (KB) in size, it is renamed **jdhcpd.0**, then **jdhcpd.1**, and so on, until there are three trace files. Then the oldest trace file (**jdhcpd.2**) is overwritten.

You can configure the limits on the number and size of trace files by including the following statements at the **[edit system processes dhcp-service traceoptions]** hierarchy level:

```
[edit system processes dhcp-service traceoptions]  
file filename 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 tracking operation (**jdhcpd**) reaches 2 MB, **jdhcpd** is renamed **jdhcpd.0**, and a new file called **jdhcpd** is created. When the new **jdhcpd** reaches 2 MB, **jdhcpd.0** is renamed **jdhcpd.1** and **filename** is renamed **jdhcpd.0**. This process repeats until there are 20 trace files. Then the oldest file (**jdhcpd.19**) is overwritten by the newest file (**jdhcpd.0**).

The number of files can be from 2 through 1000 files. The file size of each file can be from 10KB through 1 gigabyte (GB).

Configuring Access to the Log File

By default, log files can be accessed only by the user who configures the tracing operation.

To specify that any user can read all log files, include the **file world-readable** statement at the **[edit system processes dhcp-service traceoptions]** hierarchy level:

```
[edit system processes dhcp-service traceoptions]
```

```
file filename world-readable;
```

To set the default behavior explicitly, include the **file no-world-readable** statement at the **[edit system processes dhcp-service traceoptions]** hierarchy level:

```
[edit system processes dhcp-service traceoptions]
file filename no-world readable;
```

Configuring a Regular Expression for Lines to Be Logged

By default, the trace operations output includes all lines relevant to the logged events.

You can refine the output by including the **match** statement at the **[edit system processes dhcp-service traceoptions]** hierarchy level and specifying a regular expression (regex) to be matched:

```
[edit system processes dhcp-service traceoptions]
file filename match regex;
```

Configuring Trace Option Flags

By default, only important events are logged. You can configure the trace operations to be logged by including extended DHCP local server tracing flags at the **[edit system processes dhcp-service traceoptions]** hierarchy level:

```
[edit system processes dhcp-service traceoptions]
flag flag;
```

You can configure the following tracing flags:

- **all**—Trace all operations.
- **auth**—Trace authentication operations.
- **database**—Trace database events.
- **fwd**—Trace firewall process events.
- **general**—Trace miscellaneous events.
- **ha**—Trace high availability-related events.
- **interface**—Trace interface operations.
- **io**—Trace I/O operations.
- **packet**—Trace packet decoding operations.
- **performance**—Trace performance measurement operations.
- **profile**—Trace profile operations.
- **rpd**—Trace routing protocol process events.
- **rtsock**—Trace routing socket operations.
- **session-db**—Trace session database operations.

- **state**—Trace changes in state.
- **statistics**—Trace baseline statistics.
- **ui**—Trace user interface operations.

CHAPTER 23

Configuring DHCP Access Service on Switches

- [DHCP and BOOTP Relay Overview on page 608](#)
- [DHCP/BOOTP Relay for Switches Overview on page 608](#)
- [Port Number Requirements for DHCP Firewall Filters on page 609](#)
- [Graceful Routing Engine Switchover for DHCP on page 610](#)
- [Extended DHCP Local Server Overview on page 611](#)
- [Configuring DHCP and BOOTP on page 616](#)
- [Example: Minimum Extended DHCP Local Server Configuration on page 616](#)
- [Overriding the Default DHCP Local Server Configuration Settings Overview on page 617](#)
- [Configuring a Token for DHCP Local Server Authentication on page 620](#)
- [Centrally Configured Opaque DHCP Options on page 621](#)
- [Verifying and Managing DHCP Local Server Configuration on page 625](#)
- [Configuring an Extended DHCP Relay Server on EX Series Switches \(CLI Procedure\) on page 626](#)
- [DHCPv6 Local Server Overview on page 628](#)
- [Enabling DHCPv6 Rapid Commit Support on page 629](#)
- [Specifying the Delegated Address Pool for IPv6 Prefix Assignment on page 629](#)
- [Preventing Binding of Clients That Do Not Support Reconfigure Messages on page 630](#)
- [Verifying and Managing DHCPv6 Local Server Configuration on page 631](#)
- [Extended DHCP Relay Agent Overview on page 632](#)
- [Understanding the Extended DHCP Relay Agent for EX Series Switches on page 634](#)
- [Example: Minimum DHCP Relay Agent Configuration on page 635](#)
- [DHCP Relay Proxy Overview on page 636](#)
- [Enabling DHCP Relay Proxy Mode on page 638](#)
- [Overriding the Default DHCP Relay Configuration Settings on page 638](#)
- [Using Layer 2 Unicast Transmission Instead of Broadcast for DHCP Packets on page 641](#)
- [Verifying and Managing DHCP Relay Configuration on page 641](#)
- [Verifying and Managing DHCP Relay Configuration for EX Series Switches on page 642](#)

- [Changing the Gateway IP Address \(giaddr\) Field to the giaddr of the DHCP Relay Agent on page 642](#)
- [Replacing the DHCP Relay Request and Release Packet Source Address on page 642](#)
- [Example: Configuring DHCP Relay Agent Selective Traffic Processing Based on DHCP Option Strings on page 643](#)
- [Disabling DHCP Relay Agent for Interfaces, for Groups, or Globally on page 647](#)
- [DHCPv6 Relay Agent Overview on page 648](#)
- [Inserting DHCPv6 Interface-ID Option \(Option 18\) In DHCPv6 Packets on page 649](#)
- [Verifying and Managing DHCPv6 Relay Configuration on page 650](#)
- [DHCP Snooping Support on page 650](#)
- [Example: Configuring DHCP Snooping Support for DHCP Relay Agent on page 652](#)
- [Preventing Binding of Clients That Do Not Support Reconfigure Messages on page 654](#)
- [Configuring DHCP Snooped Packets Forwarding Support for DHCP Relay Agent on page 655](#)
- [Using DHCP Relay Agent Option 82 Information on page 657](#)
- [How DHCP Relay Agent Uses Option 82 for Auto Logout on page 665](#)
- [Enable Processing of Untrusted Packets So Option 82 Information Can Be Used on page 666](#)
- [Overriding Option 82 Information on page 666](#)
- [Understanding DHCP Services for Switches on page 667](#)
- [Configuring a DHCP Server on Switches \(CLI Procedure\) on page 671](#)
- [Configuring a Switch as a DHCP Server \(CLI Procedure\) on page 674](#)
- [Configuring a DHCP Client \(CLI Procedure\) on page 677](#)
- [Configuring a DHCP SIP Server \(CLI Procedure\) on page 678](#)
- [Disabling Automatic Binding of Stray DHCP Requests on page 679](#)
- [Attaching Dynamic Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces on page 681](#)
- [Using External AAA Authentication Services with DHCP on page 682](#)
- [Creating Unique Usernames for DHCP Clients on page 684](#)
- [Specifying the Maximum Number of DHCP Clients Per Interface on page 687](#)
- [DHCP Local Server Handling of Client Information Request Messages on page 688](#)
- [Enabling Processing of Client Information Requests on page 689](#)
- [Sending Release Messages When Clients Are Deleted on page 690](#)
- [Understanding Dynamic Reconfiguration of Extended DHCP Local Server Clients on page 690](#)
- [Configuring Dynamic Client Reconfiguration of Extended Local Server Clients Overview on page 693](#)
- [Requesting DHCP Local Server to Initiate Reconfiguration of Client Bindings on page 695](#)
- [Configuring Dynamic Reconfiguration Attempts for DHCP Clients on page 696](#)

- [Configuring Deletion of the Client When Dynamic Reconfiguration Fails on page 697](#)
- [Configuring Reconfiguration of the Client on Receipt of RADIUS-Initiated Disconnect on page 697](#)
- [DHCP Auto Logout Overview on page 698](#)
- [Automatically Logging Out DHCP Clients on page 699](#)
- [Configuring Named Server Groups on page 700](#)
- [Configuring Active Server Groups to Apply a Common DHCP Relay Agent Configuration to Named Server Groups on page 701](#)
- [Grouping Interfaces with Common DHCP Configurations on page 704](#)
- [Guidelines for Configuring Interface Ranges for Groups of DHCP Interfaces on page 705](#)
- [Configuring Group-Specific DHCP Local Server Options on page 706](#)
- [Configuring Group-Specific DHCP Relay Options on page 706](#)
- [DHCP Liveness Detection Overview on page 707](#)
- [Configuring Detection of DHCP Relay or DHCP Relay Proxy Client Connectivity with BFD on page 709](#)
- [Configuring Detection of DHCP Local Server Client Connectivity with BFD on page 711](#)
- [Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714](#)
- [DHCP Message Exchange Between DHCP Clients and DHCP Server in Different VRFs on page 717](#)
- [Configuring DHCP Message Exchange Between DHCP Server and Clients in Different Virtual Routing Instances on page 718](#)
- [Address-Assignment Pools Overview on page 721](#)
- [Configuring How the Extended DHCP Local Server Determines Which Address-Assignment Pool to Use on page 723](#)
- [Example: Extended DHCP Local Server Configuration with Optional Pool Matching on page 725](#)
- [Assign a Specific IP Address to a Client Using DHCP Option 50 and DHCPv6 IA_NA Option on page 725](#)
- [Multiple Address Assignment for DHCPv6 Clients on page 726](#)
- [Suppressing DHCP Access, Access-Internal, and Destination Routes on page 727](#)
- [Preventing DHCP from Installing Access, Access-Internal, and Destination Routes by Default on page 728](#)
- [Tracing Extended DHCP Operations on page 729](#)
- [Tracing Extended DHCP Operations for Specific Interfaces on page 735](#)

DHCP and BOOTP Relay Overview

You can configure a Juniper Networks switch to act as a Dynamic Host Configuration Protocol (DHCP) or Bootstrap Protocol (BOOTP) relay agent. This means that if the switch receives a broadcast DHCP or BOOTP request from a locally attached host (client), it relays the message to a specified DHCP or BOOTP server. You should configure the switch to be a DHCP/BOOTP relay agent if you have locally attached hosts and a distant DHCP or BOOTP server.

You can configure the switch to use the gateway IP address (`giaddr`) as the source IP address of the switch for relayed DHCP packets when the switch is used as the DHCP relay agent. For information on configuring this option, see the [source-address-giaddr](#) configuration statement.

You can also use smart DHCP relay, which enables you to configure alternative IP addresses for the gateway interface so that if the server fails to reply to the requests sent from the primary gateway address, the switch can resend the requests using the alternative gateway addresses. To use this feature, you must configure a Layer 3 interface, Layer 3 subinterface, or IRB interface with multiple IP addresses and configure that interface to be a relay agent.



NOTE: Because DHCP and BOOTP messages are broadcast and are not directed to a specific server, switch, or router, Juniper switches cannot function as both a DHCP server and a DHCP/BOOTP relay agent at the same time. The Junos operating system (Junos OS) generates a commit error if both options are configured at the same time, and the commit operation does not succeed until one of the options is removed.

Related Documentation

- [Configuring DHCP and BOOTP on page 616](#)

DHCP/BOOTP Relay for Switches Overview

You can configure the switch to act as a Dynamic Host Configuration Protocol (DHCP) or Bootstrap Protocol (BOOTP) relay agent. This means that a locally attached host can issue a DHCP or BOOTP request as a broadcast message. After the switch receives this broadcast message, it relays the message to a specified DHCP or BOOTP server. You must configure the switch to be a DHCP or BOOTP relay agent if you have locally attached hosts and a remote DHCP or BOOTP server.

You can configure a switch to use the gateway IP address (`giaddr`) as the source IP address of the switch for relayed DHCP packets when the switch is used as the DHCP relay agent. For information about configuring this option, see the [source-address-giaddr](#) configuration statement.



NOTE: Because DHCP and BOOTP messages are broadcast and are not directed to a specific server, switch, or router, EX Series switches and the QFX Series cannot function as both a DHCP server and a DHCP or BOOTP relay agent at the same time. The Juniper Networks Junos operating system (Junos OS) generates a commit error if both options are configured at the same time, and the commit operation does not succeed until one of the options is removed.



NOTE: DHCP relay across routing instances is not supported on EX Series switches or on the QFX Series.

Related Documentation

- [Understanding DHCP Services for Switches on page 667](#)
- [Configuring DHCP and BOOTP on page 616](#)
- [Verifying and Managing DHCP Relay Configuration](#)

Port Number Requirements for DHCP Firewall Filters

When you configure a firewall filter to perform some action on DHCP packets at the Routing Engine, such as protecting the Routing Engine by allowing only proper DHCP packets, you must specify both port 67 (bootps) and port 68 (bootpc) for both the source and destination. The firewall filter acts at both the line cards and the Routing Engine.

This requirement applies to both DHCP local server and DHCP relay, but it applies only when DHCP is provided by the `jdhcpd` process. MX Series routers use `jdhcpd`. For DHCP relay, that means the configuration is required only at the **[edit forwarding-options dhcp-relay]** hierarchy level and not at the **[edit forwarding-options helpers bootp]** hierarchy level.

DHCP packets received on the line cards are encapsulated by `jdhcpd` with a new UDP header where their source and destination addresses are set to port 68 before being forwarded to the Routing Engine.

For DHCP relay and DHCP proxy, packets sent to the DHCP server from the router have both the source and destination UDP ports set to 67. The DHCP server responds using the same ports. However, when the line card receives these DHCP response packets, it changes both port numbers from 67 to 68 before passing the packets to the Routing Engine. Consequently the filter needs to accept port 67 for packets relayed from the client to the server, and port 68 for packets relayed from the server to the client.

Failure to include both port 67 and port 68 as described here results in most DHCP packets not being accepted.

For complete information about configuring firewall filters in general, see *Routing Policies, Firewall Filters, and Traffic Policers Feature Guide*.

- Related Documentation**
- *Example: Configuring a DHCP Firewall Filter to Protect the Routing Engine*
 - [Extended DHCP Local Server Overview on page 611](#)
 - [Extended DHCP Relay Agent Overview on page 632](#)
 - *Understanding Dynamic Firewall Filters*

Graceful Routing Engine Switchover for DHCP

For EX Series switches, only extended DHCP local server maintains the state of active DHCP client leases. The DHCP local server supports the attachment of dynamic profiles and also interacts with the local AAA Service Framework to use back-end authentication servers, such as RADIUS, to provide subscriber authentication. You can configure dynamic profile and authentication support on a global basis or for a specific group of interfaces. The extended DHCP local server also supports the use of Junos address-assignment pools or external authorities, such as RADIUS, to provide the client address and configuration information.

For MX Series routers, the extended DHCP local server and the DHCP relay agent applications both maintain the state of active DHCP client leases in the session database. The extended DHCP application can recover this state if the DHCP process fails or is manually restarted, thus preventing the loss of active DHCP clients in either of these circumstances. However, the state of active DHCP client leases is lost if a power failure occurs or if the kernel stops operating (for example, when the router is reloaded) on a single Routing Engine.

You can enable graceful switchover support on both EX Series switches and MX Series routers. To enable graceful switchover support for the extended DHCP local server or extended DHCP relay agent on a switch, include the **graceful-switchover** statement at the **[edit chassis redundancy]** hierarchy level. To enable graceful Routing Engine switchover support on MX Series routers, include the **graceful-switchover** statement at the **[edit chassis redundancy]** hierarchy level. You cannot disable graceful Routing Engine switchover support for the extended DHCP application when the router is configured to support graceful Routing Engine switchover.

For more information about using graceful Routing Engine switchover, see *Understanding Graceful Routing Engine Switchover*.

- Related Documentation**
- [Extended DHCP Local Server Overview on page 611](#)
 - [Extended DHCP Relay Agent Overview on page 632](#)
 - *High Availability Using Unified ISSU in the PPP Access Network*

Extended DHCP Local Server Overview

Junos OS includes an extended DHCP local server that enhances traditional DHCP server operation by providing additional address assignment and client configuration functionality and flexibility in a subscriber-aware environment. The extended DHCP local server enables service providers to take advantage of external address-assignment pools and integrated RADIUS-based configuration capabilities in addition to the continued support of traditional local address pools. The address-assignment pools are considered external because they are external to the DHCP local server. The pools are managed independently of the DHCP local server, and can be shared by different client applications, such as DHCP or PPPoE access. [Table 49 on page 612](#) provides a comparison of the extended DHCP local server and a traditional DHCP local server.

The extended DHCP local server provides an IP address and other configuration information in response to a client request. The server supports the attachment of dynamic profiles and also interacts with the local AAA Service Framework to use back-end authentication servers, such as RADIUS, to provide DHCP client authentication. You can configure the dynamic profile and authentication support on a global basis or for a specific group of interfaces.

Table 49: Comparing the Extended DHCP Local Server to the Traditional DHCP Local Server

Feature	Extended DHCP Local Server	Traditional DHCP Local Server
Local address pools	X	X
External, centrally-managed address pools	X	—
Local configuration	X	X
External configuration using information from address-assignment pools or RADIUS servers	X	—
Dynamic-profile attachment	X	—
RADIUS-based subscriber authentication, and configuration using RADIUS attributes and Juniper Networks VSAs	X	—
IPv6 client support	X	—
Default minimum client configuration	X	X

You can also configure the extended DHCP local server to support IPv6 clients. Both DHCP local server and DHCPv6 local server support the specific address request feature, which enables you to assign a particular address to a client.



NOTE: If you delete the DHCP server configuration, DHCP server bindings might still remain. To ensure that DHCP bindings are removed, issue the `clear dhcp server binding` command before you delete the DHCP server configuration.

This overview covers:

- [Interaction Among the DHCP Client, Extended DHCP Local Server, and Address-Assignment Pools on page 613](#)
- [Providing DHCP Client Configuration Information on page 614](#)
- [Minimal Configuration for Clients on page 615](#)
- [DHCP Local Server and Address-Assignment Pools on page 615](#)

Interaction Among the DHCP Client, Extended DHCP Local Server, and Address-Assignment Pools

The pattern of interaction between the DHCP local server, the DHCP client, and address-assignment pools is the same regardless of whether you are using a router or a switch. However, there are some differences in the details of usage.

- On routers—In a typical carrier edge network configuration, the DHCP client is on the subscriber's computer or customer premises equipment (CPE), and the DHCP local server is configured on the router.
- On switches—In a typical network configuration, the DHCP client is on an access device, such as a personal computer, and the DHCP local server is configured on the switch.

The following steps provide a high-level description of the interaction among the DHCP local server, DHCP client, and address-assignment pools:

1. The DHCP client sends a discover packet to one or more DHCP local servers in the network to obtain configuration parameters and an IP address for the subscriber (or DHCP client).
2. Each DHCP local server that receives the discover packet then searches its address-assignment pool for the client address and configuration options. Each local server creates an entry in its internal client table to keep track of the client state, then sends a DHCP offer packet to the client.
3. On receipt of the offer packet, the DHCP client selects the DHCP local server from which to obtain configuration information and sends a request packet indicating the DHCP local server selected to grant the address and configuration information.
4. The selected DHCP local server sends an acknowledgement packet to the client that contains the client address lease and configuration parameters. The server also installs the host route and ARP entry, and then monitors the lease state.

Providing DHCP Client Configuration Information

When the extended DHCP application receives a response from an external authentication server, the response might include information in addition to the IP address and subnet mask. The extended DHCP application uses the information from the authentication grant for the response the DHCP application sends to the DHCP client. The DHCP application can either send the information in its original form or the application might merge the information with local configuration specifications. For example, if the authentication grant includes an address pool name and a local configuration specifies DHCP attributes for that pool (such as, DNS server address), the extended DHCP application merges the authentication results and the attributes in the reply that the server sends to the client.

A local configuration is optional — a client can be fully configured by the external authentication service. However, if the external authentication service does not provide client configuration, you might need to configure the local address-assignment pool to provide the configuration information, such as DNS server, for the client. When a local configuration specifies options, the extended DHCP application adds the local configuration options to the offer PDU the server sends to the client. If the two sets of options overlap, the options in the authentication response from the external service take precedence.

When you use RADIUS to provide the authentication, the additional information might be in the form of RADIUS attributes and Juniper Networks VSAs. [Table 50 on page 614](#) lists the information that RADIUS might include in the authentication grant. See *RADIUS Attributes and Juniper Networks VSAs Supported by the AAA Service Framework* for a complete list of RADIUS attributes and Juniper Networks VSAs that the extended DHCP applications supports for subscriber access management or DHCP management.

Table 50: Information in Authentication Grant

Attribute Number	Attribute Name	Description
RADIUS attribute 8	Framed-IP-Address	Client IP address
RADIUS attribute 9	Framed-IP-Netmask	Subnet mask for client IP address (DHCP option 1)
Juniper Networks VSA 26-4	Primary-DNS	Primary domain server (DHCP option 6)
Juniper Networks VSA 26-5	Secondary-DNS	Secondary domain server (DHCP option 6)
Juniper Networks VSA 26-6	Primary-WINS	Primary WINS server (DHCP option 44)
Juniper Networks VSA 26-7	Secondary-WINS	Secondary WINS server (DHCP option 44)
RADIUS attribute 27	Session-Timeout	Lease time

Table 50: Information in Authentication Grant (continued)

Attribute Number	Attribute Name	Description
RADIUS attribute 88	Framed-Pool	Address assignment pool name
Juniper Networks VSA 26-109	DHCP-Guided-Relay-Server	DHCP relay server

Minimal Configuration for Clients

The extended DHCP local server provides a minimal configuration to the DHCP client if the client does not have DHCP option 55 configured. The server provides the subnet mask of the address-assignment pool that is selected for the client. In addition to the subnet mask, the server provides the following values to the client if the information is configured in the selected address-assignment pool:

- **router**—A router located on the client's subnet. This statement is the equivalent of DHCP option 3.
- **domain name**—The name of the domain in which the client searches for a DHCP server host. This is the default domain name that is appended to hostnames that are not fully qualified. This is equivalent to DHCP option 15.
- **domain name server**—A Domain Name System (DNS) name server that is available to the client to resolve hostname-to-client mappings. This is equivalent to DHCP option 6.

DHCP Local Server and Address-Assignment Pools

In the traditional DHCP server operation, the client address pool and client configuration information reside on the DHCP server. With the extended DHCP local server, the client address and configuration information reside in external address-assignment pools (external to the DHCP local server). The external address-assignment pools are managed by the **authd** process, independently of the DHCP local server, and can be shared by different client applications.

The extended DHCP local server also supports advanced pool matching and the use of named address ranges. You can also configure the local server to use DHCP option 82 information in the client PDU to determine which named address range to use for a particular client. The client configuration information, which is configured in the address-assignment pool, includes user-defined options, such as boot server, grace period, and lease time.

Configuring the DHCP environment that includes the extended DHCP local server requires two independent configuration operations, which you can complete in any order. In one operation, you configure the extended DHCP local server on the router and specify how the DHCP local server determines which address-assignment pool to use. In the other operation, you configure the address-assignment pools used by the DHCP local server. The address-assignment pools contain the IP addresses, named address ranges, and configuration information for DHCP clients.



NOTE: The extended DHCP local server and the address-assignment pools used by the server must be configured in the same logical system and routing instance.

Configuring DHCP and BOOTP

You can configure a switch to act as a Dynamic Host Configuration Protocol (DHCP) and Bootstrap Protocol (BOOTP) server or DHCP relay agent. When a switch is a relay agent, if a locally attached host issues a DHCP or BOOTP request as a broadcast message, the switch relays the message to a specified DHCP or BOOTP server. You should configure a switch to be a DHCP and BOOTP relay agent if you have locally attached hosts and a remote DHCP or BOOTP server.



NOTE: This task uses the Enhanced Layer 2 Software (ELS) configuration style. If your switch runs software that does not support ELS, see *Configuring DHCP and BOOTP Relay*. For ELS details, see *Using the Enhanced Layer 2 Software CLI*.

To configure a switch to be a server, use the `dhcp-local-server` statement. To configure a switch to be a relay agent, use the `dhcp-relay` statement.

If you want to enable BOOTP support when the switch is configured to be a DHCP server, enter the following statement:

```
[edit system services dhcp-local-server]
user@switch# set overrides bootp-support
```

If you want to enable BOOTP support when the switch is configured to be a DHCP relay agent, enter the following statement:

```
[edit forwarding-options dhcp-relay]
user@switch# set overrides bootp-support
```

Example: Minimum Extended DHCP Local Server Configuration

This example shows the minimum configuration you need to use for the extended DHCP local server on the router or switch:

```
[edit system services]
dhcp-local-server {
  group group_one {
    interface fe-0/0/2.0;
  }
}
```



NOTE: The interface type in this topic is just an example. The **fe-** interface type is not supported by EX Series switches.

This example creates the server group named **group_one**, and specifies that the DHCP local server is enabled on interface **fe-0/0/2.0** within the group. The DHCP local server uses the default pool match configuration of **ip-address-first**.



NOTE: If you delete the DHCP server configuration, DHCP server bindings might still remain. To ensure that DHCP bindings are removed, issue the **clear dhcp server binding** command before you delete the DHCP server configuration.

Related Documentation

- [Extended DHCP Local Server Overview on page 611](#)

Overriding the Default DHCP Local Server Configuration Settings Overview

Subscriber management enables you to override certain default DHCP local server configuration settings. You can override the configuration settings at the global level, for a named group of interfaces, or for a specific interface within a named group.

- To override global default DHCP local server configuration options, include the **overrides** statement and its subordinate statements at the **[edit system services dhcp-local-server]** hierarchy level.
- To override DHCP local server configuration options for a named group of interfaces, include the statements at the **[edit system services dhcp-local-server group group-name]** hierarchy level.
- To override DHCP local server configuration options for a specific interface within a named group of interfaces, include the statements at the **[edit system services dhcp-local-server group group-name interface interface-name]** hierarchy level.
- To configure overrides for DHCPv6 local server at the global level, group level, or per-interface, use the corresponding statements at the **[edit system services dhcp-local-server dhcpv6]** hierarchy level.

To override default DHCP local server configuration settings:

1. (DHCPv4 and DHCPv6) Specify that you want to configure override options.

- DHCPv4 overrides.

Global override:

```
[edit system services dhcp-local-server]
user@host# edit overrides
```

Group-level override:

```
[edit system services dhcp-local-server]
user@host# edit group group-name overrides
```

Per-interface override:

```
[edit system services dhcp-local-server]
user@host# edit group group-name overrides interface interface-name
```

DHCPv6 overrides.

Global override:

```
[edit system services dhcp-local-server dhcpv6]
user@host# edit overrides
```

Group level override:

```
[edit system services dhcp-local-server dhcpv6]
user@host# edit group group-name overrides
```

Per-interface override:

```
[edit system services dhcp-local-server dhcpv6]
user@host# edit group group-name overrides interface interface-name
```

2. (Optional) Override the maximum number of DHCP clients allowed per interface.

See [“Specifying the Maximum Number of DHCP Clients Per Interface” on page 687](#).

3. (Optional) Configure DHCP client auto logout.

See [“Automatically Logging Out DHCP Clients” on page 699](#).

4. (Optional) Enable processing of information requests from clients.

See [“Enabling Processing of Client Information Requests” on page 689](#).

5. (Optional) Specify that DHCP NAK and FORCERENEW messages support option 82 information.

See [Configuring DHCP Message Exchange Between DHCP Server and Clients in Different Virtual Routing Instances](#).

6. (Optional, DHCPv6 only) Specify a delegated pool name to use for DHCPv6 multiple address assignment.

See [Specifying the Delegated Address-Assignment Pool to Be Used for DHCPv6 Prefix Delegation](#).

7. (Optional, DHCPv6 only) Enable DHCPv6 rapid commit support.

See ["Enabling DHCPv6 Rapid Commit Support" on page 629](#).

8. (Optional, DHCPv6 only) Specify that DHCPv6 local server return DNS server addresses as IA_NA or IA_PD suboptions rather than as a global DHCPv6 option.

See [Overriding How the DNS Server Address Is Returned in a DHCPv6 Multiple Address Environment](#).

9. (Optional, DHCPv6 only) Automatically log out existing client when new client solicits on same interface.

See [Automatically Logging Out DHCPv6 Clients](#).

10. (Optional) Specify that when the DHCP or DHCPv6 local server receives a Discover or Solicit message that has a client ID that matches the existing client entry, the local server deletes the existing client entry.

See [DHCP Behavior When Renegotiating While in Bound State](#).

11. (Optional, DHCPv4 and DHCPv6) Specify that a short lease be sent to the client.

See [Configuring DHCP Asymmetric Leasing](#).

12. (Optional, DHCPv4 and DHCPv6) Specify DHCP attributes globally or for groups.

See [Configuring DHCP Attributes for All Clients or a Group of Clients](#).

13. Load balance traffic by allowing some local servers to respond to specific clients while preventing other local servers from responding immediately to these clients.

See [Delaying DHCP Offer and Advertise Responses to Load Balance DHCP Servers](#).

Configuring a Token for DHCP Local Server Authentication

You can configure an authentication token to provide rudimentary protection against inadvertently instantiated DHCP servers. You can configure the local server to include a constant, unencoded token in the DHCP forcere new message as part of the authentication option it sends to clients. If the service provider has previously configured the DHCP client with a token, then the client can compare that token against the newly received token. If the tokens do not match, the DHCP client discards the forcere new message. This functionality corresponds to RFC 3118, *Authentication for DHCP Messages*, section 4.

(Optional) To configure the DHCP local server to include a token in the forcere new message sent to the client, for all clients:

- Specify the token.

For DHCPv4:

```
[edit system services dhcp-local-server reconfigure]
user@host# set token token-value
```

For DHCPv6:

```
[edit system services dhcp-local-server dhcpv6 reconfigure]
user@host# set token token-value
```

(Optional) For only a particular group of clients:

- Specify the token.

For DHCPv4:

```
[edit system services dhcp-local-server group group-name reconfigure]
user@host# set token token-value
```

For DHCPv6:

```
[edit system services dhcp-local-server dhcpv6 group group-name reconfigure]
user@host# set token token-value
```


Centrally Configured Opaque DHCP Options

Subscriber management (on the routers) or DHCP management (on the switches) enables you to centrally configure DHCP options on a RADIUS server and then distribute the options on a per-subscriber or per DHCP-client basis. This method results in RADIUS-sourced DHCP options—the DHCP options originate at the RADIUS server and are sent to the subscriber (or DHCP client). This differs from the traditional client-sourced method (also called DHCP-sourced) of configuring DHCP options, in which the options originate at the client and are sent to the RADIUS server. The subscriber management (DHCP management) RADIUS-sourced DHCP options are also considered to be *opaque*, because DHCP local server performs minimal processing and error checking for the DHCP options string before passing the options to the subscriber (DHCP client).

Subscriber management (or DHCP management) uses Juniper Networks VSA 26-55 (DHCP-Options) to distribute the RADIUS-sourced DHCP options. The RADIUS server includes VSA 26-55 in the Access-Accept message that the server returns during subscriber authentication or DHCP client authentication. The RADIUS server sends the Access-Accept message to the RADIUS client, and then on to DHCP local server for return to the DHCP subscriber. The RADIUS server can include multiple instances of VSA 26-55 in a single Access-Accept message. The RADIUS client concatenates the multiple instances and uses the result as a single instance.

There is no CLI configuration required to enable subscriber management (DHCP management) to use the centrally configured DHCP options—the procedure is triggered by the presence of VSA 26-55 in the RADIUS Access-Accept message.

When building the offer packet for the DHCP client, DHCP local server uses the following sequence:

1. Processes any RADIUS-configured parameters that are passed as separate RADIUS attributes; for example, RADIUS attribute 27 (Session Timeout).
2. Processes any client-sourced parameters; for example, RADIUS attributes 53 (DHCP Message Type) and 54 (Server Identifier).
3. Appends (without performing any processing) the opaque DHCP options string contained in the VSA 26-55 received from the RADIUS server.

In addition to supporting central configuration of DHCP options directly on the RADIUS server (RADIUS-sourced options), subscriber management (DHCP management) also supports the traditional client-sourced options configuration, in which the router's (switch's) DHCP component sends the options to the RADIUS server. The client-sourced DHCP options method is supported for both DHCP local server and DHCP relay agent; however, the RADIUS-sourced central configuration method is supported on DHCP local server only. Both the RADIUS-sourced and client-sourced methods support DHCPv4 and DHCPv6 subscribers (clients).



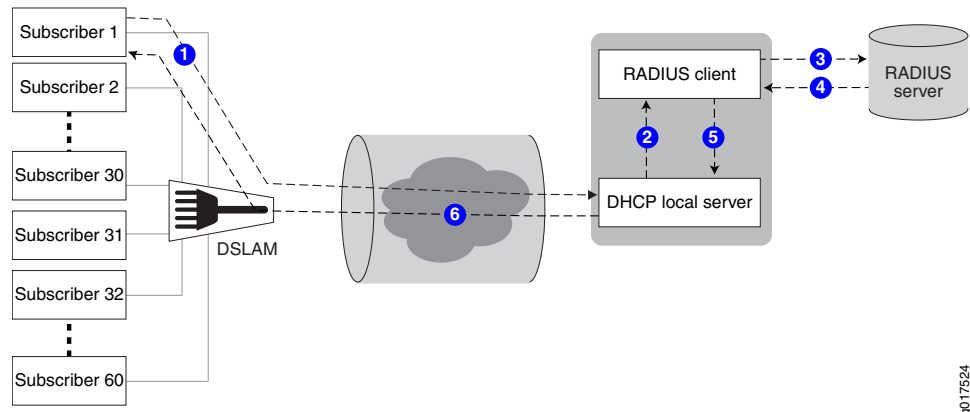
NOTE: You can use the RADIUS-sourced and client-sourced methods simultaneously on DHCP local server. However, you must ensure that the central configuration method does not include options that override client-sourced DHCP options, because this can create unpredictable results.

- [Data Flow for RADIUS-Sourced DHCP Options on page 623](#)
- [Multiple VSA 26-55 Instances Configuration on page 624](#)
- [DHCP Options That Cannot Be Centrally Configured on page 624](#)

Data Flow for RADIUS-Sourced DHCP Options

Figure 34 on page 623 shows the procedure subscriber management (DHCP management) uses when configuring DHCP options for subscribers (DHCP clients).

Figure 34: DHCP Options Data Flow



The following general sequence describes the data flow when subscriber management (DHCP management) uses RADIUS-sourced DHCP options and VSA 26-55 to configure a DHCP subscriber (client):

1. The subscriber (DHCP client) sends a DHCP discover message (or DHCPv6 solicit message) to the DHCP local server. The message includes client-sourced DHCP options.
2. The DHCP local server initiates authentication with the Junos OS RADIUS client.
3. The RADIUS client sends an Access-Request message on behalf of the subscriber (DHCP client) to the external RADIUS server. The message includes the subscriber's (DHCP client's) client-sourced DHCP options.
4. The external RADIUS server responds by sending an Access-Accept message to the RADIUS client. The Access-Accept message includes the RADIUS-sourced opaque DHCP options in VSA 26-55.
5. The RADIUS client sends the DHCP options string to DHCP local server. If there are multiple VSA 26-55 instances, the RADIUS client first assembles them into a single options string.
6. DHCP local server processes all options into the DHCP offer (or DHCPv6 reply) message, except for the RADIUS-sourced VSA 26-55 DHCP options. After processing

all other options, DHCP local server then appends the unmodified VSA 26-55 DHCP options to the message and sends the message to the subscriber (DHCP client).

7. The subscriber (DHCP client) is configured with the DHCP options.
8. The following operations occur after the subscriber (DHCP client) receives the DHCP options:
 - Accounting—The RADIUS client sends Acct-Start and Interim-Accounting requests to the RADIUS server, including the RADIUS-sourced DHCP options in VSA 26-55. By default, the DHCP options are included in accounting requests.
 - Renewal—When the subscriber (DHCP client) renews, the cached DHCP options value is returned in the DHCP renew (or DHCPv6 ACK) message. The originally assigned DHCP options cannot be modified during a renew cycle.
 - Logout—When the subscriber (DHCP client) logs out, the RADIUS client sends an Acct-Stop message to the RADIUS server, including the RADIUS-sourced VSA 26-55.

Multiple VSA 26-55 Instances Configuration

VSA 26-55 supports a maximum size of 247 bytes. If your RADIUS-sourced DHCP options field is greater than 247 bytes, you must break the field up and manually configure multiple instances of VSA 26-55 for the RADIUS server to return. When using multiple instances for an options field, you must place the instances in the packet in the order in which the fragments are to be reassembled by the RADIUS client. The fragments can be of any size of 247 bytes or less.



BEST PRACTICE: For ease of configuration and management of your DHCP options, you might want to have one DHCP option per VSA 26-55 instance, regardless of the size of the option field.

When the RADIUS client returns a reassembled opaque options field in an accounting request to the RADIUS server, the client uses 247-byte fragments. If you had originally created instances of fewer than 247 bytes, the returned fragments might not be the same as you originally configured on the RADIUS server.



NOTE: If you are configuring Steel-Belted Radius (SBR) to support multiple VSA 26-55 instances, ensure that you specify VSA 26-55 with the RO flags in the Subscriber Management RADIUS dictionary file. The R value indicates a multivalued reply attribute and the O value indicates an ordered attribute.

DHCP Options That Cannot Be Centrally Configured

Table 51 on page 625 shows the DHCP options that you must not centrally configure on the RADIUS server.

Table 51: Unsupported Opaque DHCP Options

DHCP Option	Option Name	Comments
Option 0	Pad Option	Not supported.
Option 51	IP Address Lease Time	Value is provided by RADIUS attribute 27 (Session-Timeout).
Option 52	Option Overload	Not supported.
Option 53	DHCP Message Type	Value is provided by DHCP local server.
Option 54	Server Identifier	Value is provided by DHCP local server.
Option 55	Parameter Request List	Value is provided by DHCP local server.
Option 255	End	Value is provided by DHCP local server.
–	DHCP magic cookie	Not supported.

Verifying and Managing DHCP Local Server Configuration

Purpose View or clear information about client address bindings and statistics for the extended DHCP local server.



NOTE: If you delete the DHCP server configuration, DHCP server bindings might still remain. To ensure that DHCP bindings are removed, issue the `clear dhcp server binding` command before you delete the DHCP server configuration.

Action • To display the address bindings in the client table on the extended DHCP local server:

```
user@host> show dhcp server binding routing-instance customer routing instance
```

• To display extended DHCP local server statistics:

```
user@host> show dhcp server statistics routing-instance customer routing instance
```

• To clear the binding state of a DHCP client from the client table on the extended DHCP local server:

```
user@host> clear dhcp server binding routing-instance customer routing instance
```

• To clear all extended DHCP local server statistics:

```
user@host> clear dhcp server statistics routing-instance customer routing instance
```

Configuring an Extended DHCP Relay Server on EX Series Switches (CLI Procedure)

You can configure an EX Series switch to act as an extended DHCP relay agent. This means that a locally attached host can issue a DHCP request as a broadcast message and the switch configured for DHCP relay relays the message to a specified DHCP server. Configure a switch to be a DHCP relay agent if you have locally attached hosts and a remote DHCP server.

Before you begin:

- Ensure that the switch can connect to the DHCP server.

To configure a switch to act as an extended DHCP relay agent server:

1. Create at least one DHCP server group, which is a group of 1 through 5 DHCP server IP addresses:

```
[edit forwarding-options dhcp-relay]
user@switch# set server-group server-group-name ip-address
```

2. Set the global active DHCP server group. The DHCP relay server relays DHCP client requests to the DHCP servers defined in the active server group:

```
[edit forwarding-options dhcp-relay]
user@switch# set active-server-group server-group-name
```

3. Create a DHCP relay group that includes at least one interface. DHCP relay runs on the interfaces defined in DHCP groups:

```
[edit forwarding-options dhcp-relay]
user@switch# set group group-name interface interface-name
```

4. (Optional) Configure overrides of default DHCP relay behaviors, at the global level. See the override options in the [overrides](#) statement.

```
[edit forwarding-options dhcp-relay]
user@switch# set overrides
```

5. (Optional) Configure DHCP relay to use the DHCP vendor class identifier option (option 60) in DHCP client packets, at the global level:

```
[edit forwarding-options dhcp-relay]
user@switch# set relay-option option-number 60
```

6. (Optional) Configure settings for a DHCP relay group that override the settings at the global level, using these statements:

```
[edit forwarding-options dhcp-relay group group-name]  
user@switch# set active-server-group server-group-name  
user@switch# set overrides  
user@switch# set relay-option option-number 60
```

7. (Optional) Configure settings for a DHCP relay group interface that override the settings at the global and **group** levels, using these statements:

```
[edit forwarding-options dhcp-relay group group-name interface interface-name]  
user@switch# exclude  
user@switch# set overrides  
user@switch# set trace  
user@switch# set upto upto-interface-name
```

**Related
Documentation**

- [Configuring a DHCP Server on Switches \(CLI Procedure\) on page 671](#)
- [Configuring a DHCP Client \(CLI Procedure\) on page 677](#)
- [Understanding the Extended DHCP Relay Agent for EX Series Switches on page 634](#)

DHCPv6 Local Server Overview

The DHCPv6 local server is compatible with the DHCP local server and the DHCP relay agent, and can be enabled on the same interface as either the extended DHCP local server or DHCP relay agent.

The DHCPv6 local server provides many of the same features as the DHCP local server, including:

- Configuration for a specific interface or for a group of interfaces
- Site-specific usernames and passwords
- Numbered Ethernet interfaces
- Statically configured CoS and filters
- AAA directed login
- Use of the IA_NA option to assign a specific address to a client

When a DHCPv6 client logs in, the DHCPv6 local server can optionally use the AAA service framework to interact with the RADIUS server. The RADIUS server, which is configured independently of DHCP, authenticates the client and supplies the IPv6 prefix and client configuration parameters.

The client username, which uniquely identifies a subscriber or a DHCP client, must be present in the configuration in order for DHCPv6 local server to use RADIUS authentication.

You can configure DHCPv6 local server to communicate the following attributes to the AAA service framework and RADIUS at login time:

- Client username
- Client password

Based on the attributes that the DHCPv6 local server provides, RADIUS returns the information listed in [Table 52 on page 628](#) to configure the client:

Table 52: RADIUS Attributes and VSAs for DHCPv6 Local Server

Attribute Number	Attribute Name	Description
27	Session-Timeout	Lease time, in seconds. If not supplied, the lease does not expire
123	Delegated-IPv6-Prefix	Prefix that is delegated to the client
26-143	Max-Clients-Per-Interface	Maximum number of clients allowed per interface

To configure the extended DHCPv6 local server on the router (or switch), you include the **dhcpv6** statement at the **[edit system services dhcp-local-server]** hierarchy level.

You can also include the **dhcpv6** statement at the following hierarchy levels:

- [edit logical-systems *logical-system-name* system services dhcp-local-server]
- [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server]
- [edit routing-instances *routing-instance-name* system services dhcp-local-server]

Enabling DHCPv6 Rapid Commit Support

You can configure the DHCPv6 local server to support the DHCPv6 Rapid Commit option (DHCPv6 option 14). When rapid commit is enabled, the server recognizes the Rapid Commit option in Solicit messages sent from the DHCPv6 client. (DHCPv6 clients are configured separately to include the DHCPv6 Rapid Commit option in the Solicit messages.) The server and client then use a two-message exchange (Solicit and Reply) to configure clients, rather than the default four-message exchange (Solicit, Advertise, Request, and Reply). The two-message exchange provides faster client configuration, and is beneficial in environments in which networks are under a heavy load.

You can configure the DHCPv6 local server to support the Rapid Commit option globally, for a specific group, or for a specific interface. By default, rapid commit support is disabled on the DHCPv6 local server.

To configure the DHCPv6 local server to support the DHCPv6 Rapid Commit option:

1. Specify that you want to configure the **overrides** options:

```
[edit system services dhcp-local-server dhcpv6]
user@host# edit overrides
```

2. Enable rapid commit support:

```
[edit system services dhcp-local-server dhcpv6 overrides]
user@host# set rapid-commit
```

Related Documentation

- [Overriding the Default DHCP Local Server Configuration Settings Overview on page 617](#)

Specifying the Delegated Address Pool for IPv6 Prefix Assignment

You can explicitly specify a delegated address pool:

- On routers—Subscriber management uses the pool to assign IPv6 prefixes for subscribers. You can specify the delegated address pool globally, for a specific group of interfaces, or for a particular interface.
- On switches—DHCP management uses the pool to assign IPv6 prefixes for DHCP clients. You can specify the delegated address pool globally, for a specific group of interfaces, or for a particular interface.



NOTE: You can also use by Juniper Networks VSA 26-161 to specify the delegated address pool. The VSA-specified value always takes precedence over the delegated-address statement.

To configure the delegated address pool for DHCPv6 local server:

1. Specify that you want to configure override options.

```
[edit system services dhcp-local-server dhcpv6]
user@host# edit overrides
```

2. Configure the delegated address pool.

```
[edit system services dhcp-local-server dhcpv6 overrides]
user@host# set delegated-pool paris-cable-12
```

Related Documentation

- [Overriding the Default DHCP Local Server Configuration Settings Overview on page 617](#)
- [Extended DHCP Local Server Overview on page 611](#)
- [Extended DHCP Relay Agent Overview on page 632](#)

Preventing Binding of Clients That Do Not Support Reconfigure Messages

The DHCPv6 client and server negotiate the use of reconfigure messages. When the client can accept reconfigure messages from the server, then the client includes the Reconfigure Accept option in both solicit and request messages sent to the server.

By default, the DHCPv6 server accepts solicit messages from clients regardless of whether they support reconfiguration. You can specify that the server require clients to accept reconfigure messages. In this case, the DHCPv6 server includes the Reconfigure Accept option in both advertise and reply messages when reconfiguration is configured for the client interface. Solicit messages from nonsupporting clients are discarded and the clients are not allowed to bind.

To configure the DHCPv6 local server to bind only clients that support client-initiated reconfiguration:

- Specify strict reconfiguration.

For all DHCPv6 clients:

```
[edit system services dhcp-local-server dhcpv6 reconfigure]
user@host# set strict
```

For only a particular group of DHCPv6 clients:

```
[edit system services dhcp-local-server dhcpv6 group group-name reconfigure]
```

```
user@host# set strict
```

The **show dhcpv6 server statistics** command displays a count of solicit messages that the server has discarded.

- Related Documentation**
- [Configuring Dynamic Client Reconfiguration of Extended Local Server Clients Overview on page 693](#)
 - [Understanding Dynamic Reconfiguration of Extended DHCP Local Server Clients on page 690](#)

Verifying and Managing DHCPv6 Local Server Configuration

Purpose View or clear information about client address bindings and statistics for the DHCPv6 local server.

- Action**
- To display the address bindings in the client table on the DHCPv6 local server:

```
user@host> show dhcpv6 server binding
```

- To display DHCPv6 local server statistics:

```
user@host> show dhcpv6 server statistics
```

- To clear all DHCPv6 local server statistics:

```
user@host> clear dhcpv6 server binding
```

- To clear all DHCPv6 local server statistics:

```
user@host> clear dhcpv6 server statistics
```

Extended DHCP Relay Agent Overview

You can configure extended DHCP relay options on the router or on the switch and enable the router (or switch) to function as a DHCP relay agent. A DHCP relay agent forwards DHCP request and reply packets between a DHCP client and a DHCP server.

DHCP relay supports the attachment of dynamic profiles and also interacts with the local AAA Service Framework to use back-end authentication servers, such as RADIUS, to provide subscriber authentication or DHCP client authentication. You can attach dynamic profiles and configure authentication support on a global basis or for a specific group of interfaces.



NOTE: The PTX Series Packet Transport Routers do not support authentication for DHCP relay agents.

On the routers, you can use DHCP relay in carrier edge applications such as video/IPTV to obtain configuration parameters, including an IP address, for your subscribers.

On the switches, you can use DHCP relay to obtain configuration parameters including an IP address for DHCP clients.



NOTE: The extended DHCP relay agent options configured with the `dhcp-relay` statement are incompatible with the DHCP/BOOTP relay agent options configured with the `bootp` statement. As a result, you cannot enable both the extended DHCP relay agent and the DHCP/BOOTP relay agent on the router at the same time.

For information about the DHCP/BOOTP relay agent, see *Configuring Routers, Switches, and Interfaces as DHCP and BOOTP Relay Agents*.

You can also configure the extended DHCP relay agent to support IPv6 clients. See “[DHCPv6 Relay Agent Overview](#)” on [page 648](#) for information about the DHCPv6 relay agent feature.

To configure the extended DHCP relay agent on the router (or switch), include the `dhcp-relay` statement at the `[edit forwarding-options]` hierarchy level.

You can also include the `dhcp-relay` statement at the following hierarchy levels:

- `[edit logical-systems logical-system-name forwarding-options]`
- `[edit logical-systems logical-system-name routing-instances routing-instance-name forwarding-options]`
- `[edit routing-instances routing-instance-name forwarding-options]`
- [Interaction Among the DHCP Relay Agent, DHCP Client, and DHCP Servers on page 633](#)
- [DHCP Liveness Detection on page 634](#)

Interaction Among the DHCP Relay Agent, DHCP Client, and DHCP Servers

The pattern of interaction among the DHCP Relay agent, DHCP client, and DHCP servers is the same regardless of whether the software installation is on a router or a switch. However, there are some difference in the details of usage.

On routers—In a typical carrier edge network configuration, the DHCP client is on the subscriber's computer, and the DHCP relay agent is configured on the router between the DHCP client and one or more DHCP servers.

On switches—In a typical network configuration, the DHCP client is on an access device such as a personal computer and the DHCP relay agent is configured on the switch between the DHCP client and one or more DHCP servers.

The following steps describe, at a high level, how the DHCP client, DHCP relay agent, and DHCP server interact in a configuration that includes two DHCP servers.

1. The DHCP client sends a discover packet to find a DHCP server in the network from which to obtain configuration parameters for the subscriber (or DHCP client), including an IP address.
2. The DHCP relay agent receives the discover packet and forwards copies to each of the two DHCP servers. The DHCP relay agent then creates an entry in its internal client table to keep track of the client's state.
3. In response to receiving the discover packet, each DHCP server sends an offer packet to the client. The DHCP relay agent receives the offer packets and forwards them to the DHCP client.
4. On receipt of the offer packets, the DHCP client selects the DHCP server from which to obtain configuration information. Typically, the client selects the server that offers the longest lease time on the IP address.
5. The DHCP client sends a request packet that specifies the DHCP server from which to obtain configuration information.
6. The DHCP relay agent receives the request packet and forwards copies to each of the two DHCP servers.
7. The DHCP server requested by the client sends an acknowledgement (ACK) packet that contains the client's configuration parameters.
8. The DHCP relay agent receives the ACK packet and forwards it to the client.
9. The DHCP client receives the ACK packet and stores the configuration information.
10. If configured to do so, the DHCP relay agent installs a host route and Address Resolution Protocol (ARP) entry for this client.
11. After establishing the initial lease on the IP address, the DHCP client and the DHCP server use unicast transmission to negotiate lease renewal or release. The DHCP relay agent "snoops" on all of the packets unicast between the client and the server that pass through the router (or switch) to determine when the lease for this client has expired or been released. This process is referred to as *lease shadowing* or *passive snooping*.

DHCP Liveness Detection

Liveness detection for DHCP subscriber or DHCP client IP sessions utilizes an active liveness detection protocol to institute liveness detection checks for relevant clients. Clients are expected to respond to liveness detection requests within a specified amount of time. If the responses are not received within that time for a given number of consecutive attempts, then the liveness detection check fails and a failure action is implemented.



NOTE: DHCP liveness detection either globally or per DHCP group.

Understanding the Extended DHCP Relay Agent for EX Series Switches

You can configure a Juniper Networks EX Series Ethernet switch to act as an extended DHCP relay agent. This means that a locally attached host can issue a DHCP request as a broadcast message and the switch configured for DHCP relay relays the message to a specified DHCP server. Configure a switch to be an extended DHCP relay agent if you have locally attached hosts and a remote DHCP server.

You can use DHCP relay in carrier edge applications such as video/IPTV to obtain configuration parameters, including an IP address, for your subscribers.

DHCP relay supports the attachment of dynamic profiles. You can attach dynamic profiles on a global basis or for a specific group of interfaces.

EX Series switches also support the DHCPv6 relay agent.

This topic covers:

- [Extended DHCP Relay and Legacy DHCP/BOOTP Relay on page 634](#)
- [Interaction Among the DHCP Relay Agent, DHCP Client, and DHCP Servers on page 635](#)

Extended DHCP Relay and Legacy DHCP/BOOTP Relay

The extended DHCP relay agent options configured with the **dhcp-relay** statement are incompatible with the DHCP/BOOTP relay agent options configured with the **bootp** statement. Therefore, you cannot enable both the extended DHCP relay agent and the legacy DHCP/BOOTP relay agent on a switch at the same time.

For information about the legacy DHCP/BOOTP relay agent, see [“DHCP/BOOTP Relay for Switches Overview” on page 608](#).

Interaction Among the DHCP Relay Agent, DHCP Client, and DHCP Servers

The following steps describe, at a high level, how the DHCP client, DHCP relay agent, and DHCP server interact in a configuration that includes two DHCP servers:

1. The DHCP client sends a discover packet to find a DHCP server in the network from which to obtain configuration parameters, including an IP address, for the subscriber.
2. The DHCP relay agent receives the discover packet and forwards copies of the discover packets to each of the two DHCP servers. The DHCP relay agent then creates an entry in its internal client table to keep track of the client's state.
3. In response to receiving the discover packet, each DHCP server sends an offer packet to the client. The DHCP relay agent receives the offer packets and forwards them to the DHCP client.
4. On receiving the offer packets, the DHCP client selects the DHCP server from which to obtain configuration information. Typically, the client selects the server that offers the longest lease time on the IP address.
5. The DHCP client sends a request packet that specifies the DHCP server from which to obtain configuration information.
6. The DHCP relay agent receives the request packet and forwards copies of this packet to each of the two DHCP servers.
7. The DHCP server requested by the client sends an acknowledgement (ack) packet that contains the client's configuration parameters.
8. The DHCP relay agent receives the ack packet and forwards it to the client.
9. The DHCP client receives the ack packet and stores the configuration information.
10. If configured to do so, the DHCP relay agent installs a host route and Address Resolution Protocol (ARP) entry for this client.
11. After establishing the initial lease on the IP address, the DHCP client and the DHCP server use unicast transmission to negotiate lease renewal or release. The DHCP relay agent snoops all of the packets unicast between the client and the server that pass through the relay agent to determine when the lease has expired or been released. This process is referred to as *lease shadowing* or *passive snooping*.

Related Documentation

- [Configuring a DHCP Server on Switches \(CLI Procedure\) on page 671](#)
- [Configuring an Extended DHCP Relay Server on EX Series Switches \(CLI Procedure\) on page 626](#)

Example: Minimum DHCP Relay Agent Configuration

This example shows the minimum configuration you need to use the extended DHCP relay agent on the router or switch:

```
[edit forwarding-options]
```

```
dhcp-relay {  
  server-group {  
    test 203.0.113.21;  
  }  
  active-server-group test;  
  group all {  
    interface fe-0/0/2.0;  
  }  
}
```



NOTE: The interface type in this topic is just an example. The **fe-** interface type is not supported by EX Series switches.

This example creates a server group and an active server group named **test** with IP address 203.0.113.21. The DHCP relay agent configuration is applied to a group named **all**. Within this group, the DHCP relay agent is enabled on interface fe-0/0/2.0.

DHCP Relay Proxy Overview

DHCP relay proxy mode is an enhancement to extended DHCP relay. DHCP relay proxy supports all DHCP relay features while providing additional features and benefits.

Normally, extended DHCP relay operates as a helper application for DHCP operations. Except for the ability to add DHCP relay agent options and the gateway address (giaddr) to DHCP packets, DHCP relay is transparent to DHCP clients and DHCP servers, and simply forwards messages between DHCP clients and servers.

When you configure DHCP relay to operate in proxy mode, the relay is no longer transparent. In proxy mode, DHCP relay conceals DHCP server details from DHCP clients, which interact with a DHCP relay in proxy mode as though it is the DHCP server. For DHCP servers there is no change, because proxy mode has no effect on how the DHCP server interacts with the DHCP relay.



NOTE: You cannot configure both DHCP relay proxy and extended DHCP local server on the same interface.

Interaction Among DHCP Relay Proxy, DHCP Client, and DHCP Servers

The DHCP relay agent is configured on the router (or switch), which operates between the DHCP client and one or more DHCP servers.

The following steps provide a high-level description of how DHCP relay proxy interacts with DHCP clients and DHCP servers.

1. The DHCP client sends a discover packet to locate a DHCP server in the network from which to obtain configuration parameters for the subscriber.
2. The DHCP relay proxy receives the discover packet from the DHCP client and forwards copies of the packet to each supporting DHCP server. The DHCP relay proxy then creates a client table entry to keep track of the client state.
3. In response to the discover packet, each DHCP server sends an offer packet to the client, which the DHCP relay proxy receives. The DHCP relay proxy does the following:
 - a. Selects the first offer received as the offer to send to the client
 - b. Replaces the DHCP server address with the address of the DHCP relay proxy
 - c. Forwards the offer to the DHCP client.
4. The DHCP client receives the offer from the DHCP relay proxy.
5. The DHCP client sends a request packet that indicates the DHCP server from which to obtain configuration information—the request packet specifies the address of the DHCP relay proxy.
6. The DHCP relay proxy receives the request packet and forwards copies, which include the address of selected server, to all supporting DHCP servers.
7. The DHCP server requested by the client sends an acknowledgement (ACK) packet that contains the client configuration parameters.
8. The DHCP relay proxy receives the ACK packet, replaces the DHCP server address with its own address, and forwards the packet to the client.
9. The DHCP client receives the ACK packet and stores the configuration information.
10. If configured to do so, the DHCP relay proxy installs a host route and Address Resolution Protocol (ARP) entry for the DHCP client.
11. After the initial DHCP lease is established, the DHCP relay proxy receives all lease renewals and lease releases from the DHCP client and forwards them to the DHCP server.

Benefits of Using DHCP Relay Proxy

DHCP relay proxy provides the following benefits:

- DHCP server isolation and DoS protection—DHCP clients are unable to detect the DHCP servers, learn DHCP server addresses, or determine the number of servers that are providing DHCP support. Server isolation also provides denial-of-service (DoS) protection for the DHCP servers.
- Multiple lease offer selection—DHCP relay proxy receives lease offers from multiple DHCP servers and selects a single offer to send to the DHCP client, thereby reducing traffic in the network. Currently, the DHCP relay proxy selects the first offer received.

- Support for both numbered and unnumbered Ethernet interfaces—For DHCP clients connected through Ethernet interfaces, when the DHCP client obtains an address, the DHCP relay proxy adds an access internal host route specifying that interface as the outbound interface. The route is automatically removed when the lease time expires or when the client releases the address.
- Logical system support—DHCP relay proxy can be configured in a logical system, whereas a non-proxy mode DHCP relay cannot.

Enabling DHCP Relay Proxy Mode

You can enable DHCP relay proxy mode on all interfaces or a group of interfaces.

To enable DHCP relay proxy mode:

1. Specify that you want to configure override options.

```
[edit forwarding-options dhcp-relay]
user@host# edit overrides
```

2. Enable DHCP relay proxy mode.

```
[edit forwarding-options dhcp-relay overrides]
user@host# set proxy-mode
```

Overriding the Default DHCP Relay Configuration Settings

You can override the default DHCP relay configuration settings at the global level, for a named group of interfaces, or for a specific interface within a named group.

- To override global default DHCP relay agent configuration options, include the **overrides** statement and its subordinate statements at the **[edit forwarding-options dhcp-relay]** hierarchy level.
- To override DHCP relay configuration options for a named group of interfaces, include the statements at the **[edit forwarding-options dhcp-relay group *group-name*]** hierarchy level.
- To override DHCP relay configuration options for a specific interface within a named group of interfaces, include the statements at the **[edit forwarding-options dhcp-relay group *group-name* interface *interface-name*]** hierarchy level.
- To configure overrides for DHCPv6 relay at the global level, group level, or per-interface, use the corresponding statements at the **[edit forwarding-options dhcp-relay dhcpv6]** hierarchy level.

To override default DHCP relay agent configuration settings:

1. (DHCPv4 and DHCPv6) Specify that you want to configure override options.

- DHCPv4 overrides.

Global override:

```
[edit forwarding-options dhcp-relay]
user@host# edit overrides
```

Group-level override:

```
[edit forwarding-options dhcp-relay]
user@host# edit group group-name overrides
```

Per-interface override:

```
[edit forwarding-options dhcp-relay]
user@host# edit group group-name interface interface-name overrides
```

- DHCPv6 overrides.

Global override:

```
[edit forwarding-options dhcp-relay dhcpv6]
user@host# edit overrides
```

Group-level override:

```
[edit forwarding-options dhcp-relay dhcpv6]
user@host# edit group group-name overrides
```

Per-interface override:

```
[edit forwarding-options dhcp-relay dhcpv6]
user@host# edit group group-name interface interface-name overrides
```

2. (DHCPv4 only) Enable DHCP relay proxy mode.

See [“Enabling DHCP Relay Proxy Mode” on page 638](#).

3. (DHCPv4 only) Overwrite the giaddr in DHCP packets that the DHCP relay agent forwards.

See [“Changing the Gateway IP Address \(giaddr\) Field to the giaddr of the DHCP Relay Agent” on page 642](#).

4. (DHCPv4 only) Replace the IP source address in DHCP relay request and release packets with the gateway IP address (giaddr).

See [“Replacing the DHCP Relay Request and Release Packet Source Address” on page 642](#).

5. (DHCPv4 only) Override the DHCP relay agent information option (option 82) in DHCP packets.
See [“Overriding Option 82 Information” on page 660.](#)
6. (DHCPv4 only) Override the setting of the broadcast bit in DHCP request packets and use the Layer 2 unicast transmission method.
See [“Using Layer 2 Unicast Transmission instead of Broadcast for DHCP Packets” on page 641.](#)
7. (DHCPv4 only) Trust DHCP client packets that have a giaddr of 0 and that contain option 82 information.
See [“Enable Processing of Untrusted Packets So Option 82 Information Can Be Used” on page 666.](#)
8. (DHCPv4 and DHCPv6) Override the maximum number of DHCP clients allowed per interface.
See [“Specifying the Maximum Number of DHCP Clients Per Interface” on page 687.](#)
9. (DHCPv4 only) Configure client auto logout.
See [“DHCP Auto Logout Overview” on page 698.](#)
10. (DHCPv4 and DHCPv6) Enable or disable support for DHCP snooped clients on interfaces.
See *Enabling and Disabling DHCP Snooped Packets Support for DHCP Relay Agent.*
11. (DHCPv4 and DHCPv6) Delay authentication of subscribers until the DHCP client sends a Request packet.
See the *delay-authentication*.
12. (DHCPv4 and DHCPv6) Send release messages to the DHCP server when clients are deleted.
See [“Sending Release Messages When Clients Are Deleted” on page 690.](#)
13. (Optional) Specify that when the DHCP or DHCPv6 relay agent receives a Discover or Solicit message that has a client ID that matches the existing client entry, the relay agent deletes the existing client entry.
See *DHCP Behavior When Renegotiating While in Bound State.*
14. (DHCPv6 only) Automatically log out existing client when new client solicits on same interface.
See *Automatically Logging Out DHCPv6 Clients.*

15. (DHCPv4 only) Disable the DHCP relay agent on specific interfaces.
See [“Disabling DHCP Relay Agent for Interfaces, for Groups, or Globally” on page 647](#).
16. (DHCPv4 and DHCPv6) Disable automatic binding of stray DHCP requests.
See [“Disabling Automatic Binding of Stray DHCP Requests” on page 679](#).
17. (DHCPv4 and DHCPv6) Assign a single-session DHCP dual-stack group to a specified group of subscribers. You must assign the group to both legs of the DHCP dual stack.
See *Configuring Single-Session DHCP Dual-Stack Support*.
18. (Optional, DHCPv4 and DHCPv6) Specify that a short lease be sent to the client.
See *Configuring DHCP Asymmetric Leasing*.

Using Layer 2 Unicast Transmission instead of Broadcast for DHCP Packets

You can configure the DHCP relay agent to override the setting of the broadcast bit in DHCP request packets. DHCP relay agent then instead uses the Layer 2 unicast transmission method to send DHCP Offer reply packets and DHCP ACK reply packets from the DHCP server to DHCP clients during the discovery process.

To override the default setting of the broadcast bit in DHCP request packets:

1. Specify that you want to configure override options.

```
[edit forwarding-options dhcp-relay]
user@host# edit overrides
```

2. Specify that the DHCP relay agent uses the Layer 2 unicast transmission method.

```
[edit forwarding-options dhcp-relay overrides]
user@host# set layer2-unicast-replies
```

Verifying and Managing DHCP Relay Configuration

Purpose View or clear address bindings or statistics for extended DHCP relay agent clients:

Action • To display the address bindings for extended DHCP relay agent clients:

```
user@host> show dhcp relay binding routing-instance customer routing instance
```

- To display extended DHCP relay agent statistics:

```
user@host> show dhcp relay statistics routing-instance customer routing instance
```

- To clear the binding state of DHCP relay agent clients:

```
user@host> clear dhcp relay binding routing-instance customer routing instance
```

- To clear all extended DHCP relay agent statistics:

```
user@host> clear dhcp relay statistics routing-instance customer routing instance
```

Verifying and Managing DHCP Relay Configuration for EX Series Switches

Purpose View or clear statistics for extended DHCP relay agent:

- Action**
- To display extended DHCP relay agent statistics:

```
user@switcht> show dhcp relay statistics
```

- To clear all extended DHCP relay agent statistics:

```
user@switcht> clear dhcp relay statistics
```

- Related Documentation**
- [Configuring an Extended DHCP Relay Server on EX Series Switches \(CLI Procedure\) on page 626](#)
 - [Understanding the Extended DHCP Relay Agent for EX Series Switches on page 634](#)

Changing the Gateway IP Address (giaddr) Field to the giaddr of the DHCP Relay Agent

You can configure the DHCP relay agent to change the gateway IP address (giaddr) field in packets that it forwards between a DHCP client and a DHCP server.

To overwrite the giaddr of every DHCP packet with the giaddr of the DHCP relay agent before forwarding the packet to the DHCP server:

1. Specify that you want to configure override options.

```
[edit forwarding-options dhcp-relay]  
user@host# edit overrides
```

2. Specify that the giaddr of DHCP packets is overwritten.

```
[edit forwarding-options dhcp-relay overrides]  
user@host# set always-write-giaddr
```

Replacing the DHCP Relay Request and Release Packet Source Address

You can configure the DHCP relay agent to replace request and release packets with the gateway IP address (giaddr) before forwarding the packet to the DHCP server.

To replace the source address with giaddr:

1. Specify that you want to configure override options.

```
[edit forwarding-options dhcp-relay]
user@host# edit overrides
```

2. Specify that you want to replace the IP source address in DHCP relay request and release packets with the gateway IP address (giaddr).

```
[edit forwarding-options dhcp-relay overrides]
user@host# set replace-ip-source-with giaddr
```

Example: Configuring DHCP Relay Agent Selective Traffic Processing Based on DHCP Option Strings

This example shows how to configure DHCP relay agent to use DHCP option strings to selectively identify, filter, and process client traffic.

- [Requirements on page 643](#)
- [Overview on page 643](#)
- [Configuration on page 644](#)
- [Verification on page 646](#)

Requirements

This example uses the following hardware and software components:

- MX Series 5G Universal Routing Platforms or EX Series Switches

Before you configure DHCP relay agent selective processing support, be sure you:

- Configure DHCP relay agent.

See [“Extended DHCP Relay Agent Overview” on page 632](#).

- (Optional) Configure a named DHCP local server group if you want to forward client traffic to a server group.

See [“Grouping Interfaces with Common DHCP Configurations” on page 704](#).

Overview

In this example, you configure DHCP relay agent to use DHCP option strings in client packets to selectively identify, filter, and process client traffic. To configure selective processing, you perform the following procedures:

1. Identify the client traffic—Specify the DHCP option that DHCP relay agent uses to identify the client traffic you want to process. The option you specify matches the option in the client traffic.

2. Configure a default action—Specify the default processing action, which DHCP relay uses for identified client traffic that does not satisfy any configured match criteria.
3. Create match filters and associate an action with each filter—Specify match criteria that filter the client traffic. The criteria can be an exact match or a partial match with the option string in the client traffic. Associate a processing action with each match criterion.

Configuration

To configure DHCP relay agent selective processing based on DHCP option information, perform these tasks:

- [Configuring DHCP Relay Agent To Selectively Process Client Traffic Based on DHCP Option Strings on page 644](#)
- [Results on page 645](#)

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 command into the CLI at the **[edit]** hierarchy level.

```
set forwarding-options dhcp-relay relay-option option-number 60
set forwarding-options dhcp-relay relay-option equals ascii video-gold forward-only
set forwarding-options dhcp-relay relay-option equals ascii video-bronze local-server-group
  servergroup-15
set forwarding-options dhcp-relay relay-option starts-with hexadecimal ffff
  local-server-group servergroup-east
set forwarding-options dhcp-relay relay-option default-action drop
```

Configuring DHCP Relay Agent To Selectively Process Client Traffic Based on DHCP Option Strings

Step-by-Step Procedure

To configure DHCP relay selective processing:

1. Specify that you want to configure DHCP relay agent support.

```
[edit forwarding-options]
user@host# edit dhcp-relay
```

2. Specify the DHCP option that DHCP relay agent uses to identify incoming client traffic.

```
[edit forwarding-options dhcp-relay]
user@host# set relay-option option-number 60
```

3. Configure a default action, which DHCP relay agent uses when the incoming client traffic does not satisfy any configured match criteria.


```
[edit forwarding-options dhcp-relay]
user@host# set relay-option default-action drop
```

4. Configure an exact match condition and associated action that DHCP relay uses to process the identified client traffic.

```
[edit forwarding-options dhcp-relay]
user@host# set relay-option equals ascii video-gold forward-only
```

5. Configure a second exact match condition and associated action that DHCP relay uses to process client traffic.

```
[edit forwarding-options dhcp-relay]
user@host# set relay-option equals ascii video-bronze local-server-group
servergroup-15
```

6. Configure a partial match criteria and associated action that DHCP relay uses to process client traffic.

```
[edit forwarding-options dhcp-relay]
user@host# set relay-option starts-with hexadecimal ffff local-server-group
servergroup-east
```

Results

From configuration mode, confirm the results of your configuration by issuing the **show** statement at the **[edit forwarding-options]** hierarchy level. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit forwarding-options]
user@host# show
dhcp-relay {
  relay-option {
    option-number 60;
    equals {
      ascii video-gold {
        forward-only;
      }
    }
    equals {
      ascii video-bronze {
        local-server-group servergroup-15;
      }
    }
    default-action {
      drop;
    }
  }
}
```

```
starts-with {  
  hexadecimal ffff {  
    local-server-group servergroup-east;  
  }  
}  
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

To verify the status of DHCP relay agent selective traffic processing, perform this task:

- [Verifying the Status of DHCP Relay Agent Selective Traffic Processing on page 646](#)

Verifying the Status of DHCP Relay Agent Selective Traffic Processing

Purpose Verify the DHCP relay agent selective traffic processing status.

Action Display statistics for DHCP relay agent.

```
user@host> show dhcp relay statistics
```

```
Packets dropped:
  Total                  30
  Bad hardware address   1
  Bad opcode             1
  Bad options            3
  Invalid server address 5
  No available addresses 1
  No interface match     2
  No routing instance match 9
  No valid local address 4
  Packet too short       2
  Read error             1
  Send error             1
  Option 60              1
  Option 82              2

Messages received:
  BOOTREQUEST           116
  DHCPDECLINE           0
  DHCPDISCOVER          11
  DHCPINFORM            0
  DHCPRELEASE           0
  DHCPREQUEST           105

Messages sent:
  BOOTREPLY             0
  DHCPOFFER             2
  DHCPACK               1
  DHCPNAK               0
  DHCPFORCERENEW        0

Packets forwarded:
  Total                  4
  BOOTREQUEST           2
  BOOTREPLY             2
```

Meaning The **Packets forwarded** field in the **show dhcp relay statistics** command output displays the number of client packets that have been forwarded as a result of the selective traffic processing configuration. In this example, the output indicates the total number of packets that DHCP relay agent has forwarded, as well as a breakdown for the number of **BOOTREQUEST** and **BOOTREPLY** packets forwarded.

Disabling DHCP Relay Agent for Interfaces, for Groups, or Globally

You can disable DHCP relay on all interfaces or a group of interfaces.

To disable DHCP relay agent:

1. Specify that you want to configure override options.

```
[edit forwarding-options dhcp-relay]  
user@host# edit overrides
```

2. Disable the DHCP relay agent.

```
[edit forwarding-options dhcp-relay overrides]  
user@host# set disable-relay
```

DHCPv6 Relay Agent Overview

The DHCPv6 relay agent enhances the DHCP relay agent by providing support in an IPv6 network. The DHCPv6 relay agent passes messages between the DHCPv6 client and the DHCPv6 server, similar to the way DHCP relay agent supports an IPv4 network. DHCPv6 relay agents eliminate the necessity of having a DHCPv6 server on each physical network.

When a DHCPv6 client logs in, the DHCPv6 relay agent uses the AAA service framework to interact with the RADIUS server to provide authentication and accounting. The RADIUS server, which is configured independently of DHCP, authenticates the client and supplies the IPv6 prefix and client configuration parameters, such as session timeout and the maximum number of clients allowed per interface.



NOTE: The PTX Series Packet Transport Routers do not support authentication for DHCPv6 relay agents.



NOTE:

The following DHCPv6 functionalities are not supported on ACX Series routers:

- Subscriber authentication for DHCPv6 relay agents
 - DHCP snooping
 - DHCPv6 client
 - Liveness detection
 - Dynamic profiles
 - Option 37 support for remote ID insertion
 - Bidirectional Forwarding Detection (BFD) for DHCPv6 relay
 - DHCPv6 relay persistence on router reboot, crash, or power failure
-

The DHCPv6 relay agent is compatible with the DHCP local server and the DHCP relay agent, and can be enabled on the same interface as either the DHCP local server or DHCP relay agent.

To configure the DHCPv6 relay agent on the router (or switch), you include the **dhcpv6** statement at the **[edit forwarding-options dhcp-relay]** hierarchy level.

You can also include the **dhcpv6** statement at the following hierarchy levels:

- **[edit logical-systems *logical-system-name* forwarding-options dhcp-relay]**
- **[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* forwarding-options dhcp-relay]**
- **[edit routing-instances *routing-instance-name* forwarding-options dhcp-relay]**

See *DHCPv6 Monitoring and Management* for commands specific to viewing and clearing DHCPv6 bindings and statistics.

Inserting DHCPv6 Interface-ID Option (Option 18) In DHCPv6 Packets

You can configure DHCPv6 relay agent to insert the DHCPv6 Interface-ID (option 18) in the packets that the relay sends to a DHCPv6 server. You can configure the option 18 support at either the DHCPv6 global or group level.

When you configure option 18 support, you can optionally include the following additional information:

- Prefix—Specify the **prefix** option to add a prefix to the interface identifier. The prefix can be any combination of hostname, logical system name, and routing instance name.
- Interface description—Specify the **use-interface-description** option to include the textual interface description instead of the interface identifier. You can include either the device interface description or the logical interface description.
- Option 82 Agent Circuit ID suboption (suboption 1)—Specify the **use-option-82** option to include the DHCPv4 Option 82 Agent Circuit ID suboption (suboption 1). This configuration is useful in a dual-stack environment, which has both DHCPv4 and DHCPv6 subscribers that reside over the same underlying logical interface. The router checks for the option 82 suboption 1 value and inserts it into the outgoing packets. If no DHCPv4 binding exists or if the binding does not have an option 82 suboption 1 value, the router sends the packets without adding an option 18.



NOTE: If you specify one of the optional configurations, and the specified information does not exist (for example, there is no interface description), DHCPv6 relay ignores the optional configuration and inserts the default interface identifier in the packets.

To insert the DHCPv6 Interface-ID option (option 18) in DHCPv6 packets:

1. Configure the DHCPv6 relay to include option 18.

```
[edit forwarding-options dhcp-relay dhcpv6]
user@host# edit relay-agent-interface-id
```

-
2. (Optional) Specify the prefix to include in option 18.

```
[edit forwarding-options dhcp-relay dhcpv6 relay-agent-interface-id]
user@host# set prefix prefix
```

-
-
3. (Optional) Specify that option 18 include the textual description of the interface. You can specify either the **logical** interface description or the **device** interface description.

```
[edit forwarding-options dhcp-relay dhcpv6 relay-agent-interface-id]
user@host# set use-interface-description (logical | device)
```

-
-
-
4. (Optional) Specify that option 18 use the DHCPv4 Option 82 Agent Circuit ID suboption (suboption 1) value.

```
[edit forwarding-options dhcp-relay dhcpv6 relay-agent-interface-id]
user@host# set use-option-82
```

- Related Documentation**
- [Including a Prefix in DHCP Options](#)
 - [Including a Textual Description in DHCP Options](#)

Verifying and Managing DHCPv6 Relay Configuration

Purpose View or clear address bindings or statistics for extended DHCPv6 relay agent clients:

- Action**
- To display the address bindings for extended DHCPv6 relay agent clients:

```
user@host> show dhcpv6 relay binding
```

- To display extended DHCPv6 relay agent statistics:

```
user@host> show dhcpv6 relay statistics
```

- To clear the binding state of DHCPv6 relay agent clients:

```
user@host> clear dhcpv6 relay binding
```

- To clear all extended DHCPv6 relay agent statistics:

```
user@host> clear dhcpv6 relay statistics
```

DHCP Snooping Support

DHCP snooping provides DHCP security by identifying incoming DHCP packets. In the default DHCP snooping configuration, all traffic is snooped. You can optionally use the **forward-snooped-clients** statement to evaluate the snooped traffic and to determine if

the traffic is forwarded or dropped, based on whether or not the interface is configured as part of a group.

In Junos OS, DHCP snooping is enabled in a routing instance when you configure either the **dhcp-relay** statement at the **[edit forwarding-options]** hierarchy level, or the **dhcp-local-server** statement at the **[edit system services]** hierarchy level in that routing instance. The router discards snooped packets by default if there is no subscriber associated with the packet. To enable normal processing of snooped packets, you must explicitly configure the **allow-snooped-clients** statement at the **[edit forwarding-options dhcp-relay]** hierarchy level.

You can configure DHCP snooping support for a specific routing instance for the following:

- DHCPv4 relay agent—Override the router's (or switch's) default snooping configuration and specify that DHCP snooping is enabled or disabled globally, for a named group of interfaces, or for a specific interface within a named group.

In a separate procedure, you can set a global configuration to specify whether the DHCPv4 relay agent forwards or drops snooped packets for all interfaces, only configured interfaces, or only nonconfigured interfaces. The router also uses the global DHCP relay agent snooping configuration to determine whether to forward or drop snooped BOOTREPLY packets. A renew request may be unicast directly to the DHCP server. This is a BOOTPREQUEST packet and is snooped.

- DHCPv6 relay agent—As you can with snooping support for the DHCPv4 relay agent, you can override the default DHCPv6 relay agent snooping configuration on the router to explicitly enable or disable snooping support globally, for a named group of interfaces, or for a specific interface with a named group of interfaces.

In multi-relay topologies where more than one DHCPv6 relay agent is between the DHCPv6 client and the DHCPv6 server, snooping enables intervening DHCPv6 relay agents between the client and the server to correctly receive and process the unicast traffic from the client and forward it to the server. The DHCPv6 relay agent snoops incoming unicast DHCPv6 packets by setting up a filter with UDP port 547 (the DHCPv6 UDP server port) on a per-forwarding table basis. The DHCPv6 relay agent then processes the packets intercepted by the filter and forwards the packets to the DHCPv6 server.

Unlike the DHCPv4 relay agent, the DHCPv6 relay agent does not support global configuration of forwarding support for DHCPv6 snooped packets.

- DHCP local server—Configure whether DHCP local server forwards or drops snooped packets for all interfaces, only configured interfaces, or only nonconfigured interfaces.
- You can also disable snooping filters. In the preceding configurations, all DHCP traffic is forwarded to the slower routing plane of the routing instance before it is either forwarded or dropped. Disabling snooping filters causes DHCP traffic that can be forwarded directly from the faster hardware control plane to bypass the routing control plane.

Related Documentation

- *Configuring DHCP Snooped Packets Forwarding Support for DHCP Local Server*
- *Enabling and Disabling DHCP Snooped Packets Support for DHCP Relay Agent*

- [Configuring DHCP Snooped Packets Forwarding Support for DHCP Relay Agent on page 655](#)
- [Disabling DHCP Snooping Filters](#)
- [Example: Configuring DHCP Snooping Support for DHCP Relay Agent on page 652](#)
- [Example: Enabling DHCP Snooping Support for DHCPv6 Relay Agent](#)

Example: Configuring DHCP Snooping Support for DHCP Relay Agent

This example shows how to configure DHCP snooping support for DHCP relay agent.

- [Requirements on page 652](#)
- [Overview on page 652](#)
- [Configuration on page 652](#)

Requirements

- Configure DHCP relay agent. See “[Extended DHCP Relay Agent Overview](#)” on page 632.

Overview

In this example, you configure DHCP snooping support for DHCP relay agent by completing the following operations:

- Override the default DHCP snooping configuration and enable DHCP snooping support for the interfaces in group **frankfurt**.
- Configure DHCP relay agent to forward snooped packets to only configured interfaces.



NOTE: By default, DHCP snooping is disabled globally.

Configuration

Step-by-Step Procedure

To configure DHCP relay support for DHCP snooping:

1. Specify that you want to configure DHCP relay agent.

```
[edit]  
user@host# edit forwarding-options dhcp-relay
```

2. Specify the named group of interfaces on which DHCP snooping is supported.

```
[edit forwarding-options dhcp-relay]  
user@host# edit group frankfurt
```


3. Specify the interfaces that you want to include in the group. DHCP relay agent considers these as the configured interfaces when determining whether to forward or drop traffic.

```
[edit forwarding-options dhcp-relay group frankfurt]
user@host# set interface fe-1/0/1.3 upto fe-1/0/1.9
```

4. Specify that you want to override the default configuration for the group.

```
[edit forwarding-options dhcp-relay group frankfurt]
user@host# edit overrides
```

5. Enable DHCP snooping support for the group.

```
[edit forwarding-options dhcp-relay group frankfurt overrides]
user@host# set allow-snooped-clients
```

6. Return to the `[edit forwarding-options dhcp-relay]` hierarchy level to configure the forwarding action and specify that DHCP relay agent forward snooped packets on only configured interfaces:

```
[edit forwarding-options dhcp-relay group frankfurt overrides]
user@host# up 2
```

7. Enable DHCP snooped packet forwarding for DHCP relay agent.

```
[edit forwarding-options dhcp-relay]
user@host# edit forward-snooped-clients
```

8. Specify that snooped packets are forwarded on only configured interfaces (the interfaces in group **frankfurt**).

```
[edit forwarding-options dhcp-relay forward-snooped-clients]
user@host# set configured-interfaces
```

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 instructions in this example to correct it. The following output also shows a range of configured interfaces in group **frankfurt**.

```
[edit]
user@host# show forwarding-options
dhcp-relay {
  forward-snooped-clients configured-interfaces;
  group frankfurt {
    overrides {
```

```
    allow-snooped-clients;
  }
  interface fe-1/0/1.3 {
    upto fe-1/0/1.9;
  }
}
```

If you are done configuring the device, enter **commit** from configuration mode.

**Related
Documentation**

- [DHCP Snooping Support on page 650](#)
- [Enabling and Disabling DHCP Snooped Packets Support for DHCP Relay Agent](#)

Preventing Binding of Clients That Do Not Support Reconfigure Messages

The DHCPv6 client and server negotiate the use of reconfigure messages. When the client can accept reconfigure messages from the server, then the client includes the Reconfigure Accept option in both solicit and request messages sent to the server.

By default, the DHCPv6 server accepts solicit messages from clients regardless of whether they support reconfiguration. You can specify that the server require clients to accept reconfigure messages. In this case, the DHCPv6 server includes the Reconfigure Accept option in both advertise and reply messages when reconfiguration is configured for the client interface. Solicit messages from nonsupporting clients are discarded and the clients are not allowed to bind.

To configure the DHCPv6 local server to bind only clients that support client-initiated reconfiguration:

- Specify strict reconfiguration.

For all DHCPv6 clients:

```
[edit system services dhcp-local-server dhcpv6 reconfigure]
user@host# set strict
```

For only a particular group of DHCPv6 clients:

```
[edit system services dhcp-local-server dhcpv6 group group-name reconfigure]
user@host# set strict
```

The **show dhcpv6 server statistics** command displays a count of solicit messages that the server has discarded.

**Related
Documentation**

- [Configuring Dynamic Client Reconfiguration of Extended Local Server Clients Overview on page 693](#)
- [Understanding Dynamic Reconfiguration of Extended DHCP Local Server Clients on page 690](#)

Configuring DHCP Snooped Packets Forwarding Support for DHCP Relay Agent

You can configure how DHCP relay agent handles DHCP snooped packets. Depending on the configuration, DHCP relay agent either forwards or drops the snooped packets it receives.

DHCP relay uses a two-part configuration to determine how to handle DHCP snooped packets. This topic describes how you use the **forward-snooped-clients** statement to manage whether DHCP relay agent forwards or drops snooped packets, depending on the type of interface on which the packets are snooped. In the other part of the DHCP relay agent snooping configuration, which is described in *Enabling and Disabling DHCP Snooped Packets Support for DHCP Relay Agent*, you enable or disable the DHCP relay snooping feature.

Table 53 on page 655 shows the action the router or switch takes on snooped packets when DHCP snooping is enabled by the **allow-snooped-clients** statement.

Table 54 on page 656 shows the action the router (or switch) takes on snooped packets when DHCP snooping is disabled by the **no-allow-snooped-clients** statement.

The router or switch also uses the configuration of the DHCP relay agent forwarding support to determine how to handle snooped BOOTREPLY packets. Table 55 on page 656 shows the action the router (or switch) takes for the snooped BOOTREPLY packets.



NOTE: Configured interfaces have been configured with the **group** statement in the [edit forwarding-options dhcp-relay] hierarchy. Non-configured interfaces are in the logical system/routing instance but have not been configured by the **group** statement.

Table 53: Actions for DHCP Relay Agent Snooped Packets When DHCP Snooping Is Enabled

forward-snooped-clients Configuration	Action on Configured Interfaces	Action on Non-Configured Interfaces
forward-snooped-clients not configured	snooped packets result in subscriber (DHCP client) creation	dropped
all-interfaces	forwarded	forwarded
configured-interfaces	forwarded	dropped
non-configured-interfaces	snooped packets result in subscriber (DHCP client) creation	forwarded

Table 54: Actions for DHCP Relay Agent Snooped Packets When DHCP Snooping Is Disabled

forward-snooped-clients Configuration	Action on Configured Interfaces	Action on Non-Configured Interfaces
forward-snooped-clients not configured	dropped	dropped
all-interfaces	dropped	forwarded
configured-interfaces	dropped	dropped
non-configured-interfaces	dropped	forwarded

Table 55: Actions for Snooped BOOTREPLY Packets

forward-snooped-clients Configuration	Action
forward-snooped-clients not configured	snooped BOOTREPLY packets dropped if client is not found
forward-snooped-clients all configurations	snooped BOOTREPLY packets forwarded if client is not found

To configure DHCP snooped packet forwarding and BOOTREPLY snooped packet forwarding for DHCP relay agent:

1. Specify that you want to configure DHCP relay agent.

```
[edit]
user@host# edit forwarding-options dhcp-relay
```

2. Enable DHCP snooped packet forwarding.

```
[edit forwarding-options dhcp-relay]
user@host# edit forward-snooped-clients
```

3. Specify the interfaces that are supported for snooped packet forwarding.

```
[edit forwarding-options dhcp-relay forward-snooped-clients]
user@host# set (all-interfaces | configured-interfaces | non-configured-interfaces)
```

For example, to configure DHCP relay agent to forward DHCP snooped packets on only configured interfaces:

```
[edit]
forwarding-options {
  dhcp-relay {
```

```

    forward-snooped-clients configured-interfaces;
  }
}

```

**Related
Documentation**

- [DHCP Snooping Support on page 650](#)
- [Enabling and Disabling DHCP Snooped Packets Support for DHCP Relay Agent](#)

Using DHCP Relay Agent Option 82 Information

Subscriber management enables you to configure the DHCP relay agent to include additional option 82 information in the DHCP packets that the relay agent receives from clients and forwards to a DHCP server. The DHCP server uses the additional information to determine the IP address to assign to the client. The server might also use the information for other purposes—for example, to determine which services to grant the client, or to provide additional security against threats such as address spoofing. The DHCP server sends its reply back to the DHCP relay agent, and the agent removes the option 82 information from the message and forwards the packet to the client.

To configure support for the DHCP relay agent information option 82, you use the **relay-option-82** statement. You can configure the DHCP relay agent to include the following suboptions in the packet the relay agent sends to the DHCP server:

- Agent Circuit ID (suboption 1)—An ASCII string that identifies the interface on which the client DHCP packet is received.
- Agent Remote ID (suboption 2)—An ASCII string assigned by the DHCP relay agent that securely identifies the client.

You can configure the option 82 support globally or for a named group of interfaces.

To restore the default behavior, in which option 82 information is not inserted into DHCP packets, you use the **delete relay-option-82** statement.



NOTE: The DHCPv6 relay agent provides similar Agent Circuit ID and Agent Remote ID support for DHCPv6 clients. For DHCPv6, subscriber management uses DHCPv6 option 18 to include the circuit ID in the packets that the relay agent sends to a DHCPv6 server, and option 37 to include the remote ID in the packets. See *DHCPv6 Relay Agent Options*.

The following sections describe the option 82 operations you can configure:

- [Configuring Option 82 Information on page 658](#)
- [Overriding Option 82 Information on page 660](#)
- [Including a Prefix in DHCP Options on page 660](#)
- [Including a Textual Description in DHCP Options on page 663](#)

Configuring Option 82 Information

You use the **relay-option-82** statement to configure the DHCP relay agent to insert option 82 information in DHCP packets that the relay agent receives from clients and forwards to a DHCP server. When you configure option 82, you can include one of the suboption statements to specify the type of information you want to include in the DHCP packets. If you configure option 82 without including one of the suboption statements, the Agent Circuit ID option is included by default. Use the **circuit-id** statement to include the Agent Circuit ID (suboption 1) in the packets, or the **remote-id** statement to include the Agent Remote ID (suboption 2).

You can optionally configure DHCP relay agent to include a prefix or the interface description as part of the suboption information. If you specify the **circuit-id** or **remote-id** statement without including any of the optional **prefix**, **use-interface-description**, **use-vlan-id**, **include-irb-and-l2**, or **no-vlan-interface-name** statements, the format of the Agent Circuit ID or Agent Remote ID information for Fast Ethernet (fe), Gigabit Ethernet (ge), and integrated routing and bridging (irb) interfaces is one of the following, depending on your network configuration:

- For Fast Ethernet or Gigabit Ethernet interfaces that do not use VLANs, stacked VLANs (S-VLANs), or bridge domains:

```
(fe | ge)-fpc/pic/port.subunit
```



NOTE: For remote systems, the *subunit* is required and is used to differentiate an interface.

- For Fast Ethernet or Gigabit Ethernet interfaces that use VLANs:

```
(fe | ge)-fpc/pic/port:vlan-id
```

- For Fast Ethernet or Gigabit Ethernet interfaces that use S-VLANs:

```
(fe | ge)-fpc/pic/port:svlan-id-vlan-id
```



NOTE: Integrated routing and bridging (IRB) provides simultaneous support for Layer 2 bridging and Layer 3 IP routing on the same interface. IRB enables you to route local packets to another routed interface or to another bridging domain that has a Layer 3 protocol configured.

The interface to bridge domain relationship might be implicit (the interface is mapped to the bridge domain by the system based on the VLAN tag) or explicit (the interface is mapped to the bridge domain by configuring it in the bridge domain definition). For the explicit case, tagging might not be relevant for the mapping.

In the case of an IRB interface, the format displays the Layer 2 interface instead of the IRB interface along with the bridge domain name. For IRB interfaces (or other pseudo devices) the default format is as follows:

- IRB interfaces that use bridge domains but do not use VLANs or S-VLANs:

```
(fe | ge)-fpc/pic/port.subunit:bridge-domain-name
```

- IRB interfaces that use VLANs:

```
(fe | ge)-fpc/pic/port.subunit:vlan-name
```

To include the IRB interface name with the Layer 2 interface name, configure the **include-irb-and-l2** statement. The format is as follows:

- IRB interfaces that use bridge domains but do not use VLANs or S-VLANs:

```
(fe | ge)-fpc/pic/port:bridge-domain-name+irb.subunit
```

- IRB interfaces that use VLANs:

```
(fe | ge)-fpc/pic/port:vlan-name+irb.subunit
```

To include only the IRB interface name without the Layer 2 interface and bridge domain or VLAN, configure the **no-vlan-interface-name** statement. The format is as follows:

```
irb.subunit
```

To enable insertion of option 82 information:

1. Specify that you want to configure option 82 support.

```
[edit forwarding-options dhcp-relay]
user@host# edit relay-option-82
```

2. Configure the DHCP relay agent to insert the Agent Circuit ID suboption, the Agent Remote ID suboption, or both.

- To insert the Agent Circuit ID:

```
[edit forwarding-options dhcp-relay relay-option-82]
user@host# set circuit-id
```

- To insert the Agent Remote ID:

```
[edit forwarding-options dhcp-relay relay-option-82]
user@host# set remote-id
```

- To insert both, configure both set commands.

3. (Optional) Configure a prefix that is used in the option 82 information in the DHCP packets.

See Including a Prefix in DHCP Options.

4. (Optional) Configure the DHCP relay agent to include the interface's textual description instead of the interface identifier in the option 82 information.

See Including a Textual Description in DHCP Options.

Overriding Option 82 Information

You can configure the DHCP relay agent to add or remove the DHCP relay agent information option (option 82) in DHCP packets.

This feature causes the DHCP relay agent to perform one of the following actions, depending on the configuration:

- If the DHCP relay agent is configured to add option 82 information to DHCP packets, it clears the existing option 82 values from the DHCP packets and inserts the new values before forwarding the packets to the DHCP server.
- If the DHCP relay agent is not configured to add option 82 information to DHCP packets, it clears the existing option 82 values from the packets, but does not add any new values before forwarding the packets to the DHCP server.

To override the default option 82 information in DHCP packets destined for a DHCP server:

1. Specify that you want to configure override options.

```
[edit forwarding-options dhcp-relay]
user@host# edit overrides
```

2. Specify that the option 82 information in DHCP packets is overwritten.

```
[edit forwarding-options dhcp-relay overrides]
user@host# set always-write-option-82
```

Including a Prefix in DHCP Options

When you configure the DHCP relay agent to include DHCP options in the packets that the relay agent sends to a DHCP server, you can specify that the relay agent add a prefix to the DHCP option. You can add a prefix to the following DHCP options:

- DHCPv4 option 82 Agent Circuit ID (suboption 1)
- DHCPv4 option 82 Agent Remote ID (suboption 2)
- DHCPv6 option 18 Relay Agent Interface-ID
- DHCPv6 option 37 Relay Agent Remote-ID

The prefix is separated from the DHCP option information by a colon (:), and it can include any combination of the **host-name**, **logical-system-name**, and **routing-instance-name** options. The DHCP relay agent obtains the values for the **host-name**, **logical-system-name**, and **routing-instance-name** as follows:

- If you include the **host-name** option, the DHCP relay agent uses the hostname of the device configured with the **host-name** statement at the **[edit system]** hierarchy level.
- If you include the **logical-system-name** option, the DHCP relay agent uses the logical system name configured with the **logical-system** statement at the **[edit logical-system]** hierarchy level.
- If you include the **routing-instance-name** option, the DHCP relay agent uses the routing instance name configured with the **routing-instance** statement at the **[edit routing-instances]** hierarchy level or at the **[edit logical-system logical-system-name routing-instances]** hierarchy level.

If you include the hostname and either or both of the logical system name and the routing instance name in the prefix, the hostname is followed by a forward slash (/). If you include both the logical system name and the routing instance name in the prefix, these values are separated by a semicolon (;).

The following examples show several possible formats for the DHCP option information when you specify the **prefix** statement for Fast Ethernet (fe) or Gigabit Ethernet (ge) interfaces with S-VLANs.

- If you include only the hostname in the prefix for Fast Ethernet or Gigabit Ethernet interfaces with S-VLANs:

```
hostname:(fe | ge)-fpc/pic/port:svlan-id-vlan-id
```

- If you include only the logical system name in the prefix for Fast Ethernet or Gigabit Ethernet interfaces with S-VLANs:

```
logical-system-name:(fe | ge)-fpc/pic/port:svlan-id-vlan-id
```

- If you include only the routing instance name in the prefix for Fast Ethernet or Gigabit Ethernet interfaces with S-VLANs:

```
routing-instance-name:(fe | ge)-fpc/pic/port:svlan-id-vlan-id
```

- If you include both the hostname and the logical system name in the prefix for Fast Ethernet or Gigabit Ethernet interfaces with S-VLANs:

```
host-name/logical-system-name:(fe | ge)-fpc/pic/port:svlan-id-vlan-id
```

- If you include both the logical system name and the routing instance name in the prefix for Fast Ethernet or Gigabit Ethernet interfaces with S-VLANs:

```
logical-system-name;routing-instance-name:(fe | ge)-fpc/pic/port:svlan-id-vlan-id
```

- If you include the hostname, logical system name, and routing instance name in the prefix for Fast Ethernet or Gigabit Ethernet interfaces with S-VLANs:

```
host-name/logical-system-name;routing-instance-name:(fe |
ge)-fpc/pic/port:svlan-id-vlan-id
```

For Fast Ethernet or Gigabit Ethernet interfaces that use VLANs but not S-VLANs, only the *vlan-id* value appears in the DHCP option format.

(DHCPv4) To configure a prefix with the option 82 information:

1. Specify that you want to configure option 82 support.

```
[edit forwarding-options dhcp-relay]
user@host# edit relay-option-82
```

2. Configure DHCP relay agent to insert the Agent Circuit ID, the Agent Remote ID, or both.

- To configure the Agent Circuit ID:

```
[edit forwarding-options dhcp-relay relay-option-82]
user@host# edit circuit-id
```

- To configure the Agent Remote ID:

```
[edit forwarding-options dhcp-relay relay-option-82]
user@host# edit remote-id
```

3. Specify that the prefix be included in the option 82 information. In this example, the prefix includes the hostname and logical system name.

- To include the prefix with the Agent Circuit ID:

```
[edit forwarding-options dhcp-relay relay-option-82 circuit-id]
user@host# set prefix host-name logical-system-name
```

- To include the prefix with the Agent Remote ID:

```
[edit forwarding-options dhcp-relay relay-option-82 remote-id]
user@host# set prefix host-name logical-system-name
```

(DHCPv6) To use a prefix with the DHCPv6 option 18 or option 37 information:

1. Specify that you want to configure DHCPv6 relay agent support.

```
[edit forwarding-options dhcp-relay]
user@host# edit dhcpv6
```

2. Configure DHCPv6 relay agent to insert option 18 (Relay Agent Interface-ID), option 37 (Relay Agent Remote-ID), or both.

- To configure option 18:

```
[edit forwarding-options dhcp-relay dhcpv6]
```

```
user@host# edit relay-agent-interface-id
```

- To configure option 37:

```
[edit forwarding-options dhcp-relay dhcpv6]
user@host# edit relay-agent-remote-id
```

3. Specify that the prefix is included in the option information. In this example, the prefix includes the hostname and logical system name

- To include the prefix with option 18:

```
[edit forwarding-options dhcp-relay dhcpv6 relay-agent-interface-id]
user@host# set prefix host-name logical-system-name
```

- To include the prefix with option 37:

```
[edit forwarding-options dhcp-relay dhcpv6 relay-agent-remote-id]
user@host# set prefix host-name logical-system-name
```

Including a Textual Description in DHCP Options

By default, when DHCP relay agent inserts option information in the packets sent to a DHCP server, the options include the interface identifier. However, you can configure the DHCP relay agent to include the textual description that is configured for the interface instead of the interface identifier. You can use the textual description for either the logical interface or the device interface.

You can include the textual interface description in the following DHCP options:

- DHCPv4 option 82 Agent Circuit ID (suboption 1)
- DHCPv4 option 82 Agent Remote ID (suboption 2)
- DHCPv6 option 18 Relay Agent Interface-ID
- DHCPv6 option 37 Relay Agent Remote-ID

The textual description is configured separately, using the **description** statement at the **[edit interfaces *interface-name*]** hierarchy level. If you specify that the textual description is used and no description is configured for the interface, DHCP relay defaults to using the Layer 2 interface name.

In the case of integrated routing and bridging (IRB) interfaces, the textual description of the Layer 2 interface is used instead of the textual description of the IRB interface. If there is no description configured, the Layer 2 logical interface name is used.



NOTE: For IRB interfaces, the option 82 field must be able to uniquely identify the incoming interface based on either the Agent Circuit ID or Agent Remote ID. You can modify the information in the textual interface description to match the raw IFD (physical interface without a subunit) name and configure the option 82 field to use the interface description.

You can use the textual description with the following DHCP options:

- DHCPv4 Option 82 Agent Circuit ID (suboption 1)
- DHCPv4 Option 82 Agent Remote ID (suboption 2)
- DHCPv6 Relay Agent Interface-ID (option 18)
- DHCPv6 Relay Agent Remote-ID (option 37)

(DHCPv4) To configure the DHCP relay option 82 suboption to include the textual interface description:

1. Specify that you want to configure option 82 support.

```
[edit forwarding-options dhcp-relay]
user@host# edit relay-option-82
```

2. Configure DHCP relay agent to insert the Agent Circuit ID, Agent Remote ID, or both.

```
[edit forwarding-options dhcp-relay relay-option-82]
user@host# edit circuit-id
```

3. Specify that the textual description is included in the option 82 information. In this example, the option 82 information includes the description used for the device interface.

```
[edit forwarding-options dhcp-relay relay-option-82 circuit-id]
user@host# set use-interface-description device
```

(DHCPv6) To configure the DHCPv6 option 18 or option 37 to include the textual interface description:

1. Specify that you want to configure DHCPv6 relay agent support.

```
[edit forwarding-options dhcp-relay]
user@host# edit dhcpv6
```

2. Configure DHCPv6 relay agent to insert option 18 (Relay Agent Interface-ID), option 37 (Relay Agent Remote-ID), or both.

- To configure option 18:

```
[edit forwarding-options dhcp-relay dhcpv6]
user@host# edit relay-agent-interface-id
```

- To configure option 37:

```
[edit forwarding-options dhcp-relay dhcpv6]
user@host# edit relay-agent-remote-id
```

3. Specify that the textual description is included in the option information. In the following example, the option information includes the description used for the device interface.

- To include the textual description in option 18:

```
[edit forwarding-options dhcp-relay dhcpv6 relay-agent-interface-id]
user@host# set use-interface-description device
```

- To include the textual description in option 37:

```
[edit forwarding-options dhcp-relay dhcpv6 relay-agent-remote-id]
user@host# set use-interface-description device
```

See Also • *Configuring Interface Description*

How DHCP Relay Agent Uses Option 82 for Auto Logout

Table 56 on page 665 indicates how the DHCP relay agent determines the option 82 value used for the client auto logout feature. Depending on the configuration settings, DHCP relay agent takes the action indicated in the right column.

Table 56: DHCP Relay Agent Option 82 Value for Auto Logout

DHCP Relay Agent Configuration Settings				giaddr in non-snooped packet	Action Taken
DHCP Relay Configured with Option 82	Discover Packet Contains Option 82	Override "trust-option-82"	Override "always-write-option-82"		
No	No	—	—	—	No secondary search performed
No	Yes	Yes	—	—	Use option 82 from packet
No	Yes	No	—	Zero	Drop packet
No	Yes	No	—	Non-zero	Use option 82 from packet
Yes	No	—	—	—	Use configured option 82
Yes	Yes	No	—	Zero	Drop packet
Yes	Yes	No	No	Non-zero	Use option 82 from packet

Table 56: DHCP Relay Agent Option 82 Value for Auto Logout (continued)

DHCP Relay Agent Configuration Settings				giaddr in non-snooped packet	Action Taken
DHCP Relay Configured with Option 82	Discover Packet Contains Option 82	Override "trust-option-82"	Override "always-write-option-82"		
Yes	Yes	No	Yes	Non-zero	Overwrite the configured option 82
Yes	Yes	Yes	No	—	Use option 82 from packet
Yes	Yes	Yes	Yes	—	Overwrite the configured option 82

Enable Processing of Untrusted Packets So Option 82 Information Can Be Used

By default, the DHCP relay agent treats client packets with a giaddr of 0 (zero) and option 82 information as if the packets originated at an untrusted source, and drops them without further processing. You can override this behavior and specify that the DHCP relay agent process DHCP client packets that have a giaddr of 0 (zero) and contain option 82 information.

To configure DHCP relay agent to trust option 82 information:

1. Specify that you want to configure override options.

```
[edit forwarding-options dhcp-relay]
user@host# edit overrides
```

2. Specify that the DHCP relay agent process DHCP client packets with a giaddr of 0 and that contain option 82 information.

```
[edit forwarding-options dhcp-relay overrides]
user@host# set trust-option-82
```

Overriding Option 82 Information

You can configure the DHCP relay agent to add or remove the DHCP relay agent information option (option 82) in DHCP packets.

This feature causes the DHCP relay agent to perform one of the following actions, depending on the configuration:

- If the DHCP relay agent is configured to add option 82 information to DHCP packets, it clears the existing option 82 values from the DHCP packets and inserts the new values before forwarding the packets to the DHCP server.
- If the DHCP relay agent is not configured to add option 82 information to DHCP packets, it clears the existing option 82 values from the packets, but does not add any new values before forwarding the packets to the DHCP server.

To override the default option 82 information in DHCP packets destined for a DHCP server:

1. Specify that you want to configure override options.

```
[edit forwarding-options dhcp-relay]
user@host# edit overrides
```

2. Specify that the option 82 information in DHCP packets is overwritten.

```
[edit forwarding-options dhcp-relay overrides]
user@host# set always-write-option-82
```

Understanding DHCP Services for Switches

A Dynamic Host Configuration Protocol (DHCP) server on a switch can provide many valuable TCP/IP network services. For example, DHCP can dynamically allocate the four required IP parameters to each computer on the LAN: IP address, network mask, switch address, and name server address. Additionally, DHCP on the switch can automatically upgrade software on client systems.

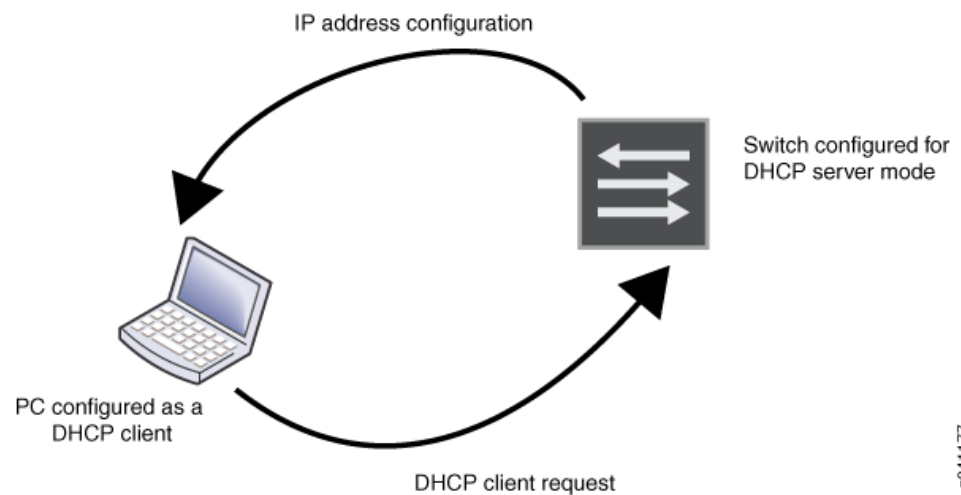
This topic describes:

- [DHCP Client/Server Model on page 667](#)
- [Using DHCP on page 668](#)
- [DHCP Relay Servers and DHCP Servers on page 668](#)
- [Legacy DHCP and Extended DHCP for Server Versions on page 669](#)
- [Configuring DHCP on a Switch on page 670](#)
- [How DHCP Works on page 670](#)

DHCP Client/Server Model

DHCP IP address allocation works on a client/server model in which the server, in this case a switch, assigns the client reusable IP information from an address pool. A DHCP client might receive offer messages from multiple DHCP servers and can accept any one of the offers; however, the client usually accepts the first offer it receives. See [Figure 35 on page 668](#).

Figure 35: DHCP Client/Server Model



Using DHCP

DHCP automates network-parameter assignment to network devices. Even in small networks, DHCP is useful because it makes it easy to add new machines to the network.

DHCP access service minimizes the overhead required to add clients to the network by providing a centralized, server-based setup, which means that you do not have to manually create and maintain IP address assignments for clients. In addition, when you use DHCP to manage a pool of IP addresses among hosts, you reduce the number of IP addresses needed on the network. DHCP does this by leasing an IP address to a host for a limited period of time, allowing the DHCP server to share a limited number of IP addresses. DHCP also provides a central database of devices that are connected to the network and eliminates duplicate resource assignments. In addition to IP addresses for clients, DHCP provides other configuration information, particularly the IP addresses of local caching Domain Name System (DNS) resolvers, network boot servers, or other service hosts.

Another valuable DHCP feature is automatic software download for installation of software packages on switches. DHCP clients configured for automatic software download receive messages as part of the DHCP message exchange process—when the software package name in the DHCP server message is different from that of the software package that booted the DHCP client switch, the new software is downloaded and installed. See *Upgrading Software by Using Automatic Software Download for Switches*.

DHCP Relay Servers and DHCP Servers

You can configure a switch either as a DHCP server or as a DHCP relay server, but not both. Whereas a DHCP server replies to a client with an IP address, a DHCP relay server relays DHCP messages to and from the configured DHCP server, even if the client and server are on different IP networks.

Configure a switch to be a DHCP relay agent if you have locally attached hosts and a remote DHCP server.

Legacy DHCP and Extended DHCP for Server Versions

Two versions of both DHCP server and DHCP relay agent are available on EX Series, QFX Series, and OCX Series switches. The original legacy DHCP server and legacy DHCP relay agent can be used in the same network as the extended DHCP servers and extended DHCP relay agent—extended DHCP is also referred to as virtual router (VR) aware DHCP.

You cannot configure legacy DHCP and extended DHCP versions on the same switch. Because the newer extended DHCP server version has more features, we recommend that you configure the extended DHCP server if it is supported by the switch.

The extended DHCP server version has the following added features:

- Graceful Routing Engine switchover (GRES), which provides mirroring support for clients.
- Virtual routing and forwarding (VRF), which allows multiple instances of a routing table to simultaneously coexist on the same switch. For details, see *Understanding Virtual Routing Instances on EX Series Switches*.



NOTE: Legacy DHCP supports the circuit ID and the remote ID fields for the relay agent option (option 82). Extended DHCP for the relay agent option supports only circuit ID. See *EX Series Switch Software Features Overview* for a list of switches that support extended DHCP (VR-aware DHCP).

Legacy DHCP and extended DHCP servers can be configured at the hierarchy levels shown in [Table 57 on page 669](#):

Table 57: Legacy DHCP and Extended DHCP Server Hierarchy Levels

DHCP Service	Hierarchy
Extended DHCP server	<code>edit system services dhcp-local-server</code>
Extended DHCP address pool	<code>edit access address-assignment pool</code>
Legacy DHCP server	<code>edit system services dhcp</code>
Legacy DHCP relay	<code>edit forwarding-options helpers bootp</code>
Extended DHCP relay	<code>edit forwarding-options dhcp-relay</code>
Legacy DHCP address pool	<code>edit system services dhcp pool</code>

DHCP clients on a switch are always configured at the hierarchy level `[edit interfaces interface-name family dhcp]`.

Configuring DHCP on a Switch

A DHCP configuration consists of two parts: the configuration for a DHCP server and the configuration for DHCP clients. The DHCP server configuration is simple if you accept the default configurations.

When you configure a legacy DHCP server, you only need to define the DHCP server name and the interface on the switch. You can use the default configuration for the rest of the settings. When you configure an extended DHCP server, you need to only define a DHCP pool, indicate IP addresses for the pool, and create a server group. You can use the default configuration for the rest of the settings.

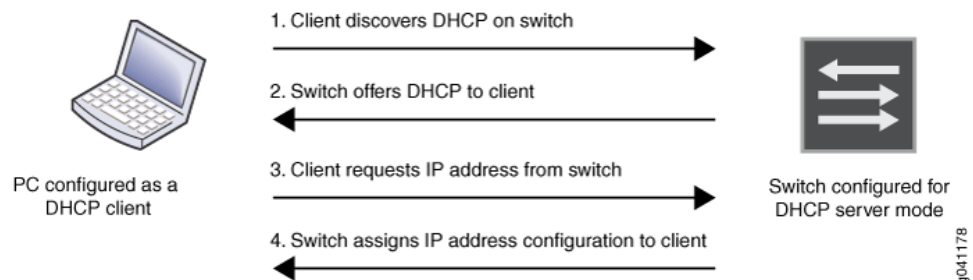
For directions for configuring either a legacy DHCP server or an extended DHCP server, see [“Configuring a DHCP Server on Switches \(CLI Procedure\)” on page 671](#).

To configure a DHCP client, set the client’s DHCP interface address in the **[edit interfaces interface-name unit 0 family inet dhcp]** hierarchy. For directions for configuring a DHCP client on a switch, see [“Configuring a DHCP Client \(CLI Procedure\)” on page 677](#).

How DHCP Works

DHCP consists of a four-step transfer process beginning with a broadcast DHCP discovery message from the client. As the second step, the client receives a DHCP offer message from the server. This message includes the IP address and mask, and some other specific parameters. The client then sends a DHCP request message to accept the IP address and other parameters that it received from the server in the previous step. The DHCP server sends a DHCP response message and removes the now-allocated address from the DHCP address pool. See [Figure 36 on page 670](#).

Figure 36: DHCP Four-Step Transfer



NOTE: Because the DHCP discovery message from the client is a broadcast message and because broadcast messages cross other segments only when they are explicitly routed, you might have to configure a DHCP relay agent on the switch interface so that all DHCP discovery messages from the clients are forwarded to one DHCP server.

Related Documentation

- [Configuring a DHCP Client \(CLI Procedure\) on page 677](#)
- [Configuring a DHCP Server on Switches \(CLI Procedure\) on page 671](#)

- [Configuring an Extended DHCP Relay Server on EX Series Switches \(CLI Procedure\) on page 626](#)
- [Configuring a DHCP SIP Server \(CLI Procedure\) on page 678](#)
- [Upgrading Software by Using Automatic Software Download for Switches](#)

Configuring a DHCP Server on Switches (CLI Procedure)



NOTE: This task uses Junos OS for EX Series switches that does not support the Enhanced Layer 2 Software (ELS) configuration style. If your switch runs software that supports ELS, see [“Configuring a Switch as a DHCP Server \(CLI Procedure\)” on page 674](#). For ELS details, see *Using the Enhanced Layer 2 Software CLI*.

A Dynamic Host Configuration Protocol (DHCP) server can provide two valuable TCP/IP network services. DHCP can dynamically allocate IP parameters, such as an IP address, to clients and it can also deliver software upgrades to clients.

A DHCP configuration consists of two components—an optional reconfiguration of default settings on DHCP clients and the configuration of a DHCP server. This topic covers configuration of the DHCP server. For information about reconfiguring a DHCP client, see [“Configuring a DHCP Client \(CLI Procedure\)” on page 677](#).

You can configure either of two versions of a DHCP server on a switch—the extended server version or the legacy server version. We recommend that you configure the extended server unless you need to keep your DHCP server configuration backward-compatible with the legacy server version.

This topic includes the following tasks:

1. [Configuring an Extended DHCP Server on a Switch on page 671](#)
2. [Configuring a Legacy DHCP Server on a Switch \(CLI Procedure\) on page 672](#)

Configuring an Extended DHCP Server on a Switch

To configure an extended DHCP server, you must configure a DHCP pool, indicate IP addresses for the pool, and create a server group. Additional configurations are optional.

Do not assign addresses that are already in use in the network to address pools. The extended DHCP server does not check whether addresses are already in use before it assigns them to clients.

1. Create an address pool for DHCP IP addresses:

```
[edit]
user@switch# set access address-pool address-pool
```

2. Configure an address-assignment pool that can be used by different client applications for DHCP dynamic assignment:

```
[edit access address-assignment]
user@switch# set pool address-pool-name
```

3. Create a server group on the switch, providing a group name and an interface name for DHCP:

```
[edit system services dhcp-local-server]
user@switch# set group group-name interface interface-name
```

4. (Optional) Process the information protocol data units (PDUs):

```
[edit system services dhcp-local-server]
user@switch# set overrides process-inform
```

5. (Optional) Redefine the order of attribute matching for pool selection:

```
[edit system services dhcp-local-server]
user@switch# set pool-match-order ip-address-first
```

6. (Optional) Enable dynamic reconfiguration triggered by the DHCP extended server for all DHCP clients or only for the DHCP clients serviced by the specified group of interfaces:

```
[edit system services dhcp-local-server]
user@switch# set reconfigure
```

```
[edit system services dhcp-local-server group group-name]
user@switch# set reconfigure
```

Configuring a Legacy DHCP Server on a Switch (CLI Procedure)

To configure a legacy DHCP server, you must configure a pool of IP addresses for dynamic assignment. You only need to supply a series of network addresses. Additional configurations are optional.

1. Configure a pool of IP addresses for dynamic assignment:

```
[edit system services dhcp]
user@switch# set pool network-range
```



NOTE: Step 2 through Step 15 are for assigning global values at the [edit system services dhcp] hierarchy level. You can also assign the same values to a specific pool by using those same commands at the [edit system services dhcp pool *network-range*] hierarchy level.

2. (Optional) Change the domain search list used to resolve hostnames:

```
[edit system services dhcp]
user@switch# set domain-search [ domain-list ]
```

3. (Optional) Change the domain name server (DNS) name that the DHCP server advertises to clients:

```
[edit system services dhcp]
user@switch# set name-server address
```

4. (Optional) Change the DHCP options:

```
[edit system services dhcp]
user@switch# set option id-number
```

5. (Optional) Change the devices advertised to clients:

```
[edit system services dhcp]
user@switch# set router address
```

6. (Optional) Configure the name of the boot server advertised to DHCP clients. The client uses a boot file located on the boot server to complete the DHCP setup. This configuration step is equivalent to DHCP Option 66:

```
[edit system services dhcp]
user@switch# set boot-server (address | hostname)
```

7. (Optional) Set the boot file advertised to DHCP clients. After the client receives an IP address and the boot file location from the DHCP server, the client uses the boot image stored in the boot file to complete DHCP setup. This configuration step is equivalent to DHCP Option 67:

```
[edit system services dhcp]
user@switch# set boot-file filename
```

8. (Optional) Change the SIP server:

```
[edit system services dhcp]
```

```
user@switch# set sip-server addresses-or-names
```

For more information, see “Configuring a DHCP SIP Server (CLI Procedure)” on page 678.

9. (Optional) Change the DHCP client's hardware address:

```
[edit system services dhcp]  
user@switch# set static-binding mac-address
```

10. (Optional) Change the NetBIOS name server:

```
[edit system services dhcp]  
user@switch# set wins-server address
```

**Related
Documentation**

- [Configuring a DHCP Client \(CLI Procedure\) on page 677](#)
- [Configuring a DHCP SIP Server \(CLI Procedure\) on page 678](#)
- [Understanding DHCP Services for Switches on page 667](#)

Configuring a Switch as a DHCP Server (CLI Procedure)



NOTE: This topic applies to Junos OS for EX Series switches and QFX Series switches with support for the Enhanced Layer 2 Software (ELS) configuration style. If your switch runs software that does not support ELS, see “[Configuring a DHCP Server on Switches \(CLI Procedure\)](#)” on page 671. For ELS details, see *Using the Enhanced Layer 2 Software CLI*.

A Dynamic Host Configuration Protocol (DHCP) server provides a framework to pass configuration information to client hosts on a TCP/IP network. A switch acting as a DHCP server can dynamically allocate IP addresses and other configuration parameters, minimizing the overhead that is required to add clients to the network.

A DHCP configuration consists of two components—an optional reconfiguration of default settings on DHCP clients and the configuration of a DHCP server. This topic covers configuration of the switch as a local DHCP server using DHCP for IPv4 (DHCPv4). For information about DHCPv6 local server, see “[DHCPv6 Local Server Overview](#)” on page 628.

This topic describes the following task:

1. [Configuring the Switch as a Local DHCP Server on page 675](#)

Configuring the Switch as a Local DHCP Server

To configure a switch as a local DHCP server, you must configure a DHCP address pool and indicate IP addresses for the pool. The switch, operating as the DHCP server, dynamically distributes the IP addresses from this pool. The switch can dynamically assign additional configuration parameters, such as default gateway, to provide the client with information about the network.

Multiple address pools can be configured for a DHCP server. DHCP maintains the state information about all configured pools. Clients are assigned addresses from pools with subnets that match the interface on which the DHCPDISCOVER packet sent by the client is received on the server. When more than one pool exists on the same interface, addresses are assigned on a rotating basis from all available pools.

You must ensure that you do not assign addresses that are already in use in the network to the address pools. The DHCP server does not check whether the addresses are already in use in the network before it assigns them to clients.

1. Configure a Layer 3 interface with an IP address on which the DHCP server will be reachable:

```
[edit]
user@switch# set interfaces interface-name unit unit-number family family address
address/prefix-length
user@switch# set vlans vlan-name vlan-id vlan-id
user@switch# set vlans vlan-name l3-interface irb-name
user@switch# set interfaces irb-name l3-interface irb-name family family address
address/prefix-length
```

For example:

```
[edit]
user@switch# set interfaces ge-0/0/1 unit 0 family inet address 192.0.2.1/24
user@switch# set vlans server vlan-id 301
user@switch# set vlans server l3-interface irb.301
user@switch# set interfaces irb.301 family inet address 192.0.2.2/24
```

2. Configure the DHCP server for the Layer 3 interface:

```
[edit]
user@switch# set system services dhcp-local-server group-name interface
interface-name
```

For example:

```
[edit]
user@switch# set system services dhcp-local-server group server1 interface ge-0/0/1
user@switch# set system services dhcp-local-server group server1 interface irb.301
```

3. Create an address pool for IPv4 addresses that can be assigned to clients. The addresses in the pool must be on the subnet in which the DHCP clients reside. Do not include addresses that are already in use on the network.

```
[edit]
user@switch# set access address-assignment pool pool-name family family network
address/prefix-length
```

For example:

```
[edit]
user@switch# set access address-assignment pool pool1 family inet network
198.51.100.0/24
```

4. (Optional) Define a range of addresses in the address-assignment pool. The range is a subset of addresses within the pool that can be assigned to clients. If no range is specified, then all addresses within the pool are available for assignment. Configure the name of the range and the lower and upper boundaries of the addresses in the range:

```
[edit]
user@switch# set access address-assignment pool pool-name family family range
range-name low low-IP-address
user@switch# set access address-assignment pool pool-name family family range
range-name high high-IP-address
```

For example:

```
[edit]
user@switch# set access address-assignment pool pool1 family inet range range1 low
198.51.100.1
user@switch# set access address-assignment pool pool1 family inet range range1 high
198.51.100.2
```

5. (Optional) Configure one or more routers as the default gateway on the client's subnet:

```
[edit]
user@switch# set access address-assignment pool pool-name family family
dhcp-attributes router gateway-ip-address
```

For example:

```
[edit]
user@switch# set access address-assignment pool pool1 family inet dhcp-attributes
router 198.1.1.254
```

6. (Optional) Configure the IP address that is used as the source address for the DHCP server in messages exchanged with the client. Clients use this information to distinguish between lease offers.


```
[edit]
user@switch# set access address-assignment pool pool-name family family
dhcp-attributes server-identifier ip-address
```

For example:

```
[edit]
user@switch# set access address-assignment pool pool1 family inet dhcp-attributes
server-identifier 198.51.100.254
```

7. (Optional) Specify the maximum time period, in seconds, that a client holds the lease for an assigned IP address if the client does not renew the lease:

```
[edit]
user@switch# set access address-assignment pool pool-name family family
dhcp-attributes maximum-lease-time seconds
```

For example:

```
[edit]
user@switch# set access address-assignment pool pool1 family inet dhcp-attributes
maximum-lease-time 43,200
```

8. (Optional) Specify user-defined options to be included in DHCP packets:

```
[edit]
user@switch# set access address-assignment pool pool-name family family
dhcp-attributes option option-id-number option-type option-value
```

For example:

```
[edit]
user@switch# set access address-assignment pool pool1 family inet dhcp-attributes
option 98 string test98
```

Related Documentation

- [Configuring a DHCP Client \(CLI Procedure\) on page 677](#)
- [Configuring a DHCP SIP Server \(CLI Procedure\) on page 678](#)

Configuring a DHCP Client (CLI Procedure)

A Dynamic Host Configuration Protocol (DHCP) server can provide many valuable TCP/IP network services. DHCP can dynamically allocate IP parameters, such as an IP address, to clients, and it can also deliver software upgrades to clients.

DHCP configuration consists of two components, configuration of DHCP clients and configuration of a DHCP server. Client configuration determines how clients send a message requesting an IP address, whereas a DHCP server configuration enables the server to send an IP address configuration back to the client. This topic describes

configuring a DHCP client. For directions for configuring a DHCP server, see [“Configuring a DHCP Server on Switches \(CLI Procedure\)” on page 671](#) or [“Configuring a Switch as a DHCP Server \(CLI Procedure\)” on page 674](#).

You can change DHCP client configurations from the switch, using client identifiers to indicate which clients you want to configure.

To configure a DHCP client, you configure an interface to belong to the DHCP family and specify additional attributes, as desired:

```
[edit]
user@switch# set interfaces interface-name unit number family inet dhcp
configuration-statement
```

The options that you can configure are listed in [Table 58 on page 678](#). Replace the variable *configuration-statement* with one or more of the statements listed in this table. If you do not explicitly configure these options, the switch uses default values for them.

Table 58: DHCP Client Settings

Configuration Statement	Description
client-identifier	Unique client ID—By default this consists of the hardware type (01 for Ethernet) and the MAC address (a.b.c.d). For this example, the value would be 01abcd.
lease-time	Time in seconds that a client holds the lease for an IP address assigned by a DHCP server. If a client does not request a specific lease time, then the server sends the default lease time. The default lease time on a Junos OS DHCP server is 1 day.
retransmission-attempt	Number of times the client attempts to retransmit a DHCP packet.
retransmission-interval	Time between transmission attempts.
server-address	IP address of the server that the client queries for an IP address.
update-server	TCP/IP settings learned from an external DHCP server to the DHCP server running on the switch are propagated.
vendor-option	Vendor class ID (CPU's manufacturer ID string) for the DHCP client.

- Related Documentation**
- [Configuring a DHCP Server on Switches \(CLI Procedure\) on page 671](#)
 - [Understanding DHCP Services for Switches on page 667](#)

Configuring a DHCP SIP Server (CLI Procedure)

You can use the **sip-server** statement on the EX Series switch to configure option 120 on a DHCP server. The DHCP server sends configured option values—Session Initiation Protocol (SIP) server addresses or names—to DHCP clients when they request them. Previously, you were only allowed to specify a SIP server by address using **[edit system services dhcp option 120]**. You specify either an IPv4 address or a fully qualified domain

name to be used by SIP clients to locate a SIP server. You cannot specify both an address and name in the same statement.

To configure a SIP server using the **address** option:

```
[edit system services dhcp]
user@switch# set sip-server address
```

For example, to configure one address:

```
[edit system services dhcp]
user@switch set sip-server 192.168.0.11
```

To configure a SIP server using the **name** option:

```
[edit system services dhcp]
user@switch# set sip-server name
```

For example, to configure a name:

```
[edit system services dhcp]
user@switch set sip-server abc.example.com
```

- Related Documentation**
- [Configuring a DHCP Client \(CLI Procedure\) on page 677](#)
 - [Understanding DHCP Services for Switches on page 667](#)

Disabling Automatic Binding of Stray DHCP Requests

DHCP requests that are received but have no entry in the database are known as stray requests. By default, DHCP relay, DHCP relay proxy, and DHCPv6 relay agent attempt to bind the requesting client by creating a database entry and forwarding the request to the DHCP server. If the server responds with an ACK, the client is bound and the ACK is forwarded to the client. If the server responds with a NAK, the database entry is deleted and the NAK is forwarded to the client. This behavior occurs regardless of whether authentication is configured.

You can override the default configuration at the global level, for a named group of interfaces, or for a specific interface within a named group. Overriding the default causes DHCP relay, DHCP relay proxy, and DHCPv6 relay agent to drop all stray requests instead of attempting to bind the clients.



NOTE: Automatic binding of stray requests is enabled by default.

- To disable automatic binding behavior, include the **no-bind-on-request** statement when you configure DHCP overrides at the global, group, or interface level.

```
[edit forwarding-options dhcp-relay overrides]
```

```
user@host# set no-bind-on-request
```

- To override the default behavior for DHCPv6 relay agent, configure the override at the **[edit forwarding-options dhcp-relay dhcpv6]** hierarchy level.

```
[edit forwarding-options dhcp-relay dhcpv6 overrides]  
user@host# set no-bind-on-request
```

The following two examples show a configuration that disables automatic binding of stray requests for a group of interfaces and a configuration that disables automatic binding on a specific interface.

To disable automatic binding of stray requests on a group of interfaces:

1. Specify the named group.

```
[edit forwarding-options dhcp-relay]  
user@host# edit group boston
```

2. Specify that you want to configure overrides.

```
[edit forwarding-options dhcp-relay group boston]  
user@host# edit overrides
```

3. Disable automatic binding for the group.

```
[edit forwarding-options dhcp-relay group boston overrides]  
user@host# set no-bind-on-request
```

To disable automatic binding of stray requests on a specific interface:

1. Specify the named group of which the interface is a member.

```
[edit forwarding-options dhcp-relay]  
user@host# edit group boston
```

2. Specify the interface on which you want to disable automatic binding.

```
[edit forwarding-options dhcp-relay group boston]  
user@host# edit interface fe-1/0/1.2
```

3. Specify that you want to configure overrides.

```
[edit forwarding-options dhcp-relay group boston interface fe-1/0/1.2]  
user@host# edit overrides
```

4. Disable automatic binding on the interface.

```
[edit forwarding-options dhcp-relay group boston interface fe-1/0/1.2 overrides]
user@host# set no-bind-on-request
```

Attaching Dynamic Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces

This topic describes how to attach a dynamic profile to a DHCP subscriber interface or a DHCP client interface. When a DHCP subscriber or DHCP client logs in, the specified dynamic profile is instantiated and the services defined in the profile are applied to the interface.

This topic contains the following sections:

- [Attaching a Dynamic Profile to All DHCP Subscriber or All DHCP Client Interfaces on page 681](#)
- [Attaching a Dynamic Profile to a Group of DHCP Subscriber Interfaces or a Group of DHCP Client Interfaces on page 682](#)

Attaching a Dynamic Profile to All DHCP Subscriber or All DHCP Client Interfaces

To attach a dynamic profile to all DHCP subscriber or all DHCP client interfaces:

1. At the DHCP configuration hierarchy, use the **dynamic-profile** statement to specify the name of the dynamic profile to attach to all interfaces.

- For DHCP local server:

```
[edit system services dhcp-local-server]
user@host# set dynamic-profile vod-profile-22
```

- For DHCP relay agent:

```
[edit forwarding-options dhcp-relay]
user@host# set dynamic-profile vod-profile-west
```

2. (Routers only) Optionally, you can configure the attribute to use when attaching the specified profile.

You can include either the **aggregate-clients** option to enable multiple DHCP subscribers to share the same VLAN logical interface, or the **use-primary** option to specify that the primary dynamic profile is used. The **aggregate-clients** option does not apply to demux subscriber interfaces. The two options are mutually exclusive.

- To enable multiple subscribers to share the same VLAN logical interface:

```
[edit system services dhcp-local-server dynamic-profile]
user@host# set aggregate-clients merge
```

- To use the primary dynamic profile:

```
[edit forwarding-options dhcp-relay dynamic-profile]
user@host# set use-primary subscriber_profile
```

Attaching a Dynamic Profile to a Group of DHCP Subscriber Interfaces or a Group of DHCP Client Interfaces

Before you begin:

- Configure the interface group.

See [“Grouping Interfaces with Common DHCP Configurations”](#) on page 704.

To attach a dynamic profile to a group of interfaces:

1. At the DHCP configuration hierarchy, specify the name of the interface group and the dynamic profile to attach to the group.

- For DHCP local server:

```
[edit system services dhcp-local-server]
user@host# set group boston dynamic-profile vod-profile-42
```

- For DHCP relay agent:

```
[edit forwarding-options dhcp-relay]
user@host# set group quebec dynamic-profile vod-profile-east
```

2. (Routers only) Optionally, you can configure the attribute to use when attaching the specified profile.

You can include either the **aggregate-clients** option to enable multiple DHCP subscribers to share the same VLAN logical interface, or the **use-primary** option to specify that the primary dynamic profile is used. The **aggregate-clients** option does not apply to demux subscriber interfaces. The two options are mutually exclusive.

- To enable multiple subscribers to share the same VLAN logical interface:

```
[edit system services dhcp-local-server dynamic-profile]
user@host# set aggregate-clients merge
```

- To use the primary dynamic profile:

```
[edit forwarding-options dhcp-relay dynamic-profile]
user@host# set use-primary subscriber_profile
```

Related Documentation

- [Dynamic Profiles Overview](#)
- [Dynamic Profile Attachment to DHCP Subscriber Interfaces Overview](#)

Using External AAA Authentication Services with DHCP

The extended DHCP local server, including DHCPv6 local server, and the extended DHCP relay agent, including DHCPv6 relay agent, support the use of external AAA authentication services, such as RADIUS, to authenticate DHCP clients. When the extended DHCP local server or relay agent receives a discover PDU from a client, the extended DHCP application

contacts the AAA server to authenticate the DHCP client. The extended DHCP application can obtain client addresses and DHCP configuration options from the external AAA authentication server.



NOTE: This section uses the term *extended DHCP application* to refer to both the extended DHCP local server and the extended DHCP relay agent.

The external authentication feature also supports AAA directed logout. If the external AAA service supports a user logout directive, the extended DHCP application honors the logout and responds as though it were requested by a CLI management command. All of the client state information and allocated resources are deleted at logout. The extended DHCP application supports directed logout using the list of configured authentication servers you specify with the **authentication-server** statement at the **[edit access profile profile-name]** hierarchy level.

You can configure either global authentication support or group-specific support.

You must configure the **username-include** statement to enable the use of authentication. The **password** statement is not required and does not cause DHCP to use authentication if the **username-include** statement is not included.

To configure DHCP local server and DHCP relay agent authentication support:

1. Specify that you want to configure authentication options.

- For DHCP local server:

```
[edit system services dhcp-local-server]
user@host# edit authentication
```

- For DHCP relay agent:

```
[edit forwarding-options dhcp-relay]
user@host# edit authentication
```

- For DHCPv6 local server:

```
[edit system services dhcp-local-server dhcpv6]
user@host# edit authentication
```

- For DHCPv6 relay agent:

```
[edit forwarding-options dhcp-relay dhcpv6]
user@host# edit authentication
```

2. (Optional) Configure a password that authenticates the username to the external authentication service.

See *Configuring Passwords for Usernames*.

3. (Optional) Configure optional features to create a unique username.

See [“Creating Unique Usernames for DHCP Clients”](#) on page 684.

Creating Unique Usernames for DHCP Clients

You can configure the extended DHCP application to include additional information in the username that is passed to the external AAA authentication service when the DHCP client logs in. This additional information enables you to construct usernames that uniquely identify subscribers (DHCP clients).



NOTE: If you do not include a username in the authentication configuration, the router (or switch) does not perform authentication; however, the IP address is provided by the local pool if it is configured.

When you use the DHCPv6 local server, you must configure authentication and the client username; otherwise client login fails.

The following list describes the optional information that you can include as part of the username:

- **circuit-type**—The circuit type used by the DHCP client, for example **enet**.
- **client-id**—The client identifier option (option 1). (DHCPv6 local server DHCPv6 relay agent only)
- **delimiter**—The delimiter character that separates components that make up the concatenated username. The default delimiter is a period (.). The semicolon (;) is not supported as a delimiter character.
- **domain-name**—The client domain name as a string. The router adds the @ delimiter to the username.
- **interface-description**—The description of the device (physical) interface or the logical interface.
- **interface-name**—The interface name, including the interface device and associated VLAN IDs.
- **logical-system-name**—The name of the logical system, if the receiving interface is in a logical system.
- **mac-address**—The client MAC address, in a string of the format **xxxx.xxxx.xxxx**.

For DHCPv6 clients, because the DHCPv6 packet format has no specific field for the client MAC address, the MAC address is derived from among several sources with the following priority:

- Client DUID Type 1 or Type 3.
- Option 79 (client link-layer address), if present.
- The packet source address if the client is directly connected.
- The link local address.

- **option-60**—The portion of the option 60 payload that follows the length field. (Not supported for DHCPv6 local server)
- **option-82 <circuit-id> <remote-id>**—The specified contents of the option 82 payload. (Not supported for DHCPv6 local server)
 - **circuit-id**—The payload of the Agent Circuit ID suboption.
 - **remote-id**—The payload of the Agent Remote ID suboption.
 - Both **circuit-id** and **remote-id**—The payloads of both suboptions, in the format: **circuit-id[delimiter]remote-id**.
 - Neither **circuit-id** or **remote-id**—The raw payload of the option 82 from the PDU is concatenated to the username.



NOTE: For DHCP relay agent, the option 82 value used in creating the username is based on the option 82 value that is encoded in the outgoing (relayed) PDU.

- **relay-agent-interface-id**—The Interface-ID option (option 18). (DHCPv6 local server or DHCPv6 relay agent only)
- **relay-agent-remote-id**—The DHCPv6 Relay Agent Remote-ID option (option 37). (DHCPv6 local server or DHCPv6 relay agent only)
- **relay-agent-subscriber-id**—(On routers only) The DHCPv6 Relay Agent Subscriber-ID option (option 38). (DHCPv6 local server or DHCPv6 relay agent only)
- **routing-instance-name**—The name of the routing instance, if the receiving interface is in a routing instance.
- **user-prefix**—A string indicating the user prefix.
- **vlan-tags**—The subscriber VLAN tags. Includes the outer VLAN tag and, if present, the inner VLAN tag. You can use this option instead of the **interface-name** option when the outer VLAN tag is unique across the system and you do not need the underlying physical interface name to be part of the format.

The router (switch) creates the unique username by including the specified additional information in the following order, with the fields separated by a delimiter.

For DHCP local server and DHCP relay agent:

```
user-prefix[delimiter]mac-address[delimiter]logical-system-name[delimiter]
routing-instance-name[delimiter]circuit-type[delimiter]interface-name[delimiter]option-82[delimiter]
option-60@domain-name
```

For DHCPv6 local server:

```
user-prefix[delimiter]mac-address[delimiter]logical-system-name[delimiter]routing-instance-name[delimiter]
circuit-type[delimiter]interface-name[delimiter]relay-agent-remote-id[delimiter]
relay-agent-subscriber-id[delimiter]relay-agent-interface-id[delimiter]client-id@domain-name
```

To configure a unique username:

1. Specify that you want to configure authentication.

- For DHCP local server:

```
[edit system services dhcp-local-server]
user@host# edit authentication
```

- For DHCPv6 local server:

```
[edit system services dhcp-local-server dhcpv6]
user@host# edit authentication
```

- For DHCP relay agent:

```
[edit forwarding-options dhcp-relay]
user@host# edit authentication
```

- For DHCPv6 relay agent:

```
[edit forwarding-options dhcp-relay dhcpv6]
user@host# edit authentication
```



NOTE: You can also configure authentication and usernames for groups at additional hierarchy levels. See [authentication \(DHCP Local Server\)](#) and [authentication \(DHCP Relay Agent\)](#).

2. Specify that you want to include optional information in the username. (DHCP local server, DHCPv6 local server, DHCP relay agent, and DHCPv6 relay agent all support the **username-include** statement.)

```
[edit system services dhcp-local-server authentication]
user@host# set username-include
```

3. (Optional) Specify the optional information you want to include in the username. DHCP local server, DHCPv6 local server, DHCP relay agent, and DHCPv6 relay agent all support the **username-include** statement.

The following sample configuration produces this unique username:

wallybrown.00:00:5e:00:53:ff.enet@example.com

```
[edit system services dhcp-local-server authentication username-include]
user@host# set username-include circuit-type
user@host# set username-include domain-name example.com
user@host# set username-include mac-address
user@host# set username-include user-prefix wallybrown
```

Specifying the Maximum Number of DHCP Clients Per Interface

By default, there is no limit to the number of DHCP local server or DHCP relay clients allowed on an interface. However, you can override the default setting and specify the maximum number of clients allowed per interface, in the range 1 through 500,000. When the number of clients on the interface reaches the specified limit, no additional DHCP Discover PDUs or DHCPv6 Solicit PDUs are accepted. When the number of clients subsequently drops below the limit, new clients are again accepted.



NOTE: The maximum number of DHCP (and DHCPv6) local server clients or DHCP (and DHCPv6) relay clients can also be specified by Juniper Networks VSA 26-143 during client login. The VSA-specified value always takes precedence if the `interface-client-limit` statement specifies a different number.

If the VSA-specified value differs with each client login, DHCP uses the largest limit set by the VSA until there are no clients on the interface.

To configure the maximum number of DHCP clients allowed per interface:

1. Specify that you want to configure override options.

- For DHCP local server:

```
[edit system services dhcp-local-server]
user@host# edit overrides
```

- For DHCPv6 local server:

```
[edit system services dhcp-local-server dhcpv6]
user@host# edit overrides
```

- For DHCP relay agent:

```
[edit forwarding-options dhcp-relay]
user@host# edit overrides
```

- For DHCPv6 relay agent:

```
[edit forwarding-options dhcp-relay dhcpv6]
user@host# edit overrides
```

2. Configure the maximum number of clients allowed per interface. (DHCP local server, DHCPv6 local server, DHCP relay agent and DHCPv6 relay agent all support the `interface-client-limit` statement.)

```
[edit system services dhcp-local-server overrides]
user@host# set interface-client-limit number
```



NOTE: For DHCP local server and DHCP relay agent, you can use either the `interface-client-limit` statement or the `client-discover-match incoming-interface` statement to set a limit of one client per interface. The `interface-client-limit` statement with a value of 1 retains the existing client and rejects any new client connections. The `client-discover-match incoming-interface` statement deletes the existing client and allows a new client to connect.

DHCP Local Server Handling of Client Information Request Messages

DHCP clients that already have externally provided addresses may solicit further configuration information from a DHCP server by sending a DHCP inform or DHCPv6 information-request message that indicates what information is desired. These message types can be collectively referred to as information request messages. By default, DHCP local server and DHCPv6 local server ignore any DHCP information requests that they receive. You can override this default behavior to enable processing of these messages.

If you enable processing of information requests, DHCP local server responds to the client with a DHCP acknowledgment message that includes the requested information—if it is available. DHCPv6 local server responds in the same manner but uses a DHCP reply message. No subscriber management or DHCP-management is applied as a result of the DHCP information request message.

By default, DHCP relay and DHCP relay proxy automatically forward DHCP information request messages without modification if the messages are received on an interface configured for a DHCP server group. DHCP relay and relay proxy drop information request messages received on any other interfaces. You cannot disable this default DHCP relay and relay proxy behavior.

The information requested by these clients is typically configured with the `dhcp-attributes` statement for an address pool defined by the `address-assignment pool pool-name` statement at the `[edit access]` hierarchy level.

When you enable processing of DHCP information requests, you can optionally specify the name of the pool from which the local server retrieves the requested configuration information for the client. If you do not specify a local pool, then the local server requests that AAA selects and returns only the name of the relevant pool.



NOTE: PPP interfaces are not supported on EX Series switches.

When DHCPv6 is configured over PPP interfaces, the PPP RADIUS authentication data can be used to select the pool from which the response information is taken. Additionally other RADIUS attributes can also be inserted into the DHCPv6 reply message. If an overlap exists between RADIUS attributes and local pool attributes, the RADIUS values are used instead of the local configuration data. If no RADIUS information is received from the underlying PPP interface, then the behavior is the same as described previously for non-PPP interfaces.

Enabling Processing of Client Information Requests

By default, DHCP local server and DHCPv6 local server do not respond to information request (DHCP inform and DHCPv6 information-request) messages from the client. You can enable DHCP local server and DHCPv6 local server to process these messages and respond to them with an acknowledgment (ack or reply message, respectively) and the requested information.

DHCP relay agent automatically forwards the information request messages without modification to the configured server group by means of the interfaces configured for the respective server group. The messages are dropped if they are received on an unconfigured interface. DHCP relay proxy also supports forwarding these messages. You cannot disable forwarding of the information request messages.

Configure one or more local address pools if you want to use a local pool rather than one provided by AAA. See *Configuring an Address-Assignment Pool Name and Addresses*. For processing information request messages, the address configuration is not necessary. For DHCP local server, you must specify the IPv4 family; for DHCPv6 local server, you must specify the IPv6 family.

See *Configuring DHCP Client-Specific Attributes Applied When Clients Obtain an Address* for details about how to configure the information sought by clients that send information request messages.

To enable processing of DHCP client information request messages:

1. Specify that you want to configure override options.

- For DHCP local server:

```
[edit system services dhcp-local-server overrides]
user@host# set process-inform
```

- For DHCPv6 local server:

```
[edit system services dhcp-local-server dhcpv6 overrides]
user@host# set process-inform
```

2. (Optional) Specify a pool name from which DHCP information is returned to the client.

- For DHCP local server:

```
[edit system services dhcp-local-server overrides process-inform]
user@host# set pool pool-name
```

- For DHCPv6 local server:

```
[edit system services dhcp-local-server dhcpv6 overrides process-inform]
user@host# set pool pool-name
```

Sending Release Messages When Clients Are Deleted

By default, when DHCP relay and relay proxy delete a client, they do not send a release message to the DHCP server. You can override the default behavior and configure DHCP relay and relay proxy to send a release message whenever they delete a client. The release message sent by DHCP relay and relay proxy includes option 82 information.



NOTE: You must include the `send-release-on-delete` statement to configure DHCP relay and relay proxy to send the release message when the `client-discover-match` statement is included.

You can use the `[edit forwarding-options dhcp-relay dhcpv6]` hierarchy level to override the default behavior for DHCPv6 relay agent.

To send a release message:

1. Specify that you want to configure override options.
 - For DHCP relay agent:

```
[edit forwarding-options dhcp-relay]
user@host# edit overrides
```

- For DHCPv6 relay agent:

```
[edit forwarding-options dhcp-relay dhcpv6]
user@host# edit overrides
```

2. Specify that you want DHCP relay and relay proxy (or DHCPv6 relay agent) to send a release message when clients are deleted.

```
[edit forwarding-options dhcp-relay overrides]
user@host# set send-release-on-delete
```

Understanding Dynamic Reconfiguration of Extended DHCP Local Server Clients

Dynamic reconfiguration of clients enables the extended DHCP local server to initiate a client update without waiting for the client to initiate a request.

Default Client/Server Interaction

Typically the DHCP client initiates all of the basic DHCP client/server interactions. The DHCP server sends information to a client only in response to a request from that client. This behavior does not enable a client to be quickly updated with its network address and configuration in the event of server changes:



NOTE: Technically, the DHCP client/server interactions are the same on routers and switches. However, the primary usage of this technology on the routers is for subscriber management. The switches are not used for subscriber management. Therefore, this topic provides two sample scenarios. The actions are the same, but the implementation details are different.

- On routers—Suppose a service provider restructures its addressing scheme or changes the server IP addresses that it provided to clients. Without dynamic reconfiguration, the service provider typically clears the DHCP server binding table, but cannot inform the DHCP clients that their bindings have been cleared. Consequently, the DHCP client operates as though its IP address is still valid, but it is now unable to communicate over the access network, resulting in an outage. The DHCP local server needs to wait for the client to send a message to renew its lease or rebind to the server. In response, the server sends a NAK message to the client to force it to begin the DHCP connection process again. Alternatively, the provider can wait for customers to make a service call about the network failures and then instruct them to power cycle their customer premises equipment to reinitiate the connection. Neither of these actions is timely or convenient for customers.
- On switches—Suppose you restructure the addressing scheme or change the server IP addresses that the DHCP server provides to clients. Without dynamic reconfiguration, the network typically clears the DHCP server binding table, but cannot inform the DHCP clients that their bindings have been cleared. Consequently, the DHCP client operates as though its IP address is still valid, but it is now unable to communicate over the access network, resulting in an outage. The DHCP local server needs to wait for the client to send a message to renew its lease or rebind to the server. In response, the server sends a NAK message to the client to force it to begin the DHCP connection process again. Alternatively, you can wait for users to notify you of the network failures and then instruct them to power cycle their equipment to reinitiate the connection. Neither of these actions is timely or convenient for users.

Dynamic Client/Server Interaction for DHCPv4

Dynamic reconfiguration for DHCPv4 is available through a partial implementation of RFC 3203, *DHCP Reconfigure Extension* for DHCPv4. It enables the DHCPv4 local server to send a message to the client to force reconfiguration.

The server sends a `forcerenew` message to a DHCPv4 client, initiating a message exchange. In response, DHCPv4 clients that support the `forcerenew` message then send a lease renewal message to the server. The server rejects the lease renewal request and sends a NAK to the client, causing the client to reinitiate the DHCP connection. A successful reconnection results in the reconfiguration of the DHCP client. Only the exchange of `forcerenew`, `renew`, and NAK messages is supported from RFC 3202. DHCP relay and DHCP relay proxy do not participate in the client reconfiguration or react to `forcerenew` messages other than to forward them to the client.

When the local server state machine starts the reconfiguration process on a bound client, the client transitions to the reconfiguring state and the local server sends a `forcerenew`

message to the client. Because the client was in the bound state before entering the reconfiguring state, all subscriber services or DHCP-managed services, such as forwarding and statistics, continue to work. Client statistics are not maintained in the interval between a successful reconfiguration and the subsequent client binding. When the server responds to the client renewal request with a NAK, the client entry is removed from the binding table and final statistics are reported. New statistics are collected when the client sends a discover message to establish a new session.

Dynamic Client/Server Interaction for DHCPv6

Dynamic reconfiguration for DHCPv6 is available through a partial implementation of RFC 3315, *Dynamic Host Configuration Protocol for IPv6 (DHCPv6)*. It enables the DHCPv6 local server to send a message to the client to force reconfiguration.

DHCPv6 servers send reconfigure messages to DHCPv6 clients, initiating a message exchange. In response, DHCPv6 clients that support the reconfigure message transition to the renewing state and send a renew message to the server. The server returns a reply message with a lifetime of zero (0). The client transitions to the init state and sends a solicit message. The server sends an advertise message to indicate that it is available for service. The client sends a request for configuration parameters, which the server then includes in its reply. DHCP relay and DHCP relay proxy do not participate in the client reconfiguration or react to reconfigure messages other than to forward them to the client.

When a DHCPv6 server is triggered to initiate reconfiguration on a bound DHCPv6 client, the client transitions to the reconfigure state. All subscriber services, such as forwarding and statistics, continue to work. The server then sends the reconfigure message to the client. If the DHCPv6 client is already in the reconfigure state, the DHCPv6 server ignores the reconfiguration trigger. For clients in any state other than bound or reconfigure, the server clears the binding state of the client, as if the **clear dhcpv6 server binding** command had been issued.

Manually Forcing the Local Server to Initiate the Reconfiguration Process

You can force the local server to initiate the reconfiguration process for clients by issuing the **request dhcp server reconfigure** command for DHCPv4 clients, and the **request dhcpv6 server reconfigure** command for DHCPv6 clients. Command options determine whether reconfiguration is then attempted for all clients or specified clients.

Action Taken for Events That Occur During a Reconfiguration

Events that take place while a reconfiguration is in process take precedence over the reconfiguration. [Table 59 on page 692](#) lists the actions taken in response to several different events.

Table 59: Action Taken for Events That Occur During a Reconfiguration

Event	Action
Server receives a discover (DHCPv4) or solicit (DHCPv6) message from the client.	Server drops packet and deletes client.

Table 59: Action Taken for Events That Occur During a Reconfiguration (continued)

Event	Action
Server receives a request, renew, rebind, or init-reboot message from the client.	DHCPv4—Server sends NAK message and deletes client. DHCPv6—Server drops packet and deletes client. Server replies to renew message with lease time of zero (0).
Server receives a release or decline message from the client.	Server deletes client.
The client lease times out.	Server deletes client.
The clear dhcp server binding command is issued.	Server deletes client.
The request dhcp server reconfigure (DHCPv4) or request dhcpv6 server reconfigure (DHCPv6) command is issued.	Command is ignored.
GRES or DHCP restart occurs.	Reconfiguration process is halted.

Configuring Dynamic Client Reconfiguration of Extended Local Server Clients Overview

The DHCP local server can initiate reconfiguration of its clients to avoid extended outages because of server configuration changes. You can enable dynamic reconfiguration for all DHCP clients or only the DHCP clients serviced by a specified group of interfaces, and you can modify the behavior accordingly.

Starting in Junos OS Release 14.1, you can modify the behavior of the process in which the DHCP local server initiates reconfiguration of its clients by including the appropriate configuration statements. You can provide the statements at the **[edit system services dhcp-local-server reconfigure]** hierarchy level for all DHCPv4 clients, and at the **[edit system services dhcp-local-server dhcpv6 reconfigure]** hierarchy level for all DHCPv6 clients. To override this global configuration for only the DHCP clients serviced by a specified group of interfaces, you can include the statements with different values at the **[edit system services dhcp-local-server group group-name reconfigure]** hierarchy level for DHCPv4 clients, and at the **[edit system services dhcp-local-server dhcpv6 group group-name reconfigure]** hierarchy level for DHCPv6 clients.

To configure dynamic reconfiguration of DHCP clients:

1. Enable dynamic reconfiguration with default values for all clients.

For DHCPv4:

```
[edit system services dhcp-local-server]
user@host# set reconfigure
```

For DHCPv6:

```
[edit system services dhcp-local-server dhcpv6]  
user@host# set reconfigure
```

2. (Optional) Enable dynamic reconfiguration for only the clients serviced by a group of interfaces.

For DHCPv4:

```
[edit system services dhcp-local-server group-name]  
user@host# set reconfigure
```

For DHCPv6:

```
[edit system services dhcp-local-server dhcpv6 group group-name]  
user@host# set reconfigure
```

3. (Optional) Configure how the server attempts reconfiguration.
See [“Configuring Dynamic Reconfiguration Attempts for DHCP Clients” on page 696](#).
4. (Optional) Configure the response to a failed reconfiguration.
See [“Configuring Deletion of the Client When Dynamic Reconfiguration Fails” on page 697](#).
5. (Optional) Configure the behavior in response to a RADIUS-initiated disconnect.
See [“Configuring Reconfiguration of the Client on Receipt of RADIUS-Initiated Disconnect” on page 697](#).
6. (Optional) Configure a token for rudimentary server authentication.
See [“Configuring a Token for DHCP Local Server Authentication” on page 620](#).
7. (Optional) Prevent DHCPv6 clients from binding if they do not support reconfigure messages.
See [“Preventing Binding of Clients That Do Not Support Reconfigure Messages” on page 630](#).

Release History Table

Release	Description
14.1	Starting in Junos OS Release 14.1, you can modify the behavior of the process in which the DHCP local server initiates reconfiguration of its clients by including the appropriate configuration statements.

Requesting DHCP Local Server to Initiate Reconfiguration of Client Bindings

You can request that the DHCP local server initiate reconfiguration of all of clients or only specified clients.

To request reconfiguration of all clients:

- Specify the **all** option.

```
user@host> request dhcp server reconfigure all
```

You can use any of the following methods to request reconfiguration of specific clients:

- Specify the IP address of the DHCPv4 client.

```
user@host> request dhcp server reconfigure 192.168.27.3
```

- Specify the MAC address of a DHCPv4 client.

```
user@host> request dhcp server reconfigure 00:00:5E:00:53:67
```

- Specify an interface; reconfiguration is attempted for all clients on this interface.

```
user@host> request dhcp server reconfigure interface fe-0/0/0.100
```

- Specify a logical system; reconfiguration is attempted for all clients or the specified clients in this logical system.

```
user@host> request dhcp server reconfigure all logical-system ls-bldg5
```

- Specify a routing instance; reconfiguration is attempted for all clients or the specified clients in this routing instance.

```
user@host> request dhcp server reconfigure all routing-instance ri-boston
```

Configuring Dynamic Reconfiguration Attempts for DHCP Clients

You can configure how many attempts the local server makes to initiate reconfiguration of the DHCP client by sending `forcerenew` or `reconfigure` messages. You can also specify how long the server waits between attempts. By default, eight attempts are made and the initial interval is two seconds.

Each successive attempt doubles the interval between attempts. For example, if the first value is 2, the first retry is attempted 2 seconds after the first attempt fails. The second retry is attempted 4 seconds after the first retry fails. The third retry is attempted 8 seconds after the second retry fails, and so on. A group configuration takes precedence over a DHCP local server configuration.

(Optional) To configure DHCP local server reconfiguration behavior for all DHCP clients:

1. Specify the number of reconfiguration attempts.

For DHCPv4:

```
[edit system services dhcp-local-server reconfigure]
user@host# set attempts 5
```

For DHCPv6:

```
[edit system services dhcp-local-server dhcpv6 reconfigure]
user@host# set attempts 5
```

2. Specify the interval between reconfiguration attempts.

For DHCPv4:

```
[edit system services dhcp-local-server reconfigure]
user@host# set timeout 8
```

For DHCPv6:

```
[edit system services dhcp-local-server dhcpv6 reconfigure]
user@host# set timeout 8
```

To override the global configuration for a particular group of clients, include the statements at the `[edit system services dhcp-local-server group group-name reconfigure]` hierarchy level or the `[edit system services dhcpv6 dhcp-local-server group group-name reconfigure]` hierarchy level.

Configuring Deletion of the Client When Dynamic Reconfiguration Fails

You can configure the local server to delete the client when the maximum number of reconfiguration attempts has been made without success. By default, the client's original configuration is restored.

(Optional) To configure the DHCP local server to delete the client when reconfiguration is not successful, for all clients:

- Specify the client deletion.

For DHCPv4:

```
[edit system services dhcp-local-server reconfigure]
user@host# set clear-on-abort
```

For DHCPv6:

```
[edit system services dhcp-local-server dhcpv6 reconfigure]
user@host# set clear-on-abort
```

To override the global configuration for a particular group of clients, include the statement at the `[edit system services dhcp-local-server group group-name reconfigure]` hierarchy level or the `[edit system services dhcpv6 dhcp-local-server group group-name reconfigure]` hierarchy level.

Configuring Reconfiguration of the Client on Receipt of RADIUS-Initiated Disconnect

You can configure the local server to reconfigure the client when the client receives a RADIUS-initiated disconnect. By default, the client is deleted when a RADIUS-initiated disconnect is received.

(Optional) To configure the DHCP local server to reconfigure the client instead of deleting the client when a RADIUS-initiated disconnect is received, for all clients:

- Specify the RADIUS-initiated disconnect trigger.

For DHCPv4:

```
[edit system services dhcp-local-server reconfigure trigger]
user@host# set radius-disconnect
```

For DHCPv6:

```
[edit system services dhcp-local-server dhcpv6 reconfigure trigger]
user@host# set radius-disconnect
```

To override the global configuration for a particular group of clients, include the statement at the `[edit system services dhcp-local-server group group-name reconfigure trigger]` hierarchy level or the `[edit system services dhcpv6 dhcp-local-server group group-name reconfigure trigger]` hierarchy level.

DHCP Auto Logout Overview

This topic provides an introduction to the DHCP auto logout feature and includes the following sections:

- [Auto Logout Overview on page 698](#)
- [How DHCP Identifies and Releases Clients on page 698](#)
- [Option 60 and Option 82 Requirements on page 699](#)

Auto Logout Overview

Auto logout is supported for DHCP local server and DHCP relay agent. It improves the efficiency of DHCP IP address assignment by allowing IP addresses to be immediately released and returned to the address pool when DHCP clients are no longer using the addresses. DHCP can then assign the addresses to other clients. Without auto logout, an IP address is blocked for the entire lease period, and DHCP must wait until the address lease time expires before reusing the address.

Auto logout is particularly useful when DHCP uses long lease times for IP address assignments and to help avoid allocating duplicate IP addresses for a single client.

For example, you might have an environment that includes set-top boxes (STB) that are often upgraded or replaced. Each time a STB is changed, the new STB repeats the DHCP discover process to obtain client configuration information and an IP address. DHCP views the new STB as a completely new client and assigns a new IP address— the previous IP address assigned to the client (the old STB) remains blocked and unavailable until the lease expires. If auto logout is configured in this situation, DHCP recognizes that the new STB is actually the same client and then immediately releases the original IP address. DHCP relay agent acts as a proxy client for auto logout and sends a DHCP release message to the DHCP server.

How DHCP Identifies and Releases Clients

The auto logout feature requires that DHCP explicitly identify clients. By default, DHCP local server and DHCP relay agent identify clients based on MAC address or Client Identifier, and subnet. However, in some cases this type of identification might not be sufficient. For example, in the previous STB example, each STB has a different MAC address, so DHCP incorrectly assumes that an upgraded or replacement STB is a new client.

In order to explicitly identify clients, auto logout uses a secondary identification method when the primary identification method is unsuccessful— the primary method is considered unsuccessful if the MAC address or Client Identifier does not match that of an existing client. Subscriber management supports two secondary identification methods that you can configure.

- Incoming interface method— DHCP views a new client connection on the interface as if it comes from the same client. DHCP deletes the existing client binding before creating a binding for the newly connected device. This method allows only one client device to connect on the interface.



NOTE: The incoming interface method differs from the `interface-client-limit 1` statement, which retains the existing binding and rejects the newly connected client.

- Option 60 and option 82 method— DHCP considers two clients as different if they have the same option 60 and option 82 information, but different subnets.

DHCP local server and DHCP relay agent perform the following operations when auto logout is enabled and the secondary identification method identifies a duplicate client (that is, the Discover packet is from an existing client).

- DHCP local server immediately releases the existing address.
- DHCP relay agent immediately releases the existing client and then sends a DHCP release packet to the DHCP server. Sending the release packet ensures that DHCP relay and the DHCP server are synchronized.

If the DHCP relay receives a Discover message from an existing client, the DHCP relay forwards the Discover message to the DHCP server. The DHCP relay preserves the binding if the client's existing IP address is returned by the DHCP server. This behavior is not applicable if the proxy-mode override or client-discover-match functionality are enabled.



NOTE: If the DHCP relay agent is in snoop mode, DHCP relay releases the client but does not send a release packet to the DHCP server if the discover packet is for a passive client (a client added as a result of snooped packets) or if the discover packet is a snooped packet.

Option 60 and Option 82 Requirements

DHCP local server requires that the received discover packet include both DHCP option 60 and option 82. If either option is missing, DHCP local server cannot perform the secondary identification method and auto logout is not used.

DHCP relay agent requires that the received discover packet contain DHCP option 60. DHCP relay determines the option 82 value based on the guidelines provided in [Table 56 on page 665](#).

Automatically Logging Out DHCP Clients

You can configure the extended DHCP local server and extended DHCP relay to automatically log out DHCP clients. Auto logout immediately releases an existing client when DHCP receives a discover packet from a client whose identity matches an existing client. DHCP then releases the existing client IP address without waiting for the normal lease expiration.



NOTE: When the existing client is released, the new client undergoes the normal authentication process. The new client might not receive the same IP address as the original client.

To configure DHCP client auto logout:

1. Specify that you want to configure override options.

- For DHCP local server:

```
[edit system services dhcp-local-server]
user@host# edit overrides
```

- For DHCP relay agent:

```
[edit forwarding-options dhcp-relay]
user@host# edit overrides
```

2. Enable auto logout and specify the secondary identification method you want to use when the primary identification method is unsuccessful.

- For example, to configure DHCP local server to use the incoming interface method:

```
[edit system services dhcp-local-server overrides]
user@host# set client-discover-match incoming-interface
```

- For example, to configure DHCP relay agent to use the option 60 and option 82 method:

```
[edit forwarding-options dhcp-relay overrides]
user@host# set client-discover-match option60-and-option82
```



NOTE: If you change the auto logout configuration, existing clients continue to use the auto logout setting that was configured when they logged in. New clients use the new setting.

Configuring Named Server Groups

You can configure a named group of DHCP servers for use by the extended DHCP relay agent on the router or switch.

You specify the name of the DHCP server group and the IP addresses of one or more DHCP servers that belong to this group. You can configure a maximum of five IP addresses per named server group.

To configure a named server group:

1. Specify the name of the server group.


```
[edit forwarding-options dhcp-relay]
user@host# set server-group myServerGroup
```

2. Add the IP addresses of the DHCP servers belonging to the group.

```
[edit forwarding-options dhcp-relay server-group myServerGroup]
user@host# set 192.168.100.50
user@host# set 192.168.100.75
```

Related Documentation

- [Extended DHCP Relay Agent Overview on page 632](#)

Configuring Active Server Groups to Apply a Common DHCP Relay Agent Configuration to Named Server Groups

You can apply a common DHCP or DHCPv6 relay configuration to a set of DHCP server IP addresses configured as a server group, by specifying that group with the **active-server-group** statement globally or at the group level (configured with the **group** statement). When you apply the active server group at the group level, it overrides a global active server group configuration. An active server group is sometimes referred to as a trusted group of servers.

For example, you might want to direct certain DHCP clients to a different DHCP server than other clients, and you have different relay configurations for the clients. You can configure an interface group for each set of clients, specifying the DHCP relay interfaces for the group and any other relay configuration. In each of these groups, you specify an active server group to which each client groups traffic is forwarded.

To configure a group of DHCP server addresses and apply them as an active server group:

1. Specify the name of the server group.

- For DHCPv4 servers:

```
[edit forwarding-options dhcp-relay]
user@host# set server-group server-group-name
```

- For DHCPv6 servers:

```
[edit forwarding-options dhcp-relay dhcpv6]
user@host# set server-group server-group-name
```

2. Add the IP addresses of the DHCP servers belonging to the group.

```
[edit forwarding-options dhcp-relay server-group server-group-name]
user@host# set ip-address1
user@host# set ip-address2
```



NOTE: Starting in Junos OS Release 18.4R1, up to 32 server IP addresses are supported per DHCPv4 server group. In earlier releases, a maximum of 5 server IP addresses are supported for DHCPv4 servers. Configuring more than the maximum number of server addresses results in a commit check failure.

3. Apply the server group as an active server group.

- For all DHCP clients, unless overridden:

```
[edit forwarding-options dhcp-relay]
user@host# set active-server-group server-group-name
```

- For a group of DHCP relay interfaces, overriding the global active server group:

```
[edit forwarding-options dhcp-relay group interface-group-name]
user@host# set active-server-group server-group-name
```

- For all DHCPv6 clients, unless overridden for a group:

```
[edit forwarding-options dhcp-relay dhcpv6]
user@host# set active-server-group server-group-name
```

- For a group of DHCPv6 relay interfaces, overriding the global active server group:

```
[edit forwarding-options dhcp-relay dhcpv6 group interface-group-name]
user@host# set active-server-group server-group-name
```

Consider the following example. Three groups of DHCP server addresses are configured, Default, Campus-A, and Campus-B. The Default group is applied as the global active server group for the overall DHCP relay configuration.

The Campus-A server group is assigned as the active server group for interface group Campus-A-v10-DHCP-RELAY. DHCP traffic received on the interfaces in Campus-A-v10-DHCP-RELAY is forwarded to DHCP servers 198.51.100.100 and 198.51.100.101.

The Campus-B server group is assigned as the active server group for interface group Campus-B-v200-DHCP-RELAY. DHCP traffic received on the interfaces in Campus-B-v200-DHCP-RELAY is forwarded to DHCP servers 198.51.100.55 and 198.51.100.56.

All other DHCP traffic is forwarded to DHCP server 203.0.113.1.

```
[edit forwarding-options dhcp-relay]
#
# Server groups
user@host# set server-group Default 203.0.113.1
user@host# set server-group Campus-A 198.51.100.100
user@host# set server-group Campus-A 198.51.100.101
```

```

user@host# set server-group Campus-B 198.51.100.55
user@host# set server-group Campus-B 198.51.100.56
#
# Default server group applied globally.
user@host# set active-server-group Default
#
# Interface groups with application of active server groups
user@host# set group Campus-A-v10-DHCP-RELAY interface ge-1/1/0.1
user@host# set group Campus-A-v10-DHCP-RELAY interface ge-1/1/0.2
user@host# set group Campus-A-v10-DHCP-RELAY interface ge-1/1/0.3
user@host# set group Campus-A-v10-DHCP-RELAY active-server-group Campus-A
user@host# set group Campus-B-v200-DHCP-RELAY interface ge-2/2/0.4
user@host# set group Campus-B-v200-DHCP-RELAY interface ge-2/2/0.5
user@host# set group Campus-B-v200-DHCP-RELAY interface ge-2/1/0.6
user@host# set group Campus-B-v200-DHCP-RELAY active-server-group Campus-B

```

In some configurations, servers in an active server group maintain redundant information about the DHCP clients. If the binding server later becomes inaccessible, the client is unable to renew the lease from that server. When the client attempts to rebind to a server, other servers in the group with the client information can reply with an ACK message. By default, instead of forwarding the ACK to the DHCP client, the relay agent drops any such ACKs that it receives from any server other than the binding server because the new server address does not match the expected server address in the DHCP client entry. Consequently the lease cannot be extended by any of the redundant servers.

Starting in Junos OS Release 16.2R1, you can enable a DHCPv4 relay agent to forward DHCP request (renew or rebind) ACKs from any server in the active server group (thus, any trusted server). The relay agent updates the client entry with the new server address. Because the servers in the group are expected to mirror the client information exactly, the lease option is expected to be the same as for the original server and the relay agent does not need to verify the lease option.

Starting in Junos OS Release 18.4R1, this capability is extended to allow a DHCP relay agent to forward DHCP information request (DHCPINFORM) ACK messages from any server in the active server group.

To enable ACK forwarding from any server in the active server group:

- Enable forwarding for the active server group.

```

[edit forwarding-options dhcp-relay active-server-group]
user@host# set allow-server-change

```

Release History Table

Release	Description
18.4R1	Starting in Junos OS Release 18.4R1
16.2R1	Starting in Junos OS Release 16.2R1

Grouping Interfaces with Common DHCP Configurations

You use the group feature to group a set of interfaces and then apply a common DHCP configuration to the named interface group. The extended DHCP local server, DHCPv6 local server, DHCP relay agent, and DHCPv6 relay agent all support interface groups.

The following steps create a DHCP local server group; the steps are similar for the DHCPv6 local server, DHCP relay agent, and DHCPv6 relay agent.

To configure a DHCP local server interface group:

1. Specify that you want to configure DHCP local server.

```
[edit system services]
user@host# edit dhcp-local-server
```

2. Create the group and assign a name.

```
[edit system services dhcp-local-server]
user@host# edit group boston
```

3. Specify the names of one or more interfaces on which the extended DHCP application is enabled. You can repeat the `interface interface-name` statement to specify multiple interfaces within the group, but you cannot use the same interface in more than one group.

```
[edit system services dhcp-local-server group boston]
user@host# set interface fe-1/0/1.1
user@host# set interface fe-1/0/1.2
```

4. (Optional) You can use the `upto` option to specify a range of interfaces for a group.

```
[edit system services dhcp-local-server group boston]
user@host# set interface fe-1/0/1.3 upto fe-1/0/1.9
```

5. (Optional) You can use the `exclude` option to exclude a specific interface or a specified range of interfaces from the group. For example:

```
[edit system services dhcp-local-server group boston]
user@host# set interface fe-1/0/1.1 upto fe-1/0/1.102
user@host# set interface fe-1/0/1.6 exclude
```

```
user@host# set interface fe-1/0/1.70 upto fe-1/0/1.80 exclude
```

Guidelines for Configuring Interface Ranges for Groups of DHCP Interfaces

This topic describes guidelines to consider when configuring interface ranges for named interface groups for DHCP local server and DHCP relay. The guidelines refer to the following configuration statement:

```
user@host# set interface interface-name upto upto-interface-name
```

- The start subunit, **interface *interface-name***, serves as the key for the stanza. The remaining configuration settings are considered attributes.
- If the subunit is not included, an implicit .0 subunit is enforced. The implicit subunit is applied to all interfaces when autoconfiguration is enabled. For example, **interface ge-2/2/2** is treated as **interface ge-2/2/2.0**.
- Ranged entries contain the **upto** option, and the configuration applies to all interfaces within the specified range. The start of a ranged entry must be less than the end of the range. Discrete entries apply to a single interface, except in the case of autoconfiguration, in which a 0 (zero) subunit acts as a wildcard.
- Interface stanzas defined within the same router or switch context are dependent and can constrain each other—both DHCP local server and DHCP relay are considered. Interface stanzas defined across different router (switch) contexts are independent and do not constrain one another.
- Each interface stanza, whether discrete or ranged, has a unique start subunit across a given router context. For example, the following configuration is not allowed within the same group because **ge-1/0/0.10** is the start subunit for both.

```
interface ge-1/0/0.10 upto ge-1/0/0.30
interface ge-1/0/0.10
```

- Two groups cannot share interface space. For example, the following configuration is not allowed because the three stanzas share the same space and interfere with one another—interface **ge-1/0/0.26** is common to all three.

```
dhcp-relay group diamond interface ge-1/0/0.10 upto ge-1/0/0.30
dhcp-local-server group ruby interface ge-1/0/0.26
dhcp-relay group sapphire interface ge-1/0/0.25 upto ge-1/0/0.35
```

- Two ranges cannot overlap, either within a group or across groups. Overlapping occurs when two interface ranges share common subunit space but neither range is a proper subset of the other. The following ranges overlap:

```
interface ge-1/0/0.10 upto ge-1/0/0.30
interface ge-1/0/0.20 upto ge-1/0/0.40
```

- A range can contain multiple nested ranges. A nested range is a proper subset of another range. When ranges are nested, the smallest matching range applies.

In the following example, the three ranges nest properly:

```
interface ge-1/0/0.10 upto ge-1/0/0.30
interface ge-1/0/0.12 upto ge-1/0/0.15 exclude
interface ge-1/0/0.25 upto ge-1/0/0.29 exclude
```

- Discrete interfaces take precedence over ranges. In the following example, interface **ge-1/0/0.20** takes precedence and enforces an interface client limit of 5.

```
interface ge-1/0/0.10 upto ge-1/0/0.30
interface ge-1/0/0.15 upto ge-1/0/0.25 exclude
interface ge-1/0/0.20 overrides interface-client-limit 5
```

Configuring Group-Specific DHCP Local Server Options

You can include the following statements at the **[edit system services dhcp-local-server group group-name]** hierarchy level to set group-specific DHCP local server configuration options. Statements configured at the **[edit system services dhcp-local-server group group-name]** hierarchy level apply only to the named group of interfaces, and override any global DHCP local server settings configured with the same statements at the **[edit system services dhcp-local-server]** hierarchy level.

DHCPv6 local server supports the same set of statements with the exception of the **dynamic-profile** statement.

- **authentication**—Configure the parameters the router sends to the external AAA server.
- **dynamic-profile**—Specify the dynamic profile that is attached to a group of interfaces.
- **interface**—Specify one or more interfaces, or a range of interfaces, that are within the specified group.
- **liveness-detection**—Configure bidirectional failure detection timers and authentication criteria for static routes, or Layer 2 liveness detection using ARP and Neighbor Discovery packets. For more information, see [“DHCP Liveness Detection Overview” on page 707](#).
- **overrides**—Override the default configuration settings for the extended DHCP local server. For information, see [“Overriding the Default DHCP Local Server Configuration Settings Overview” on page 617](#).

Configuring Group-Specific DHCP Relay Options

You can include the following statements at the **[edit forwarding-options dhcp-relay group group-name]** hierarchy level to set group-specific DHCP relay agent configuration options. Group-specific statements apply only to the named group of interfaces, and override any global DHCP relay agent settings for the same statement.

Include the statements at the **[edit forwarding-options dhcp-relay dhcpv6 group group-name]** hierarchy level to configure group-specific options for DHCPv6 relay agent.

- **active-server-group**—Configure an active server group to apply a common DHCP relay agent configuration for a named group of DHCP server addresses. For information, see [“Configuring Active Server Groups to Apply a Common DHCP Relay Agent Configuration to Named Server Groups” on page 701](#).
- **authentication**—Configure the parameters the router (or switch) sends to the external AAA server.
- **dynamic-profile**—Specify the dynamic profile that is attached to a group of interfaces.
- **interface**—Specify one or more interfaces, or a range of interfaces, that are within the specified group.
- **liveness-detection**—Configure bidirectional failure detection timers and authentication criteria for static routes, or Layer 2 liveness detection using ARP and Neighbor Discovery packets. For more information, see [“DHCP Liveness Detection Overview” on page 707](#).
- **overrides**—Override the default configuration settings for the extended DHCP relay agent. For information, see [“Overriding the Default DHCP Relay Configuration Settings” on page 638](#).
- **relay-agent-interface-id**—(DHCPv6 only) Insert the DHCPv6 Relay Agent Interface-ID option (option 18) in DHCPv6 packets destined for the DHCPv6 server.
- **relay-agent-remote-id**—(DHCPv6 only) Insert the DHCPv6 Relay Agent Remote-ID option (option 37) in DHCPv6 packets destined for the DHCPv6 server.
- **relay-option**—Configure selective processing, which uses DHCP options in client packets to identify and filter client traffic, and to specify the action DHCP relay agent takes with the traffic. For more information, see *Using DHCP Option Information to Selectively Process DHCP Client Traffic*.
- **relay-option-82**—(DHCPv4 only) Enable or disable the insertion of option 82 information in packets destined for a DHCP server. For information, see [“Using DHCP Relay Agent Option 82 Information” on page 657](#).
- **service-profile**—Specify the default subscriber service, (or default profile) which is activated when the subscriber (or DHCP client) logs in and no other service is activated by a RADIUS server or a provisioning server. For more information, see *Default Subscriber Service Overview*.

DHCP Liveness Detection Overview

Unlike PPP, DHCP does not define a native keepalive mechanism as part of either the DHCPv4 or DHCPv6 protocols. Without a keepalive mechanism, DHCP local server, DHCP relay, and DHCP relay proxy are unable to quickly detect if any of them has lost connectivity with a subscriber or a DHCP client. Instead, they must rely on standard DHCP subscriber session or DHCP client session termination messages.

DHCP clients often do not send DHCP release messages before exiting the network. The discovery of their absence is dependent on existing DHCP lease time and release request mechanisms. These mechanisms are often insufficient when serving as session health checks for clients in a DHCP subscriber access or a DHCP-managed network. Because DHCP lease times are typically too long to provide an adequate response time for a

session health failure, and configuring short DHCP lease times can pose an undue burden on control plane processing, implementing a DHCP liveness detection mechanism enables better monitoring of bound DHCP clients. When configured with a liveness detection protocol, if a given subscriber (or client) fails to respond to a configured number of consecutive liveness detection requests, the subscriber (or client) binding is deleted and its resources released.

DHCP liveness detection for DHCP subscriber IP or DHCP client IP sessions utilizes an active liveness detection protocol to institute liveness detection checks for relevant clients. Clients must respond to liveness detection requests within a specified amount of time. If the responses are not received within that time for a given number of consecutive attempts, then the liveness detection check fails and a failure action is implemented.

Using DHCP liveness detection, IP sessions are acted upon as soon as liveness detection checks fail. This faster response time serves to:

- Provide more accurate time-based accounting of subscriber (or DHCP client) sessions.
- Better preserve router (switch) resources.
- Help to reduce the window of vulnerability to some security attacks.

Examples of liveness detection protocols include Bidirectional Forwarding Detection (BFD) for both DHCPv4 and DHCPv6 subscribers, IPv4 Address Resolution Protocol (ARP) for DHCPv4 subscribers, and IPv6 Neighbor Unreachability Detection (NUD) using Neighbor Discovery (ND) packets for DHCPv6 subscribers.

Starting in Junos OS Release 17.4R1, the use of ARP packets for DHCPv4 and ND packets for DHCPv6 is supported on MX Series routers for Layer 2 liveness detection in addition to BFD liveness detection. In earlier releases, only BFD is supported for all platforms.

The two liveness detection methods are mutually exclusive.

When configuring BFD liveness detection, keep the following in mind:

- You can configure liveness detection for both DHCP local server and DHCP relay.
- You can configure DHCPv4 and DHCPv6 liveness detection either globally or per DHCPv4 or DHCPv6 group.
- DHCPv4 or DHCPv6 subscriber access clients that do not support BFD are not affected by the liveness detection configuration. These clients can continue to access the network (after they are validated) even if BFD liveness detection is enabled on the router (or switch).
- When configured, DHCPv4 or DHCPv6 initiates liveness detection checks for clients that support BFD when those clients enter a bound state.
- After protocol-specific messages are initiated for a BFD client, they are periodically sent to the subscriber (or client) IP address of the client and responses to those liveness detection requests are expected within a configured amount of time.
- If liveness detection responses are not received from clients that support BFD within the configured amount of time for a configured number of consecutive attempts, the

liveness detection check is deemed to have failed. A configured failure action to clear the client binding is applied.

- The only failure action supported for Layer 2 Liveness detection is **clear-binding**.

When configuring DHCP ARP and ND Layer 2 liveness detection on MX Series, keep the following in mind:

- You can configure liveness detection for both DHCP local server and DHCP relay.
- You can configure DHCPv4 and DHCPv6 ARP and ND liveness detection globally, per DHCPv4 or DHCPv6 group, and per dual-stack group.
- ARP/ND liveness detection applies only to DHCP clients that:
 - Are directly connected over dynamic VLANs.
 - Have permanent Layer 2 entries.
- DHCPv6 clients must have a unique source MAC address and link-local address. Only single liveness detection entry is used for all IPv6 addresses associated with a specific client session.

Release History Table

Release	Description
17.4R1	Starting in Junos OS Release 17.4R1, the use of ARP packets for DHCPv4 and ND packets for DHCPv6 is supported on MX Series routers for Layer 2 liveness detection in addition to BFD liveness detection.

Related Documentation

- [Configuring Detection of DHCP Local Server Client Connectivity with BFD on page 711](#)
- [Configuring Detection of DHCP Relay or DHCP Relay Proxy Client Connectivity with BFD on page 709](#)
- *DHCP Liveness Detection Using ARP and Neighbor Discovery Packets*

Configuring Detection of DHCP Relay or DHCP Relay Proxy Client Connectivity with BFD

You can configure liveness detection with Bidirectional Forwarding Detection (BFD) for DHCP subscriber IP sessions or DHCP client IP sessions to check the connectivity of DHCP relay clients. Clients must respond to liveness detection requests within a specified amount of time. If the responses are not received within that time for a given number of consecutive attempts, then the liveness detection check fails and a failure action is implemented.

To configure liveness detection for DHCP relay:

1. Specify that you want to configure liveness detection.

- For DHCP global configuration:

```
[edit forwarding-options dhcp-relay]
user@host# edit liveness-detection
```

- For DHCP group configuration:

```
[edit forwarding-options dhcp-relay group group-name]
user@host# edit liveness-detection
```



NOTE: Liveness detection is also supported for DHCPv6 configurations. To configure DHCPv6 liveness detection, include the **liveness-detection** statement, and any subsequent configuration statements, at the **[edit forwarding-options dhcp-relay dhcpv6]** or **[edit forwarding-options dhcp-relay dhcpv6 group *group-name*]** hierarchy level.

2. (Optional) Specify that you want to use DHCP relay proxy mode.

```
[edit forwarding-options dhcp-relay group group-name]
user@host# set overrides proxy-mode
```

3. Specify that you want to configure the liveness detection method.

- For DHCP global configuration:

```
[edit forwarding-options dhcp-relay liveness-detection]
user@host# edit method
```

- For DHCP group configuration:

```
[edit forwarding-options dhcp-relay group group-name liveness-detection]
user@host# edit method
```

4. Specify the liveness detection method that you want DHCP to use.



NOTE: In releases earlier than Junos OS Release 17.4R1, the only method supported for liveness detection on all platforms is BFD.

Starting in Junos OS Release 17.4R1, the use of ARP packets for DHCPv4 and ND packets for DHCPv6 is supported on MX Series routers for Layer 2 liveness detection in addition to BFD liveness detection. The two liveness detection methods are mutually exclusive. See [DHCP Liveness Detection Using ARP and Neighbor Discovery Packets](#) for information about configuring ARP and ND Layer 2 liveness detection.

- For DHCP global configuration:

```
[edit forwarding-options dhcp-relay liveness-detection method]
user@host# edit bfd
```

- For DHCP group configuration:

```
[edit forwarding-options dhcp-relay group group-name liveness-detection method]
user@host# edit bfd
```

5. Configure the liveness detection method as desired.

See “[Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients](#)” on [page 714](#) for an example of how to globally configure DHCP relay liveness detection with BFD.

6. Configure the action the router takes when a liveness detection failure occurs.

- For DHCP global configuration:

```
[edit forwarding-options dhcp-relay liveness-detection]
user@host# edit failure-action action
```

- For DHCP group configuration:

```
[edit forwarding-options dhcp-relay group group-name liveness-detection]
user@host# edit failure-action action
```

Release History Table

Release	Description
17.4R1	Starting in Junos OS Release 17.4R1, the use of ARP packets for DHCPv4 and ND packets for DHCPv6 is supported on MX Series routers for Layer 2 liveness detection in addition to BFD liveness detection.

Related Documentation

- [Extended DHCP Relay Agent Overview on page 632](#)
- [DHCP Liveness Detection Overview on page 707](#)
- [Configuring Detection of DHCP Local Server Client Connectivity with BFD on page 711](#)
- [Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients](#)
- [Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714](#)

Configuring Detection of DHCP Local Server Client Connectivity with BFD

You can configure liveness detection with Bidirectional Forwarding Detection (BFD) for DHCP subscriber IP sessions or DHCP client IP sessions to check the connectivity of DHCP local server clients. Clients must respond to liveness detection requests within a specified amount of time. If the responses are not received within that time for a given number of

consecutive attempts, then the liveness detection check fails and a failure action is implemented.



NOTE: You can also configure DHCP liveness detection for DHCP relay.

To configure liveness detection for DHCP local server:

1. Specify that you want to configure liveness detection.

- For DHCP global configuration:

```
[edit system services dhcp-local-server]
user@host# edit liveness-detection
```

- For DHCP group configuration:

```
[edit system services dhcp-local-server group group-name]
user@host# edit liveness-detection
```



NOTE: Liveness detection is also supported for DHCPv6 configurations. To configure DHCPv6 liveness detection, include the **liveness-detection** statement, and any subsequent configuration statements, at the **[edit system services dhcp-local-server dhcpv6]** or **[edit system services dhcp-local-server dhcpv6 group group-name]** hierarchy level.

2. Specify that you want to configure the liveness detection method.

- For DHCP global configuration:

```
[edit system services dhcp-local-server liveness-detection]
user@host# edit method
```

- For DHCP group configuration:

```
[edit system services dhcp-local-server group group-name liveness-detection]
user@host# edit method
```

3. Specify the liveness detection method that you want DHCP to use.



NOTE: In releases earlier than Junos OS Release 17.4R1, the only method supported for liveness detection on all platforms is BFD.

Starting in Junos OS Release 17.4R1, the use of ARP packets for DHCPv4 and ND packets for DHCPv6 is supported on MX Series routers for Layer 2 liveness detection in addition to BFD liveness detection. The two liveness detection methods are mutually exclusive. See [DHCP Liveness Detection Using ARP and Neighbor Discovery Packets](#) for information about configuring ARP and ND Layer 2 liveness detection.

- For DHCP global configuration:

```
[edit system services dhcp-local-server liveness-detection method]
user@host# edit bfd
```

- For DHCP group configuration:

```
[edit system services dhcp-local-server group group-name liveness-detection method]
user@host# edit bfd
```

4. Configure the liveness detection method as desired.

See *Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients* for an example of how to configure DHCPv4 groups for DHCP local server liveness detection with BFD.

5. Configure the action the router takes when a liveness detection failure occurs.

- For DHCP global configuration:

```
[edit system services dhcp-local-server liveness-detection]
user@host# edit failure-action action
```

- For DHCP group configuration:

```
[edit system services dhcp-local-server group group-name liveness-detection]
user@host# edit failure-action action
```

Release History Table

Release	Description
17.4R1	Starting in Junos OS Release 17.4R1, the use of ARP packets for DHCPv4 and ND packets for DHCPv6 is supported on MX Series routers for Layer 2 liveness detection in addition to BFD liveness detection.

Related Documentation

- [DHCP Liveness Detection Overview on page 707](#)
- [Extended DHCP Local Server Overview on page 611](#)

- [Configuring Detection of DHCP Relay or DHCP Relay Proxy Client Connectivity with BFD on page 709](#)
- [Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients](#)
- [Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714](#)

[Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients](#)

This example shows how to configure liveness detection for DHCP relay agent subscribers using Bidirectional Forwarding Detection (BFD) as the liveness detection method.

- [Requirements on page 714](#)
- [Overview on page 714](#)
- [Configuration on page 715](#)

Requirements

This example uses the following hardware and software components:

- Juniper Networks MX Series routers.
- Junos OS Release 12.1 or later

Before you begin:

- Configure DHCP relay agent. See [“Extended DHCP Relay Agent Overview” on page 632](#).

Overview

In this example, you configure liveness detection for DHCP relay agent subscribers by completing the following operations:

1. Enable liveness detection globally for DHCP relay subscribers.
2. Specify BFD as the liveness detection method for all dynamically created DHCP relay subscribers.
3. Configure BFD-specific statements to define how the protocol behaves.
4. Configure the action the router takes when a liveness detection failure occurs.



NOTE: This example explains how to configure liveness detection for a DHCPv4 network. Liveness detection is also supported for DHCPv6 configurations. To configure DHCPv6 liveness detection, include the `liveness-detection` statement, and any subsequent configuration statements, at the `[edit forwarding-options dhcp-relay dhcpv6]` or `[edit forwarding-options dhcp-relay dhcpv6 group group-name]` hierarchy level.

Configuration

Step-by-Step Procedure

To configure liveness detection for DHCP relay:

1. Specify that you want to configure liveness detection.

```
[edit forwarding-options dhcp-relay]
user@host# edit liveness-detection
```

2. Specify that you want to configure the liveness detection method.

```
[edit forwarding-options dhcp-relay liveness-detection]
user@host# edit method
```

3. Specify BFD as the liveness detection method that you want DHCP to use.

```
[edit forwarding-options dhcp-relay liveness-detection method]
user@host# edit bfd
```

4. Configure the detection time threshold (in milliseconds) at which a trap is produced.

```
[edit forwarding-options dhcp-relay liveness-detection method bfd]
user@host# set detection-time threshold 50000
```

5. Configure the time (in milliseconds) for which BFD holds a session up notification.

```
[edit forwarding-options dhcp-relay liveness-detection method bfd]
user@host# set holddown-interval 50
```

6. Configure the BFD minimum transmit and receive interval (in milliseconds).

```
[edit forwarding-options dhcp-relay liveness-detection method bfd]
user@host# set minimum-interval 45000
```

7. Configure the minimum receive interval (in milliseconds).

```
[edit forwarding-options dhcp-relay liveness-detection method bfd]
user@host# set minimum-receive-interval 60000
```

8. Configure a multiplier value for the detection time.

```
[edit forwarding-options dhcp-relay liveness-detection method bfd]
user@host# set multiplier 100
```

9. Disable the ability for BFD interval timers to change or adapt to network situations.

```
[edit forwarding-options dhcp-relay liveness-detection method bfd]
user@host# set no-adaptation
```

10. Configure the BFD session mode.

```
[edit forwarding-options dhcp-relay liveness-detection method bfd]
user@host# set session-mode automatic
```

11. Configure the threshold and minimum interval for the BFD transmit interval.

```
[edit forwarding-options dhcp-relay liveness-detection method bfd]
user@host# set transmit-interval threshold 60000 minimum-interval 45000
```

12. Configure the BFD protocol version you want to detect.

```
[edit forwarding-options dhcp-relay liveness-detection method bfd]
user@host# set version automatic
```

13. Configure the action the router takes when a liveness detection failure occurs. In this example, the failure action is to clear the client session only when a liveness detection failure occurs and the local interface is detected as being up.

```
[edit forwarding-options dhcp-relay liveness-detection]
user@host# edit failure-action action
```

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 instructions in this example to correct it. The following output also shows a range of configured interfaces in group frankfurt.

```
[edit]
user@host# show forwarding-options
dhcp-relay {
  liveness-detection {
    failure-action clear-binding-if-interface-up;
    method {
      bfd {
        version automatic;
        minimum-interval 45000;
      }
    }
  }
}
```



```

        minimum-receive-interval 60000;
        multiplier 100;
        no-adaptation;
        transmit-interval {
            minimum-interval 45000;
            threshold 60000;
        }
        detection-time {
            threshold 50000;
        }
        session-mode automatic;
        holddown-interval 50;
    }
}
}

```

If you are done configuring the device, enter **commit** from configuration mode.

Related Documentation

- [Extended DHCP Relay Agent Overview on page 632](#)
- [DHCP Liveness Detection Overview on page 707](#)
- [Configuring Detection of DHCP Relay or DHCP Relay Proxy Client Connectivity with BFD on page 709](#)

DHCP Message Exchange Between DHCP Clients and DHCP Server in Different VRFs

In some service provider networks, the service network in which the DHCP server resides is isolated from the actual subscriber network. This separation of the service and subscriber networks can sometimes introduce potential security issues, such as route leaking. Starting in Junos OS Release 14.2, you can use the DHCP relay agent to provide additional security when exchanging DHCP messages between different VRFs. The DHCP relay agent can ensure that there is no direct routing between the client virtual routing and forwarding instance (VRF) and the DHCP server VRF, and that only acceptable DHCP packets are relayed across the two VRFs. Subscriber management supports the cross-VRF message exchange for both DHCP and DHCPv6 packets.

To exchange DHCP messages between different VRFs, you must enable both the server side and the client side of the DHCP relay agent to recognize and forward acceptable traffic based on DHCP option information in the packets. The message exchange uses the Agent Circuit ID (DHCP option 82 suboption 1) for DHCPv4 packets and the Relay Agent Interface-ID (DHCPv6 option 18) for DHCPv6 packets to identify traffic to be relayed.

Statistics for DHCP packets using the cross-VRF message exchange are counted in the client VRF.

The following list describe how DHCP relay agent exchanges messages between the DHCP clients and DHCP server in different VRFs:

- Packets from DHCP client to DHCP server—DHCP relay agent receives the DHCP packet from the client in the client VRF, and then inserts the appropriate DHCP option 82 suboption 1 or DHCPv6 option 18 attribute into the packet. The relay agent then forwards the packet to the DHCP server in the server's VRF.
- Packets from DHCP server to DHCP client—DHCP relay agent receives the DHCP reply message from the DHCP server in the server VRF. The relay agent derives the client's interface, including VRF, from the DHCP option 82 suboption 1 or DHCPv6 option 18 attribute in the packet in the DHCP server VRF. The relay agent then forwards the reply message to the DHCP client in the client's VRF.

Release History Table

Release	Description
14.2	Starting in Junos OS Release 14.2, you can use the DHCP relay agent to provide additional security when exchanging DHCP messages between different VRFs.

Configuring DHCP Message Exchange Between DHCP Server and Clients in Different Virtual Routing Instances

Starting in Junos OS Release 14.2, you can configure DHCP relay agent to provide additional security when exchanging DHCP messages between a DHCP server and DHCP clients that reside in different virtual routing and forwarding instances (VRFs).

You can configure DHCP relay agent to provide additional security when exchanging DHCP messages between a DHCP server and DHCP clients that reside in different virtual routing instances. This type of configuration is for a *stateless* DHCP relay connection between a DHCP server and a DHCP client, when the DHCP server resides in a network that must be isolated from the client network.

A stateless DHCP relay agent does not maintain dynamic state information about the DHCP clients and does not maintain a static route for the traffic to flow between the client and server routing instances.

To enable the DHCP message exchange between the two VRFs, you configure each side of the DHCP relay to recognize and forward acceptable traffic based on the DHCP option information in the packets. The acceptable traffic is identified by either the Agent Circuit ID (DHCP option 82 suboption 1) for DHCPv4 packets or the Relay Agent Interface-ID (DHCPv6 option 18) for DHCPv6 packets.

The following list provides an overview of the tasks required to create the DHCP message exchange between the different VRFs:

- Client-side support—Configure the DHCP relay agent **forward-only** statement to specify the VRF location of the DHCP server, to which the DHCP relay agent forwards the client packets with the appropriate DHCP option information. The **forward-only** statement ensures that DHCP relay agent does not create a new session or perform any other subscriber management operations (such as creating dynamic interfaces or maintaining leases).

You can optionally configure a specific logical system and routing instance for the server VRF. If you do not specify a logical system or routing instance, then DHCP uses the local logical system and routing instance from which the configuration is added.

- Server-side support—Configure the DHCP relay agent **forward-only-replies** statement so the DHCP relay agent forwards the reply packets that have the appropriate DHCP option information. This statement also ensures that DHCP relay agent does not create a new session or perform any other subscriber management operations.



NOTE: You do not need to configure the **forward-only-replies** statement if the DHCP client and DHCP server reside in the same logical system/routing instance.

- DHCP local server support—Configure the DHCP local server to support option 82 information in DHCP NAK and forcerenew messages. By default, the two message types do not support option 82.
- Additional support—Ensure that the following required support is configured:
 - Proxy ARP support must be enabled on the server-facing interface in the DHCP server VRF so that the DHCP relay agent can receive and respond to the ARP requests for clients and the client-facing interface in the DHCP server VRF.
 - Routes must be available to receive the DHCP packets from the DHCP server in the server VRF for the clients reachable in the client VRF.

The following procedures describe the configuration tasks for creating the DHCP message exchange between the DHCP server and clients in different VRFs.

- [Client-Side Support on page 719](#)
- [Server-Side Support on page 720](#)
- [DHCP Local Server Support on page 721](#)

Client-Side Support

To configure support on the client side of the DHCP relay agent:

1. Enable DHCP relay agent configuration.

```
[edit forwarding-options]
user@host# edit dhcp-relay
```

- Specify the DHCP server VRF to which the DHCP relay agent forwards the packets from the DHCP client. DHCP relay agent forwards the acceptable packets that have the appropriate DHCP option information, but does not perform any additional subscriber management operations. You can configure the **forward-only** statement globally or for a named group of interfaces, and for DHCPv4 or DHCPv6. You can specify the current, default, or a specific logical system or routing instance for the server VRF.

The following example configures the **forward-only** statement globally for DHCPv4, and specifies the default logical system and routing instance:

```
[edit forwarding-options dhcp-relay]
user@host# set forward-only logical-system default routing-instance default
```



NOTE: For local DHCPv4 clients, the DHCP relay agent adds the Agent Circuit ID option. However, if the Agent Circuit ID option is already present in the packet, you must ensure that the DHCP server supports the option 82 Vendor-Specific Information suboption (suboption 9).

If the **forward-only** statement is configured at the [edit forwarding-options dhcp-relay relay-option] hierarchy level, then that relay-option action takes precedence over the configuration of the **forward-only** statement for the DHCP cross-VRF message exchange.

Server-Side Support

To configure the cross-VRF message exchange support on the server side of the DHCP relay:



NOTE: You do not need to configure the **forward-only-replies** statement if the DHCP client and DHCP server reside in the same logical system/routing instance.

- Enable DHCP relay agent configuration.

```
[edit forwarding-options]
user@host# edit dhcp-relay
```

- Configure the DHCP relay agent to forward the DHCP packets from the DHCP server VRF to the client. DHCP relay agent only forwards the packets, and does not perform any additional subscriber management operations. You can configure the **forward-only-replies** statement globally for DHCPv4 and DHCPv6.

The following example configures the **forward-only-replies** statement globally for DHCPv4.

```
[edit forwarding-options dhcp-relay]
user@host# set forward-only-replies
```

DHCP Local Server Support

To configure the DHCP local server to support option 82 information in NAK and forcerenew messages; the cross-VRF message exchange feature uses the option 82 or DHCPv6 option 18 information to determine the client VRF:

1. Enable DHCP local server configuration.

```
[edit system services]
user@host# edit dhcp-local-server
```

2. Specify that you want to configure an override option.

```
[edit system services dhcp-local-server]
user@host# edit overrides
```

3. Configure DHCP local server to override the default behavior and support option 82 information in DHCP NAK and forcerenew messages. You can configure the override action globally, for a group of interfaces, or for a specific interface.

```
[edit system services dhcp-local-server overrides]
user@host# set include-option-82 forcerenew nak
```

Release History Table

Release	Description
14.2	Starting in Junos OS Release 14.2, you can configure DHCP relay agent to provide additional security when exchanging DHCP messages between a DHCP server and DHCP clients that reside in different virtual routing and forwarding instances (VRFs).

Address-Assignment Pools Overview

The address-assignment pool feature supports subscriber management and DHCP management functionality by enabling you to create centralized IPv4 and IPv6 address pools independently of the client applications that use the pools. The authd process manages the pools and the address allocation, whether the addresses come from local pools or from a RADIUS server. For example, multiple client applications, such as DHCP, can use the same address-assignment pool to provide addresses for their particular clients. Client applications can acquire addresses for either authenticated or unauthenticated clients. The pool selected for a subscriber, based on the RADIUS server or network matching or other rule, is called the matching pool for the subscriber.

Address-assignment pools support both dynamic and static address assignment. In dynamic address assignment, a client is automatically assigned an address from the

address-assignment pool. In static address assignment, which is supported for IPv4 pools only, you reserve an address that is then always used by a particular client. Addresses that are reserved for static assignment are removed from the dynamic address pool and cannot be assigned to other clients.

You can configure named address ranges within an address-assignment pool. A named range is a subset of the overall address range. A client application can use named ranges to manage address assignment based on client-specific criteria. For example, for IPv4 address-assignment pools, you might create a named range that is based on a specific DHCP option 82 value. Then, when a DHCP client request matches the specified option 82 value, an address from the specified range is assigned to the client.

Starting in Junos OS Release 18.1R1, you can exclude a specified address or range of consecutive addresses to prevent them from being allocated from an address pool. For example, you might want to reserve certain addresses or ranges to be used only for static subscribers. When you configure an address or range to be excluded, and the address or an address within the range, has already been allocated, that subscriber is logged out, the address is deallocated, and the address is marked for exclusion.

You can link address-assignment pools together to provide backup pools for address assignment. When no addresses are found to be available in the primary or matching address pool, the router or switch automatically proceeds to the linked (secondary) address pool to search for an available address to allocate.

Although the first pool in a chain of linked pools is generally considered the primary pool, a matching pool is not necessarily the first pool in the chain. For example, in a chain of three pools, A, B, and C, where A is the primary pool, pool B might be matched for certain subscribers based on information returned by the RADIUS server. The search for an available address for those subscribers begins in pool B.

Starting in Junos OS Release 18.1R1, the behavior changes for how the search for an available address proceeds through a chain of linked pools. By default, the matching pool is searched first, then the search moves to the first pool in the chain and proceeds through the chain until an available address is found and allocated, or until the search determines no addresses are free. In each pool, all address ranges are fully searched for an address. This behavior enables addresses to be assigned contiguously.

Alternatively, you can configure the **linked-pool-aggregation** statement to search first within a block of addresses in each range in the matching pool and then successively through the linked pools. The search then moves back to the first pool in the chain and searches all addresses in all ranges in each pool through the last pool in the chain.

The address-assignment pool hold-down feature enables you to specify that no additional address are allocated from an existing active address-assignment pool. This configuration gracefully transforms the active pool to an inactive state as the previously allocated addresses are returned to the pool. When the pool is inactive, you can safely perform maintenance on the pool without affecting any active subscribers.

You can also explicitly identify that an address-assignment pool is used for NDRA.



NOTE: This feature requires a license. To understand more about Subscriber Access Licensing, see [Subscriber Access Licensing Overview](#). Please refer to the [Juniper Licensing Guide](#) for general information about License Management. Please refer to the product [Data Sheets](#) for details, or contact your Juniper Account Team or Juniper Partner.

Benefits of Address Assignment Pools

- You can create centralized pools of addresses independent of client applications.
- You can specify blocks of addresses, named ranges, so that a given address pool can be used to supply different addresses for different client applications or for subscribers that match different sets of criteria.
- You can link pools together to ensure that pools are searched for free addresses in a specific manner, contiguously or noncontiguously.
- You can gracefully transition an address pool from active to inactive by specifying that no further addresses are allocated from the pool.

Release History Table

Release	Description
18.1R1	Starting in Junos OS Release 18.1R1, you can exclude a specified address or range of consecutive addresses to prevent them from being allocated from an address pool.
18.1R1	Starting in Junos OS Release 18.1R1, the behavior changes for how the search for an available address proceeds through a chain of linked pools.

Configuring How the Extended DHCP Local Server Determines Which Address-Assignment Pool to Use

You can specify the match order in which the extended DHCP local server uses the client data to determine the address-assignment pool that provides the IP address and configuration for a DHCP client. You use the **pool-match-order** statement to specify the match order. If you do not specify the **pool-match-order**, the router (or switch) uses the default **ip-address-first** matching to select the address pool. After DHCP local server determines the address assignment pool to use, the server performs the matching based on the criteria you specified in the pool configuration.

In the default **ip-address-first** matching, the server selects the address-assignment pool to use by matching the IP address in the client DHCP request with the network address of the address-assignment pool. If the client request contains the gateway IP address (giaddr), the local server matches the giaddr to the address-assignment pool's address. If there is no giaddr in the request, then the DHCP local server matches the IP address of the receiving interface to the address of the address-assignment pool.

In **external-authority** matching, the DHCP local server receives the address assignment from an external authority, such as RADIUS or Diameter. If RADIUS is the external authority, the DHCP local server uses the Framed-IPv6-Pool attribute (RADIUS attribute 100) to select the pool. If Diameter is the external authority, the server uses the Diameter counterpart of the Framed-IPv6-Pool attribute to determine the pool.

For IPv4 address-assignment pools, you can optionally configure the extended DHCP local server to match the DHCP relay agent information option (option 82) in the client DHCP packets to a named range in the address-assignment pool used for the client. Named ranges are subsets within the overall address-assignment pool address range, which you can configure when you create the address-assignment pool.



NOTE: To use the DHCP local server option 82 matching feature with an IPv4 address-assignment pool, you must ensure that the **option-82** statement is included in the **dhcp-attributes** statement for the address-assignment pool.

To configure the matching order the extended DHCP local server uses to determine the address-assignment pool used for a client:

1. Access the **pool-match-order** configuration.

```
[edit system services dhcp-local-server]
user@host# edit pool-match-order
```

2. Specify the pool matching methods in the order in which the router (switch) performs the methods. You can specify the methods in any order. All methods are optional—the router (switch) uses the **ip-address-first** method by default.

- Configure the router (switch) to use an external addressing authority.

```
[edit system services dhcp-local-server pool-match-order]
user@host# set external-authority
```

- Configure the router (switch) to use the ip-address-first method.

```
[edit system services dhcp-local-server pool-match-order]
user@host# set ip-address-first
```

- (IPv4 address-assignment pools only) Specify the option 82 matching method.

```
[edit system services dhcp-local-server pool-match-order]
user@host# set option-82
```


Example: Extended DHCP Local Server Configuration with Optional Pool Matching

This example shows an extended DHCP local server configuration that includes optional IPv4 address-assignment pool matching and interface groups. For pool matching, this configuration specifies that the DHCP local server first check the response from an external authentication authority (for example, RADIUS) and use the Framed-IPv6-Pool attribute to determine the address-assignment pool to use for the client address. If no external authority match is found, the DHCP local server then uses ip-address-first matching together with the option 82 information to match the named address range for client IPv4 address assignment. The option 82 matching must also be included in the address-assignment pool configuration.

```
[edit system services]
dhcp-local-server {
  group group_one {
    interface fe-0/0/2.0;
    interface fe-0/0/2.1;
  }
  group group_two {
    interface fe-0/0/3.0;
    interface fe-0/0/3.1;
  }
  pool-match-order {
    external-authority
    ip-address-first;
    option-82;
  }
}
```



NOTE: The interface type in this topic is just an example. The fe- interface type is not supported by EX Series switches.

Assign a Specific IP Address to a Client Using DHCP Option 50 and DHCPv6 IA_NA Option

Subscriber management or DHCP management enables you to specify that DHCP local server assign a particular address to a client. For example, if a client is disconnected, you might use this capability to assign the same address that the client was using prior to being disconnected. If the requested address is available, DHCP assigns it to the client. If the address is unavailable, the DHCP local server offers another address, based on the address allocation process.

Both DHCP local server and DHCPv6 local server support the specific address request feature. DHCP local server uses DHCP option 50 in DHCP discover messages to request a particular address, while DHCPv6 local server uses the IA_NA option (Identity Association for Non-Temporary Addresses) in DHCPv6 solicit messages.



NOTE: Subscriber management (DHCP management) supports only one address for each of the DHCPv6 IA_NA or IA_PD address types. If the DHCPv6 client requests more than one address for a given type, the DHCPv6 local server uses only the first address and ignores the other addresses.

Multiple Address Assignment for DHCPv6 Clients

For a DHCPv6 local server, you can assign multiple addresses to a single DHCPv6 client. Multiple address support is enabled by default, and is activated when the DHCPv6 local server receives a DHCPv6 Solicit message from a DHCP client that contains multiple addresses.

For example, if you are implementing this feature on the routers, you might use the multiple address assignment feature when a customer premises equipment (CPE) device requires a host address and a delegated prefix.

You can use either local address pools or RADIUS when assigning multiple addresses to a DHCP client. When at least one address is successfully allocated, the switch creates a DHCP client entry and binds the entry to the assigned address. If both addresses are successfully allocated, the switch creates a single DHCP client entry and binds both addresses to that entry.

You can also configure a delegated address pool, which explicitly specifies the address pool that DHCP management uses to assign IPv6 prefixes for DHCP clients.

- Related Documentation**
- *Specifying the Delegated Address-Assignment Pool to Be Used for DHCPv6 Prefix Delegation*

Suppressing DHCP Access, Access-Internal, and Destination Routes

During the DHCP client binding operation, the DHCP process adds route information for the DHCP sessions by default. The DHCP process adds access-internal and destination routes for DHCPv4 sessions, and access-internal and access routes for DHCPv6 sessions. In some scenarios, you might want to override the default behavior and prevent DHCP from automatically installing the route information. For example, DHCP relay installs destination (host) routes by default—this action is required in certain configurations to enable address renewals from the DHCP server to work properly. However, the default installation of destination routes might cause a conflict when you configure DHCP relay with static subscriber interfaces. To avoid such configuration conflicts you can override the default behavior and prevent DHCP relay from installing the routes.



NOTE: You cannot suppress access-internal routes when the subscriber is configured with both IA_NA and IA_PD addresses over IP demux interfaces—the IA_PD route relies on the IA_NA route for next hop connectivity.

You can configure both DHCP local server and DHCP relay agent to override the default route installation behavior, and you can specify the override for both DHCPv4 and DHCPv6 sessions. You can override the route installation globally or for named interface groups. For DHCPv4 you can override the installation of destination routes only or access-internal routes (the access-internal option prevents installation of both destination and access-internal routes). For DHCPv6 you can specify access routes, access-internal routes, or both.

Related Documentation

- [Preventing DHCP from Installing Access, Access-Internal, and Destination Routes by Default on page 728](#)
- [Extended DHCP Local Server Overview on page 611](#)
- [DHCPv6 Local Server Overview on page 628](#)
- [Extended DHCP Relay Agent Overview on page 632](#)
- [DHCPv6 Relay Agent Overview on page 648](#)

Preventing DHCP from Installing Access, Access-Internal, and Destination Routes by Default

You can configure both DHCP local server and DHCP relay agent to override the default installation of access, access-internal, and destination routes. For DHCPv4 you can override the installation of destination routes only or access-internal routes (the access-internal option prevents installation of both destination and access-internal routes). For DHCPv6 you can specify access routes, access-internal routes, or both. You can configure the override globally or for named interface groups.



NOTE: You cannot suppress access-internal routes when the subscriber is configured with both IA_NA and IA_PD addresses over IP demux interfaces—the IA_PD route relies on the IA_NA route for next hop connectivity.



NOTE: The `no-arp` statement is deprecated and the function is replaced by the `route-suppression` statement.

To configure route suppression and prevent DHCP from installing specific types of routes:

- For DHCP local server route suppression (for example, a global configuration):

```
[edit system services dhcp-local-server]
user@host# set route-suppression access-internal
```

- For DHCP relay (for example, a group-specific configuration):

```
[edit forwarding-options dhcp-relay group southeast]
user@host# set route-suppression destination
```

- For DHCPv6 local server (for example, a group-specific configuration):

```
[edit system services dhcp-local-server group southern3]
user@host# set dhcpv6 route-suppression access access-internal
```

- For DHCPv6 relay (for example, a global configuration):

```
[edit forwarding-options dhcp-relay]
user@host# set dhcpv6 route-suppression access
```

Related Documentation

- [Suppressing DHCP Access, Access-Internal, and Destination Routes on page 727](#)
- [Extended DHCP Local Server Overview on page 611](#)
- [DHCPv6 Local Server Overview on page 628](#)
- [Extended DHCP Relay Agent Overview on page 632](#)
- [DHCPv6 Relay Agent Overview on page 648](#)

Tracing Extended DHCP Operations

Both the extended DHCP local server and the extended DHCP relay agent support tracing operations. DHCP tracing operations track extended DHCP operations and record them in a log file. The error descriptions captured in the log file provide detailed information to help you solve problems.

You can configure DHCP trace operations at the global level and at the interface level. Global DHCP tracing logs all DHCP-related events, whereas interface-level tracing logs only interface-specific DHCP events. If you configure interface-level trace operations, you can specify tracing for a range of interfaces or an individual interface. However, only a single interface-level log file is supported. That is, you cannot specify different interface-level log files for different interfaces or groups of interfaces.

By default, nothing is traced. When you enable the tracing operation, the default tracing behavior is as follows:

- Important events for both global and per-interface tracing are logged in a file located in the `/var/log` directory. By default, the router uses the filename, `jdhcpd`. You can specify a different filename, but you cannot change the directory in which trace files are located.
- When the trace log file *filename* reaches 128 kilobytes (KB), it is compressed and renamed *filename.0.gz*. Subsequent events are logged in a new file called *filename*, until it reaches capacity again. At this point, *filename.0.gz* is renamed *filename.1.gz* and *filename* is compressed and renamed *filename.0.gz*. This process repeats until the number of archived files reaches the maximum file number. Then the oldest trace file—the one with the highest number—is overwritten.

You can optionally specify the number of trace files to be from 2 through 1000. You can also configure the maximum file size to be from 10 KB through 1 gigabyte (GB). (For more information about how log files are created, see the [System Log Explorer](#).)

- By default, only the user who configures the tracing operation can access log files. You can optionally configure read-only access for all users.

To configure global DHCP tracing operations.

- Specify tracing operations for DHCP local server and DHCP relay:

```
[edit system processes dhcp-service]
user@host# edit traceoptions
```

The tracing configuration is applied globally to all DHCP applications in every LS:RI. Configuration of event tracing on a per-LS:RI basis is not supported. DHCP tracing is configurable only in the default LS:RI. However, DHCP applications (local server or relay) do not have to be configured in the default LS:RI.



NOTE: We recommend that you use configure tracing statements at the `[edit system processes dhcp-service]` hierarchy level.

Because you can configure DHCP tracing at three different hierarchy levels (one new and recommended, two old and deprecated), the following rules apply to manage the interaction:

- When you configure a filename or any other options for the trace log file, the configuration at the **[edit system processes dhcp-service]** hierarchy level has the highest precedence, followed by the configuration at the **[edit system services dhcp-local-server]** hierarchy level, and finally with the lowest precedence, the configuration at the **[edit forwarding-options dhcp-relay]** hierarchy level.
- The flag configurations for multiple hierarchy levels are merged and applied to all trace log events.
- The deprecated statements do not support filtering the generation of DHCP trace log events by severity level. If you use these statements, trace logging operates with an implicit severity of **all**, regardless of the severity level configured at the **[edit system processes dhcp-service]** hierarchy level.

For information about configuring per-interface tracing options, see [“Tracing Extended DHCP Operations for Specific Interfaces” on page 734](#).

The extended DHCP traceoptions operations are described in the following sections:

- [Configuring the Extended DHCP Log Filename on page 730](#)
- [Configuring the Number and Size of Extended DHCP Log Files on page 731](#)
- [Configuring Access to the Extended DHCP Log File on page 731](#)
- [Configuring a Regular Expression for Extended DHCP Messages to Be Logged on page 732](#)
- [Configuring the Extended DHCP Tracing Flags on page 732](#)
- [Configuring the Severity Level to Filter Which Extended DHCP Messages Are Logged on page 733](#)
- [Tracing Extended DHCP Operations for Specific Interfaces on page 734](#)

Configuring the Extended DHCP Log Filename

By default, the name of the file that records trace output is **jdhcpd**. You can specify a different name by including the **file** option. DHCP local server and DHCP relay agent both support the **file** option for the **traceoptions** statement and the **interface-traceoptions** statement.

To change the filename:

- Specify a filename for global tracing operations.

```
[edit system processes dhcp-service traceoptions]  
user@host# set file filename
```

- Specify a filename for per-interface tracing operations.

```
[edit system processes dhcp-service interface-traceoptions]  
user@host# set file filename
```

Configuring the Number and Size of Extended DHCP Log Files

You can optionally specify the number of compressed, archived trace log files to be from 2 through 1000. You can also configure the maximum file size to be from 10 KB through 1 gigabyte (GB); the default size is 128 kilobytes (KB).

The archived files are differentiated by a suffix in the format *.number.gz*. The newest archived file is *.0.gz* and the oldest archived file is *.(maximum number)-1.gz*. When the current trace log file reaches the maximum size, it is compressed and renamed, and any existing archived files are renamed. This process repeats until the maximum number of archived files is reached, at which point the oldest file is overwritten.

For example, you can 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 compressed and renamed *filename.0.gz*, and a new file called *filename* is created. When the new *filename* reaches 2 MB, *filename.0.gz* is renamed *filename.1.gz* and *filename* is compressed and renamed *filename.0.gz*. This process repeats until there are 20 trace files. Then the oldest file, *filename.19.gz*, is simply overwritten when the next oldest file, *filename.18.gz* is compressed and renamed to *filename.19.gz*.

DHCP local server and DHCP relay agent both support the **files** and **size** options for the **traceoptions** statement and the **interface-traceoptions** statement. To configure the number and size of trace files:

- Specify the name, number, and size of the file used for the trace output for global tracing operations.

```
[edit system processes dhcp-service traceoptions]
user@host# set file filename files number size maximum-file-size
```

- Specify the name, number, and size of the file used for the trace output for per-interface tracing operations.

```
[edit system processes dhcp-service interface-traceoptions]
user@host# set file filename files number size maximum-file-size
```

Configuring Access to the Extended DHCP Log File

By default, only the user who configures the tracing operation can access the log files. You can enable all users to read the log file and you can explicitly set the default behavior of the log file.

DHCP local server and DHCP relay agent both support the **world-readable** option and the **no-world-readable** option for the **traceoptions** statement and the **interface-traceoptions** statement. To specify that all users can read the log file:

- Configure the log file to be world-readable for global tracing operations.

```
[edit system processes dhcp-service traceoptions]
user@host# set file filename world-readable
```

- Configure the log file to be world-readable for per-interface tracing operations.

```
[edit system processes dhcp-service interface-traceoptions]
user@host# set file filename world-readable
```

To explicitly set the default behavior, in which the log file can only be read by the user who configured tracing:

- Configure the log file to be no-world-readable for global tracing operations.

```
[edit system processes dhcp-service traceoptions]
user@host# set file filename no-world-readable
```

- Configure the log file to be no-world-readable for per-interface tracing operations.

```
[edit system processes dhcp-service interface-traceoptions]
user@host# set file filename no-world-readable
```

Configuring a Regular Expression for Extended DHCP Messages to Be Logged

By default, the trace operation output includes all messages relevant to the logged events. You can refine the output by including regular expressions to be matched.

DHCP local server and DHCP relay agent both support the **match** option for the **traceoptions** statement and the **interface-traceoptions** statement. To configure regular expressions to be matched:

- Specify the regular expression for global tracing operations.

```
[edit system processes dhcp-service traceoptions]
user@host# set file filename match regular-expression
```

- Specify the regular expression for per-interface tracing operations.

```
[edit system processes dhcp-service interface-traceoptions]
user@host# set file filename match regular-expression
```

Configuring the Extended DHCP Tracing Flags

By default, only important events are logged. You can specify which events and operations are logged by specifying one or more tracing flags.

DHCP local server and DHCP relay agent both support the **flag** option for the **traceoptions** statement and the **interface-traceoptions** statement. A smaller set of flags is supported for interface-level tracing than for global tracing. To configure the flags for the events to be logged:

- Specify the flags for global tracing operations.

```
[edit system processes dhcp-service traceoptions]
user@host# set flag flag
```


- Specify the flags for per-interface tracing operations.

```
[edit system processes dhcp-service interface-traceoptions]
user@host# set flag flag
```

Configuring the Severity Level to Filter Which Extended DHCP Messages Are Logged

The messages associated with a logged event are categorized according to severity level. You can use the severity level to determine which messages are logged for the event type. A low severity level is less restrictive—filters out fewer messages—than a higher level. When you configure a severity level, all messages at that level and all higher (more restrictive) levels are logged.

The following list presents severity levels in order from lowest (least restrictive) to highest (most restrictive). This order also represents the significance of the messages; for example, **error** messages are of greater concern than **info** messages.

- **verbose**
- **info**
- **notice**
- **warning**
- **error**

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 **all**. You can also specify **verbose** with the same result, because **verbose** is the lowest (least restrictive) severity level; it has nothing to do with the terseness or verbosity of the messages. Either choice generates a large amount of output. You can specify a more restrictive severity level, such as **notice** or **info** to filter the messages. By default, the trace operation output includes only messages with a severity level of **error**.

DHCP local server and DHCP relay agent both support the **level** option for the **traceoptions** statement and the **interface-traceoptions** statement. To configure the flags for the events to be logged:

- Specify the severity level for global tracing operations.

```
[edit system processes dhcp-service traceoptions]
user@host# set level severity
```

- Specify the severity level for per-interface tracing operations.

```
[edit system processes dhcp-service interface-traceoptions]
user@host# set level severity
```

Tracing Extended DHCP Operations for Specific Interfaces

In addition to the global DHCP tracing operations, subscriber management enables you to trace extended DHCP operations for a specific interface or for a range of interfaces.

Configuring per-interface tracing is a two-step procedure. In the first step, you specify the tracing options that you want to use, such as file information and flags. In the second step, you enable the tracing operation on the specific interfaces.

To configure per-interface tracing operations:

1. Specify the tracing options you want to use.



NOTE: Per-interface tracing uses the same default tracing behavior as the global extended DHCP tracing operation. The default behavior is described in [“Tracing Extended DHCP Operations” on page 729](#).

- a. Specify that you want to configure per-interface tracing options.

- For DHCP local server, DHCPv6 local server, DHCP relay agent, and DHCPv6 relay agent:

```
[edit system processes dhcp-service]
user@host# edit interface-traceoptions
```

- b. (Optional) Specify the tracing file options.

- Configure the name for the file used for the trace output.

See [Configuring the Extended DHCP Log Filename](#).

- Configure the number and size of the log files.

See [Configuring the Number and Size of Extended DHCP Log Files](#).

- Configure access to the log file.

See [Configuring Access to the Extended DHCP Log File](#).

- Configure a regular expression to filter logging events.

See [Configuring a Regular Expression for Extended DHCP Messages to Be Logged](#).

- c. (Optional) Specify tracing flag options.

See [Configuring the Extended DHCP Tracing Flags](#).

- d. (Optional) Configure a severity level for messages to specify which event messages are logged.

See [Configuring the Severity Level to Filter Which Extended DHCP Messages Are Logged](#).

2. Enable tracing on an interface or interface range.

The following examples show a DHCP local server configuration. You can also use the **trace** statement at the **[edit forwarding-options dhcp-relay]** hierarchy level and at the **[edit system services dhcp-local-server dhcpv6]** hierarchy level.

- Enable tracing on a specific interface.

```
[edit system services dhcp-local-server]
user@host# set group group-name interface interface-name trace
```

- Enable tracing on a range of interfaces.

```
[edit system services dhcp-local-server]
user@host# set group group-name interface interface-name upto interface
interface-name trace
```

Tracing Extended DHCP Operations for Specific Interfaces

In addition to the global DHCP tracing operations, subscriber management enables you to trace extended DHCP operations for a specific interface or for a range of interfaces.

Configuring per-interface tracing is a two-step procedure. In the first step, you specify the tracing options that you want to use, such as file information and flags. In the second step, you enable the tracing operation on the specific interfaces.

To configure per-interface tracing operations:

1. Specify the tracing options you want to use.



NOTE: Per-interface tracing uses the same default tracing behavior as the global extended DHCP tracing operation. The default behavior is described in “Tracing Extended DHCP Operations” on page 729.

- a. Specify that you want to configure per-interface tracing options.

- For DHCP local server, DHCPv6 local server, DHCP relay agent, and DHCPv6 relay agent:

```
[edit system processes dhcp-service]
user@host# edit interface-traceoptions
```

- b. (Optional) Specify the tracing file options.

- Configure the name for the file used for the trace output.

See Configuring the Extended DHCP Log Filename.

- Configure the number and size of the log files.

See Configuring the Number and Size of Extended DHCP Log Files.

- Configure access to the log file.

See Configuring Access to the Extended DHCP Log File.

- Configure a regular expression to filter logging events.

See Configuring a Regular Expression for Extended DHCP Messages to Be Logged.

- c. (Optional) Specify tracing flag options.

See Configuring the Extended DHCP Tracing Flags.

- d. (Optional) Configure a severity level for messages to specify which event messages are logged.

See Configuring the Severity Level to Filter Which Extended DHCP Messages Are Logged.

2. Enable tracing on an interface or interface range.

The following examples show a DHCP local server configuration. You can also use the **trace** statement at the **[edit forwarding-options dhcp-relay]** hierarchy level and at the **[edit system services dhcp-local-server dhcpv6]** hierarchy level.

- Enable tracing on a specific interface.

```
[edit system services dhcp-local-server]
user@host# set group group-name interface interface-name trace
```

- Enable tracing on a range of interfaces.

```
[edit system services dhcp-local-server]
user@host# set group group-name interface interface-name upto interface
interface-name trace
```

CHAPTER 24

Configuring DHCP Access Service on Security Devices

- [DHCP Overview on page 738](#)
- [DHCP Server, Client, and Relay Agent Overview on page 742](#)
- [DHCP Settings and Restrictions Overview on page 743](#)
- [Understanding Cascaded DHCPv6 Prefix Delegating on page 744](#)
- [Example - Configuring DHCPv6 Prefix Delegation \(PD\) over Point-to-Point Protocol over Ethernet \(PPPoE\) on page 745](#)
- [Understanding DHCP Server Operation on page 766](#)
- [DHCP Server Configuration Overview on page 767](#)
- [Minimum DHCP Local Server Configuration on page 768](#)
- [Configuring Address-Assignment Pools on page 769](#)
- [Configuring an Address-Assignment Pool Name and Addresses on page 770](#)
- [Configuring a Named Address Range for Dynamic Address Assignment on page 770](#)
- [Configuring Static Address Assignments on page 771](#)
- [Enabling TCP/IP Propagation on a DHCP Local Server on page 772](#)
- [Verifying and Managing DHCP Local Server Configuration on page 772](#)
- [Example: Configuring the Device as a DHCP Server on page 773](#)
- [Understanding DHCP Client Operation on page 779](#)
- [Minimum DHCP Client Configuration on page 780](#)
- [Configuring DHCP Client-Specific Attributes for Address-Assignment Pools on page 781](#)
- [Configuring Optional DHCP Client Attributes on page 782](#)
- [Verifying and Managing DHCP Client Configuration on page 783](#)
- [Example: Configuring the Device as a DHCP Client on page 784](#)
- [Understanding DHCP Relay Agent Operation on page 789](#)
- [Minimum DHCP Relay Agent Configuration on page 789](#)
- [Verifying and Managing DHCP Relay Configuration on page 790](#)
- [Example - Configuring JDHCP Relay Configuration on page 791](#)
- [Example: Configuring the Device as a BOOTP or DHCP Relay Agent on page 802](#)

- [DHCPv6 Server Overview on page 806](#)
- [Creating a Security Policy for DHCPv6 on page 807](#)
- [Example: Configuring DHCPv6 Server Options on page 808](#)
- [Example: Configuring an Address-Assignment Pool on page 812](#)
- [Configuring a Named Address Range and DHCPv6 Attributes for Dynamic Address Assignment on page 814](#)
- [Configuring Address-Assignment Pool Linking on page 815](#)
- [Configuring DHCP Client-Specific Attributes on page 816](#)
- [Configuring an Address-Assignment Pool for Router Advertisement on page 817](#)
- [Understanding DHCPv6 Client and Server Identification on page 817](#)
- [DHCPv6 Client Overview on page 819](#)
- [Minimum DHCPv6 Client Configuration on page 820](#)
- [Configuring Optional DHCPv6 Client Attributes on page 821](#)
- [Configuring Nontemporary Address Assignment on page 822](#)
- [Configuring Identity Associations for Nontemporary Addresses and Prefix Delegation on page 823](#)
- [Configuring Auto-Prefix Delegation on page 824](#)
- [Configuring the DHCPv6 Client Rapid Commit Option on page 825](#)
- [Configuring a DHCPv6 Client in Autoconfig Mode on page 825](#)
- [Configuring TCP/IP Propagation on a DHCPv6 Client on page 826](#)
- [Example: Configuring the Device as a DHCP Server in Chassis Cluster Mode on page 827](#)
- [Example: Configuring the Device as a DHCP Client in Chassis Cluster Mode on page 833](#)

DHCP Overview

The Dynamic Host Configuration Protocol (DHCP) can serve as a DHCP local server, a DHCP client, or a DHCP relay agent.

DHCP Local Server

You can enable an SRX Series device to function as a DHCP local server, and then configure its options on the device. The DHCP local server provides an IP address and other configuration information in response to a client request.

To configure the DHCP local server on the device, include the **dhcp-local-server** statement at the **[edit system services]** hierarchy level.



NOTE: You cannot configure the DHCP local server and the DHCP relay agent on the same interface.

DHCP Client, DHCP Local Server, and Address-Assignment Pool Interaction

In a typical branch network configuration, the DHCP client is on the subscriber's computer, and the DHCP local server is configured on the device. The following steps provide a high-level description of the interaction among the DHCP client, DHCP local server, and address-assignment pools.

1. The DHCP client sends a discover packet to one or more DHCP local servers in the network to obtain configuration parameters and an IP address for the subscriber.
2. Each DHCP local server that receives the discover packet then searches its address-assignment pool for the client address and configuration options. Each local server creates an entry in its internal client table to keep track of the client state, then sends a DHCP offer packet to the client.
3. On receipt of the offer packet, the DHCP client selects the DHCP local server from which to obtain configuration information and sends a request packet indicating the DHCP local server selected to grant the address and configuration information.
4. The selected DHCP local server sends an acknowledgement packet to the client that contains the client address lease and configuration parameters. The server and client installs the host route and ARP entry, and then monitors the lease state.

DHCP Local Server and Address-Assignment Pools

In a DHCP local server operation, the client address and configuration information reside in centralized address-assignment pools, that are managed independently from the DHCP local server and they can be shared by different client applications.

Configuring a DHCP environment that includes a DHCP local server requires two independent configuration operations, which you can complete in any order. In one operation, you configure the DHCP local server on the device and specify how the DHCP local server determines which address-assignment pool to use. In the other operation, you configure the address-assignment pools used by the DHCP local server. The address-assignment pools contain the IP addresses, named address ranges, and configuration information for DHCP clients.



NOTE: The DHCP local server and the address-assignment pools used by the server must be configured in the same routing instance.

DHCP Client

DHCP configuration consists of configuring DHCP clients and a DHCP local server. A client configuration determines how clients send a message requesting an IP address, while a server configuration enables the server to send an IP address back to the client.

For the device to operate as a DHCP client, you configure a logical interface on the device to obtain an IP address from the DHCP local server in the network. You set the vendor class ID, lease time, DHCP server address, retransmission attempts, and retry interval.

DHCP Relay Agent

You can configure DHCP relay options on the device and enable the device to function as a DHCP relay agent. A DHCP relay agent forwards DHCP request and reply packets between a DHCP client and a DHCP local server.

To configure the DHCP relay agent on the router, include the **dhcp-relay** statement at the **[edit forwarding-options]** hierarchy level.

You can also include the **dhcp-relay** statement at the following hierarchy level:

[edit routing-instances routing-instance-name forwarding-options]

DHCP Client, DHCP Relay Agent, and DHCP Local Servers

In a typical branch network configuration, the DHCP client is on the subscriber's computer, and the DHCP relay agent is configured on the device between the DHCP client and one or more DHCP local servers.

The following steps describe, at a high level, how the DHCP client, DHCP relay agent, and DHCP local server interact in a configuration that includes two DHCP local servers.

1. The DHCP client sends a discover packet to find a DHCP local server in the network from which to obtain configuration parameters for the subscriber, including an IP address.
2. The DHCP relay agent receives the discover packet and forwards copies to each of the two DHCP local servers. The DHCP relay agent then creates an entry in its internal client table to keep track of the client's state.
3. In response to receiving the discover packet, each DHCP local server sends an offer packet to the client. The DHCP relay agent receives the offer packets and forwards them to the DHCP client.
4. On receipt of the offer packets, the DHCP client selects the DHCP local server from which to obtain configuration information. Typically, the client selects the server that offers the longest lease time on the IP address.
5. The DHCP client sends a request packet that specifies the DHCP local server from which to obtain configuration information.
6. The DHCP local server requested by the client sends an acknowledgement (ACK) packet that contains the client's configuration parameters.
7. The DHCP relay agent receives the ACK packet and forwards it to the client.

8. The DHCP client receives the ACK packet and stores the configuration information.
9. If configured to do so, the DHCP relay agent installs a host route and Address Resolution Protocol (ARP) entry for this client.
10. After establishing the initial lease on the IP address, the DHCP client and the DHCP local server use unicast transmission to negotiate lease renewal or release.

Considerations

The following considerations apply when you enable a DHCP local server, DHCP relay agent, or DHCP client in a routing instance:

- The DHCP local server, DHCP relay agent, and DHCP client can be configured in one routing instance, but the functionality is mutually exclusive on one interface. If the DHCP client is enabled on one interface, the DHCP local server or the DHCP relay agent cannot be enabled on that interface.
- The DHCP client, DHCP relay agent and DHCP local server services act independently in their respective routing instance. The following features can function simultaneously on a device:
 - DHCP client and DHCP local server
 - DHCP client and DHCP relay agent
 - Multiple routing instances. Each instance can have a DHCP local server, DHCP relay agent, or DHCP client, or each routing instance can have a DHCP client and DHCP local server or a DHCP client and DHCP relay agent.
- In Junos Release 12.1X46, autoinstallation is not compatible with jDHCPd:

```
version 12.1X46-D40.2;
system {
  /* not compatible with jDHCPd */  <<<<<<
  autoinstallation {
    usb {
      disable;
    }
  }
}
```



NOTE: Before you enable DHCP services in a routing instance, you must remove all the configuration related to DHCP services that does not include routing instance support. If you do not do this, the old default routing instance configuration will override the new routing instance configuration.



NOTE: On all SRX Series devices, logical systems and routing instances are not supported for a DHCP client in chassis cluster mode.

- Related Documentation**
- [Understanding DHCP Server Operation on page 766](#)
 - [Understanding DHCP Client Operation on page 779](#)
 - [Understanding DHCP Relay Agent Operation on page 789](#)
 - [Example - Configuring DHCPv6 Prefix Delegation \(PD\) over Point-to-Point Protocol over Ethernet \(PPPoE\) on page 745](#)

DHCP Server, Client, and Relay Agent Overview

A Dynamic Host Configuration Protocol (DHCP) server can automatically allocate IP addresses and also deliver configuration settings to client hosts on a subnet. DHCP lets network administrators centrally manage a pool of IP addresses among hosts and automate the assignment of IP addresses in a network. An IP address can be leased to a host for a limited period of time, allowing the DHCP server to share a limited number of IP addresses among a group of hosts that do not need permanent IP addresses.

The Juniper Networks device acts as the DHCP server, providing IP addresses and settings to hosts, such as PCs, that are connected to device interfaces. The DHCP server is compatible with the DHCP servers of other vendors on the network.

The device can also operate as a DHCP client and DHCP relay agent.

DHCP is based on BOOTP, a bootstrap protocol that allows a client to discover its own IP address, the IP address of a server host, and the name of a bootstrap file. DHCP servers can handle requests from BOOTP clients, but provide additional capabilities beyond BOOTP, such as the automatic allocation of reusable IP addresses and additional configuration options.



NOTE: Although a Juniper Networks device can act as a DHCP server, a DHCP client, or DHCP relay agent at the same time, you cannot configure more than one DHCP role on a single interface.

DHCP provides two primary functions:

- Allocate temporary or permanent IP addresses to clients.
 - Store, manage, and provide client configuration parameters.
-



NOTE: On all SRX Series devices, DHCPv4 is supported only in Layer 3 mode; the DHCP server and DHCP client are not supported in Layer 2 transparent mode.

- Related Documentation**
- [DHCP Server Configuration Overview on page 767](#)
 - [Understanding DHCP Server Operation on page 766](#)

- [Understanding DHCP Client Operation on page 779](#)
- [Understanding DHCP Relay Agent Operation on page 789](#)
- [DHCP Settings and Restrictions Overview on page 743](#)

DHCP Settings and Restrictions Overview

This section contains the following topics:

- [Propagation of TCP/IP Settings for DHCP on page 743](#)
- [DHCP Conflict Detection and Resolution on page 743](#)
- [DHCP Interface Restrictions on page 743](#)

Propagation of TCP/IP Settings for DHCP

The Juniper Networks device can operate simultaneously as a client of the DHCP server in the untrust zone and a DHCP server to the clients in the trust zone. The device takes the TCP/IP settings that it receives as a DHCP client and forwards them as a DHCP server to the clients in the trust zone. The device interface in the untrust zone operates as the DHCP client, receiving IP addresses dynamically from an Internet service provider (ISP) on the external network.

During the DHCP protocol exchange, the device receives TCP/IP settings from the external network on its DHCP client interface. Settings include the address of the ISP's DHCP name server and other server addresses. These settings are propagated to the DHCP server pools configured on the device to fulfill host requests for IP addresses on the device's internal network.

DHCP Conflict Detection and Resolution

A client that receives an IP address from the device operating as a DHCP server performs a series of Address Resolution Protocol (ARP) tests to verify that the address is available and no conflicts exist. If the client detects an address conflict, it informs the DHCP server about the conflict and can request another IP address from the DHCP server.

The device maintains a log of all client-detected conflicts and removes addresses with conflicts from the DHCP address pool. To display the conflicts list, you use the **show system services dhcp conflict** command. The addresses in the conflicts list remain excluded until you use the **clear system services dhcp conflict** command to manually clear the list.

DHCP Interface Restrictions

The device supports DHCP client requests received on any Ethernet interface. DHCP requests received from a relay agent are supported on all interface types.

DHCP is not supported on interfaces that are part of a virtual private network (VPN).

Related Documentation

- [DHCP Server, Client, and Relay Agent Overview on page 742](#)
- [Understanding DHCP Server Operation on page 766](#)

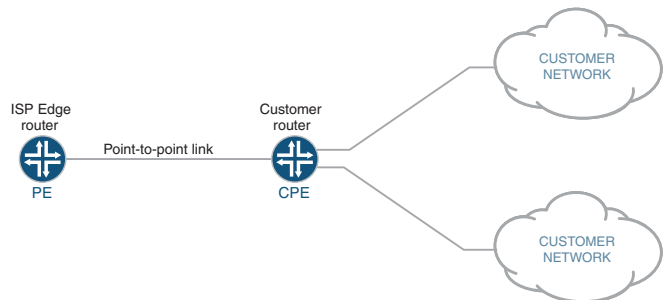
- [Understanding DHCP Client Operation on page 779](#)
- [Understanding DHCP Relay Agent Operation on page 789](#)

Understanding Cascaded DHCPv6 Prefix Delegating

You can use DHCPv6 client prefix delegation to automate the delegation of IPv6 prefixes to the customer premises equipment (CPE). With prefix delegation, a delegating device delegates IPv6 prefixes to a requesting device. The requesting device then uses the prefixes to assign global IPv6 addresses to the devices on the subscriber LAN. The requesting device can also assign subnet addresses to subnets on the LAN.

With cascaded prefix delegation, the IPv6 address block is delegated to a DHCPv6 client that is running on the WAN interface of a customer edge device. The identity association (IA) for the client is used for the identity association for prefix delegation (IA_PD). The CE device requests, through DHCPv6, an IPv6 address with the IA type of nontemporary addresses (IA_NA). Both IA_PD and IA_NA are requesting in the same DHCPv6 exchange.

Figure 37: IPv6 Prefix Delegation

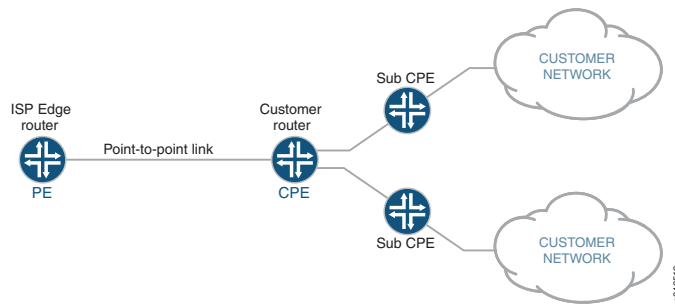


The topology in [Figure 37 on page 744](#) shows an SRX Series device acting as the CPE. The WAN interface links to the provider edge (PE) device and the LAN interfaces link to the customer networks. The service provider delegates a prefix (delegated-prefix) and an IPv6 address (cpe-wan-ipv6-address) to a DHCPv6 client. When a requesting device receives that IPv6 address through the DHCPv6 client, the device must install the IPv6 address on its WAN interface. The DHCPv6 client then divides the delegated prefix into sub-prefixes and subsequently assigns them to the connected LAN interfaces of the CPE device, making some subset of the remaining space available for sub-prefix delegation.

A CPE assigns sub-prefixes to its LAN interfaces and broadcasts the sub-prefixes through device advertisement. In this scenario, the CPE acts as a sub-PE and delegates sub-prefixes and assigns them to sub-CPEs.



NOTE: The requirements of sub-prefix delegation are the same as for the prefix delegation defined in RFC 3769.

Figure 38: Sub-prefix Delegation

There can be multi-level sub prefix delegations, see [Figure 38 on page 745](#). The top level CPE gets a delegated prefix from the PE and delegates the sub prefixes to second level sub-CPEs, then to the third level sub-CPEs, and finally to the end levels. The end level sub-CPEs assign the IPv6 address to end hosts through SLAAC, stateless DHCPv6 or stateful DHCPv6. This is called cascaded prefix delegating.

Related Documentation

Example - Configuring DHCPv6 Prefix Delegation (PD) over Point-to-Point Protocol over Ethernet (PPPoE)

This example shows how to configure DHCPv6 PD over PPPoE on SRX Series devices.

- [Requirements on page 745](#)
- [Overview on page 745](#)
- [Configuration on page 746](#)
- [Verification on page 761](#)

Requirements

No special configuration beyond the device initialization is required before configuring this feature.

Overview

The example uses SRX550M devices for configuring DHCPv6 PD over PPPoE. Before you begin, configure DHCPv6 server to permit in host-inbound traffic and receive DHCPv6 packet. Provide a host-name to establish PPPoE session. To enable IPv6, chassis reboot is required.

Configuring DHCPv6 PD over PPPoE involves the following configurations:

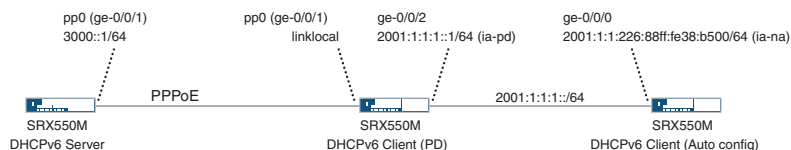
- Configuring DHCPv6 Server
- DHCPv6 Client (PD)
- DHCPv6 Client (Auto)

Topology

The following illustration describes DHCPv6 PD over PPPoE topology which provide a configuration suite using SRX Series devices.

Figure 39 on page 746 shows the topology used in this example.

Figure 39: Configuring SRX Series Devices for DHCPv6 PD over PPPoE



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.

Quick configuration for DHCPv6 Server:

- DHCPv6 server configuration

```
set interfaces ge-0/0/2 unit 0 family inet6
set system services dhcp-local-server dhcpv6 overrides interface-client-limit 100
set system services dhcp-local-server dhcpv6 group my-group overrides
  interface-client-limit 200
set system services dhcp-local-server dhcpv6 group my-group overrides delegated-pool
  v6-pd-pool
set system services dhcp-local-server dhcpv6 group my-group interface pp0.0
```

- PPPoE configuration

```
set system host-name SRX550M
set interfaces ge-0/0/1 unit 0 encapsulation ppp-over-ether
set interfaces pp0 unit 0 ppp-options chap access-profile prof-ge001
set interfaces pp0 unit 0 pppoe-options underlying-interface ge-0/0/1.0
set interfaces pp0 unit 0 pppoe-options server
set interfaces pp0 unit 0 family inet6 address 3000::1/64
```

- Router advertisement configuration

```
set protocols router-advertisement interface pp0.0 max-advertisement-interval 20
set protocols router-advertisement interface pp0.0 min-advertisement-interval 10
set protocols router-advertisement interface pp0.0 managed-configuration
set protocols router-advertisement interface pp0.0 other-stateful-configuration
set protocols router-advertisement interface pp0.0 prefix 3000::1/64
```

- Enable IPv6

```
set security forwarding-options family inet6 mode flow-based
```

- PPPoE profile configuration

```
set access profile prof-ge001 client test_user chap-secret test
```

- PD address pool configuration

```
set access address-assignment pool v6-pd-pool family inet6 prefix 2001:1::/48
set access address-assignment pool v6-pd-pool family inet6 range vp-pd prefix-length 48
set access address-assignment pool v6-pd-pool family inet6 dhcp-attributes dns-server 3000::1
```

- Security zone configuration

```
set security zones security-zone trust interface pp0.0 host-inbound-traffic
system-services dhcpv6
```

Quick configuration for DHCPv6 Client (PD):

- DHCPv6 server configuration for autoconfig device

```
set interfaces ge-0/0/2 unit 0 family inet6
set system services dhcp-local-server dhcpv6 overrides interface-client-limit 10
set system services dhcp-local-server dhcpv6 overrides process-inform pool p1
set system services dhcp-local-server dhcpv6 group ipv6 interface ge-0/0/2.0
```

- PPPoE configuration

```
set system host-name SRX550M
set interfaces ge-0/0/1 unit 0 encapsulation ppp-over-ether
set interfaces pp0 unit 0 ppp-options chap default-chap-secret test
set interfaces pp0 unit 0 ppp-options chap local-name test_user
set interfaces pp0 unit 0 ppp-options chap passive
set interfaces pp0 unit 0 pppoe-options underlying-interface ge-0/0/1.0
set interfaces pp0 unit 0 pppoe-options client
```

- DHCPv6 client configuration

```
set interfaces pp0 unit 0 family inet6 dhcpv6-client client-type statefull
set interfaces pp0 unit 0 family inet6 dhcpv6-client client-ia-type ia-pd
set interfaces pp0 unit 0 family inet6 dhcpv6-client update-router-advertisement
interface ge-0/0/2.0 other-stateful-configuration
set interfaces pp0 unit 0 family inet6 dhcpv6-client update-router-advertisement
interface ge-0/0/2.0 max-advertisement-interval 10
set interfaces pp0 unit 0 family inet6 dhcpv6-client update-router-advertisement
interface ge-0/0/2.0 min-advertisement-interval 5
set interfaces pp0 unit 0 family inet6 dhcpv6-client client-identifier duid-type duid-ll
set interfaces pp0 unit 0 family inet6 dhcpv6-client req-option dns-server
set interfaces pp0 unit 0 family inet6 dhcpv6-client update-server
set protocols router-advertisement interface pp0.0
```

- Enable IPv6

```
set security forwarding-options family inet6 mode flow-based
```

- DHCPv6 server propagate configuration

```
set access address-assignment pool p1 family inet6 prefix 2001::/16
set access address-assignment pool p1 family inet6 dhcp-attributes propagate-settings
pp0.0
```

- Security zone configuration

```
set security zones security-zone untrust interface pp0.0 host-inbound-traffic
system-services dhcpv6
set security zones security-zone trust interface ge-0/0/2.0 host-inbound-traffic
system-services dhcpv6
```

Quick configuration for DHCPv6 Client (Auto):

- DHCPv6 client configuration

```
set interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client client-type autoconfig
set interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client client-ia-type ia-na
set interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client client-identifier duid-type
duid-ll
set interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client req-option dns-server
```

- Router advertisement configuration

```
set protocols router-advertisement interface fe-0/0/0.0
```

- Enable IPv6

```
set security forwarding-options family inet6 mode flow-based
```

- Security zone configuration

```
set security zones security-zone trust interface fe-0/0/0.0 host-inbound-traffic
system-services dhcpv6
```


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 *CLI User Guide*.

1. To configure DHCPv6 server on SRX550M device:
 - a. Set the interface.

```
[edit]
user@host# set interfaces ge-0/0/2 unit 0 family inet6
```

- b. Configure a DHCP local server.

```
[edit ]
user@host# set system services dhcp-local-server dhcpv6
```

- c. Set a default limit for all DHCPv6 groups.

```
[edit system services dhcp-local-server dhcpv6]
user@host# set overrides interface-client-limit 100
```

- d. Set a custom client limit for the group.

```
[edit system services dhcp-local-server dhcpv6]
user@host# set group my-group overrides interface-client-limit 200
```

- e. Specify delegated pool name.

```
[edit system services dhcp-local-server dhcpv6]
user@host# set group my-group overrides delegated-pool v6-pd-pool
```

- f. Create a group called my-group that contains pp0 interface.

```
[edit system services dhcp-local-server dhcpv6]
user@host# set group my-group interface pp0.0
```

2. Configuring PPPoE:

- a. Set interface to encapsulate PPPoE.

```
[edit]
user@host# set interfaces ge-0/0/1 unit 0 encapsulation ppp-over-ether
```

- b. Set chap access profile value.

```
[edit system interface]
user@host# set interface pp0 unit 0 ppp-options chap access-profile prof-ge001
```

- c. Set underlying interface name.

```
[edit system interface]
user@host# set interface pp0 unit 0 pppoe-options underlying-interface
ge-0/0/1.0
```

- d. Set PPPoE-options server.

```
[edit system interface]
user@host# set interface pp0 unit 0 pppoe-options server
```

- e. Set family name and address.

```
[edit system interface]
user@host# set interface pp0 unit 0 family inet6 address 3000::1/64
```

- 3. Configuring Router advertisement:

- a. Set max advertisement interval limit.

```
[edit system protocol]
user@host# set protocols router-advertisement interface pp0.0
max-advertisement-interval 20
```

- b. Set minimum advertisement interval limit.

```
[edit system protocol]
user@host# set protocols router-advertisement interface pp0.0
min-advertisement-interval 10
```

- c. Set the configuration state to managed configuration.

```
[edit system protocol]
user@host# set protocols router-advertisement interface pp0.0
managed-configuration
```

- d. Set the configuration state to other stateful configuration.

```
[edit system protocol]
user@host# set protocols router-advertisement interface pp0.0
other-stateful-configuration
```

- e. Set the prefix value.

```
[edit system protocol]
user@host# set protocols router-advertisement interface pp0.0 prefix 3000::1/64
```

- 4. Enable IPv6:

- a. Set the family name and mode to enable IPv6.

```
[edit]
user@host# set security forwarding-options family inet6 mode flow-based
```

- 5. Configuring PPPoE profile:

- a. Set access profile name, client name and chap secret.

```
[edit]
user@host# set access profile prof-ge001 client test_user chap-secret test
```

- 6. Configuring PD address pool:

- a. Set address-assignment pool name, family name and prefix.

```
[edit]
user@host# set access address-assignment pool v6-pd-pool family inet6 prefix
2001:1:1::/48
```

- b. Set range and prefix length.

```
[edit]
user@host# set access address-assignment pool v6-pd-pool family inet6 range
vp-pd prefix-length 48
```

- c. Set dhcp attributes with dns server value.

```
[edit]
user@host# set access address-assignment pool v6-pd-pool family inet6
dhcp-attributes dns-server 3000::1
```

7. Configuring Security zone:

- a. Set the zone name, interface and host-inbound-traffic system-services.

```
[edit]
user@host# set security zones security-zone trust interface pp0.0
host-inbound-traffic system-services dhcpv6
```

Step-by-Step Procedure

1. To configure DHCPv6 client (PD) on SRX550M device:

- a. Set the interface.

```
[edit]
user@host# set interfaces ge-0/0/2 unit 0 family inet6
```

- b. Set DHCPv6 local server to override the interface client limit.

```
[edit]
user@host# set system services dhcp-local-server dhcpv6 overrides
interface-client-limit 10
```

- c. Set the process-inform pool name.

```
[edit]
user@host# set system services dhcp-local-server dhcpv6 overrides
process-inform pool p1
```

- d. Set group name and interface.

```
[edit]
user@host# set system services dhcp-local-server dhcpv6 group ipv6 interface
ge-0/0/2.0
```

2. Configuring PPPoE:

- a. Set the interface to encapsulate ppp over ethernet.

```
[edit system interface]
user@host# set interface ge-0/0/1 unit 0 encapsulation ppp-over-ether
```

- b. Set default chap secret.

```
[edit system interface]
user@host# set interfaces pp0 unit 0 ppp-options chap default-chap-secret
test
```

- c. Set chap local name.

```
[edit system interface]
user@host# set interfaces pp0 unit 0 ppp-options chap local-name test_user
```

- d. Set PPP options chap state.

```
[edit system interface]
user@host# set interfaces pp0 unit 0 ppp-options chap passive
```

- e. Set underlying-interface.

```
[edit system interface]
user@host# set interfaces pp0 unit 0 pppoe-options underlying-interface
ge-0/0/1.0
```

- f. Set pppoe-options.

```
[edit system interface]
user@host# set interfaces pp0 unit 0 pppoe-options client
```

3. Configuring DHCPv6 client:

- a. Set the family name and dhcpv6 client type.

```
[edit]
user@host# set interfaces pp0 unit 0 family inet6 dhcpv6-client client-type
statefull
```

- b. Set the dhcpv6 client identity association type.

```
[edit]
user@host# set interfaces pp0 unit 0 family inet6 dhcpv6-client client-ia-type
ia-pd
```

- c. Set update-router-advertisement interface and other stateful-configuration.

```
[edit]
user@host# set interfaces pp0 unit 0 family inet6 dhcpv6-client
update-router-advertisement interface ge-0/0/2.0 other-stateful-configuration
```

- d. Set maximum advertisement interval value.

```
[edit]
```

```
user@host# set interfaces pp0 unit 0 family inet6 dhcpv6-client
update-router-advertisement interface ge-0/0/2.0 max-advertisement-interval
10
```

- e. Set minimum advertisement interval value.

```
[edit]
user@host# set interfaces pp0 unit 0 family inet6 dhcpv6-client
update-router-advertisement interface ge-0/0/2.0 min-advertisement-interval
5
```

- f. Set client-identifier duid type.

```
[edit]
user@host# set interfaces pp0 unit 0 family inet6 dhcpv6-client client-identifier
duid-type duid-11
```

- g. Set requested option for DHCPv6 client.

```
[edit]
user@host# set interfaces pp0 unit 0 family inet6 dhcpv6-client req-option
dns-server
```

- h. Update the server.

```
[edit]
user@host# set interfaces pp0 unit 0 family inet6 dhcpv6-client update-server
```

- i. Set the protocols and the interface.

```
[edit]
user@host# set protocols router-advertisement interface pp0.0
```

4. Enable IPv6

- a. Set the family name and mode to enable IPv6.

```
[edit]
user@host# set security forwarding-options family inet6 mode flow-based
```

5. Configuring DHCPv6 server to propagate DNS server information to end device:

- a. Set address assignment pool name, family name and prefix.

```
[edit]
user@host# set access address-assignment pool p1 family inet6 prefix 2001::/16
```

- b. Set the interface name for propagating TCP/IP settings to pool.

```
[edit]
user@host# set access address-assignment pool p1 family inet6 dhcp-attributes
propagate-settings pp0.0
```

6. Configuring security zone:

- a. Set the zone name, untrust interface and system services.

```
[edit]
user@host# set security zones security-zone trust interface pp0.0
host-inbound-traffic system-services dhcpv6
```

- b. Set the trust interface.

```
[edit]
user@host# set security zones security-zone trust interface ge-0/0/2.0
host-inbound-traffic system-services dhcpv6
```

Step-by-Step Procedure

1. To configure DHCPv6 client (Auto) on SRX550M device:

- a. Set the interface, unit value, family name and DHCPv6 client type.

```
[edit system interface]
user@host# set interfaces fe-0/0/0 unit 0 family inet6 dhcpv6-client client-type
autoconfig
```

- b. Set Dhcpx6 client identity association type.

```
[edit system interface]
user@host# set interfaces fe-0/0/0 unit 0 family inet6 dhcpv6-client
client-ia-type ia-na
```

- c. Set client-identifier type.

```
[edit system interface]
user@host# set interfaces fe-0/0/0 unit 0 family inet6 dhcpv6-client
client-identifier duid-type duid-ll
```

- d. Set DHCPV6 client requested option.

```
[edit system interface]
user@host# set interfaces fe-0/0/0 unit 0 family inet6 dhcpv6-client req-option
dns-server
```

2. Configuring router advertisement:

- a. Set the protocol and interface.

```
[edit]
user@host# set protocols router-advertisement interface fe-0/0/0.0
```

3. Enable IPv6.

- a. Set family name and mode.

```
[edit]
user@host# set security forwarding-options family inet6 mode flow-based
```

4. Configuring security zone:

5. Set the zone name, trust interface and system services.

```
[edit]
user@host# set security zones security-zone trust interface pp0.0
host-inbound-traffic system-services dhcpv6
```

Results

- Result for DHCPv6 Server:

From configuration mode, confirm your configuration by entering the **show system services dhcp-local-server**, **show interfaces**, **show protocols**, **show security forwarding-options**, **show access profile prof-ge001**, **show access address-assignment pool**, and **show security zones** commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show system services dhcp-local-server
dhcpv6 {
  overrides {
    interface-client-limit 100;
  }
  group my-group {
    overrides {
      interface-client-limit 200;
      delegated-pool v6-pd-pool;
    }
    interface pp0.0 set;
    interface pp0.0;
  }
}
...
[edit]
user@host# show interfaces
ge-0/0/1 {
  unit 0 {
    encapsulation ppp-over-ether;
  }
}
pt-1/0/0 {
  vdsl-options {
    vdsl-profile auto;
  }
}
pp0 {
  unit 0 {
    ppp-options {
      chap {
        default-chap-secret "$ABC123"; ## SECRET-DATA
      }
    }
  }
}
```

```
}
ge-0/0/1 {
  unit 0 {
    encapsulation ppp-over-ether;
  }
}
pt-1/0/0 {
  vdsl-options {
    vdsl-profile auto;
  }
}
pp0 {
  unit 0 {
    ppp-options {
      chap {
        default-chap-secret "$ABC123"; ## SECRET-DATA
      }
    }
  }
}
...
[edit]
user@host# show protocols
interface pp0.0 {
  max-advertisement-interval 20;
  min-advertisement-interval 10;
  managed-configuration;
  other-stateful-configuration;
  prefix 3000::1/64;
}
...
[edit]
user@host# show security forwarding-options
family {
  inet6 {
    mode flow-based;
  }
}
...
[edit]
user@host# show access address-assignment
pool v6-pd-pool {
  family inet6 {
    prefix 2001:1::/48;
    range vp-pd prefix-length 48;
    dhcp-attributes {
      dns-server {
        3000::1;
      }
    }
  }
}
...
[edit]
user@host# show security zones
```



```

security-zone Host {
  host-inbound-traffic {
    system-services {
      all;
    }
  }
  interfaces {
    ge-0/0/0.0;
  }
}
security-zone trust {
  interfaces {
    pp0.0 {
      host-inbound-traffic {
        system-services {
          dhcpv6;
        }
      }
    }
  }
}
}

```

- Result for DHCPv6 Client (PD):

```

[edit]
user@host# show system services dhcp-local-server
dhcpv6 {
  overrides {
    interface-client-limit 10;
    process-inform {
      pool p1;
    }
  }
}
group my-group {
  overrides {
    interface-client-limit 200;
    delegated-pool v6-pd-pool;
  }
  interface pp0.0;
}
group ipv6 {
  interface ge-0/0/2.0;
}
}
...
[edit]
user@host# show interfaces
ge-0/0/1 {
  unit 0 {
    encapsulation ppp-over-ether;
  }
}
pt-1/0/0 {
  vdsl-options {

```

```
vdsl-profile auto;
}
}
pp0 {
  unit 0 {
    ppp-options {
      chap {
        default-chap-secret "$ABC123"; ## SECRET-DATA
        local-name test_user;
        passive;
      }
    }
    pppoe-options {
      underlying-interface ge-0/0/1.0;
      client;
    }
  }
}
...
[edit]
user@host# show interfaces pp0
unit 0 {
  ppp-options {
    chap {
      default-chap-secret "$ABC123"; ## SECRET-DATA
      local-name test_user;
      passive;
    }
  }
  pppoe-options {
    underlying-interface ge-0/0/1.0;
    client;
  }
  family inet6 {
    dhcpv6-client {
      client-type statefull;
      client-ia-type ia-pd;
      update-router-advertisement {
        interface ge-0/0/2.0 {
          other-stateful-configuration;
          max-advertisement-interval 10;
          min-advertisement-interval 5;
        }
      }
      client-identifier duid-type duid-ll;
      req-option dns-server;
    }
  }
}
...
[edit]
user@host# show security forwarding-options
family {
  inet6 {
    mode flow-based;
```

```

    }
  }
...
[edit]
user@host# show access address-assignment
pool v6-pd-pool {
  family inet6 {
    prefix 2001:1:1::/48;
    range vp-pd prefix-length 48;
    dhcp-attributes {
      dns-server {
        3000::1;
      }
    }
  }
}
pool p1 {
  family inet6 {
    prefix 2001::/16;
    dhcp-attributes {
      propagate-settings pp0.0;
    }
  }
}
...
[edit]
user@host# show access address-assignment
security-zone Host {
  host-inbound-traffic {
    system-services {
      all;
    }
  }
  interfaces {
    ge-0/0/0.0;
  }
}
security-zone trust {
  interfaces {
    pp0.0 {
      host-inbound-traffic {
        system-services {
          dhcpv6;
        }
      }
    }
    ge-0/0/2.0 {
      host-inbound-traffic {
        system-services {
          dhcpv6;
        }
      }
    }
  }
}
}

```

```
security-zone untrust {  
  interfaces {  
    pp0.0 {  
      host-inbound-traffic {  
        system-services {  
          dhcpv6;  
        }  
      }  
    }  
  }  
}
```

- Result for DHCPv6 Client (Auto):

```
[edit]  
user@host# show interfaces ge-0/0/0  
unit 0 {  
  family inet6 {  
    dhcpv6-client {  
      client-type autoconfig;  
      client-ia-type ia-na;  
      req-option dns-server;  
    }  
  }  
}  
...  
[edit]  
user@host# show protocols  
router-advertisement {  
  interface pp0.0 {  
    max-advertisement-interval 20;  
    min-advertisement-interval 10;  
    managed-configuration;  
    other-stateful-configuration;  
    prefix 3000::1/64;  
  }  
  interface fe-0/0/0.0;  
}  
...  
[edit]  
user@host# show security forwarding-options  
family {  
  inet6 {  
    mode flow-based;  
  }  
}  
...  
[edit]  
user@host# show security zones  
security-zone Host {  
  host-inbound-traffic {  
    system-services {  
      all;  
    }  
  }  
}
```

```

}
interfaces {
  ge-0/0/0.0;
}
}
security-zone trust {
  interfaces {
    pp0.0 {
      host-inbound-traffic {
        system-services {
          dhcpv6;
        }
      }
    }
    ge-0/0/2.0 {
      host-inbound-traffic {
        system-services {
          dhcpv6;
        }
      }
    }
    fe-0/0/0.0 {
      host-inbound-traffic {
        system-services {
          dhcpv6;
        }
      }
    }
  }
}
security-zone untrust {
  interfaces {
    pp0.0 {
      host-inbound-traffic {
        system-services {
          dhcpv6;
        }
      }
    }
  }
}
}

```

Verification

Confirm that the configuration is working properly.

Verifying DHCPv6 Server Configuration

Purpose Verify that the DHCPv6 Server has been configured.

Action

- From operational mode, enter the **show dhcpv6 server binding** command.

The following output shows the options for the **show dhcpv6 server binding** command.

```
[edit]
user@host>show dhcpv6 server binding detail
Session Id: 75
  Client IPv6 Prefix: 2001:1:1::/48
  Client DUID: LL0x1-3c:94:d5:98:90:01
  State:
    BOUND(DHCPV6_LOCAL_SERVER_STATE_BOUND)
  Lease Expires: 2016-03-26 10:12:37 JST
  Lease Expires in: 86213 seconds
  Lease Start: 2016-03-25 10:12:37 JST
  Last Packet Received: 2016-03-25 10:12:50 JST
  Incoming Client Interface: pp0.0
  Server Ip Address: 0.0.0.0
  Client Prefix Pool Name: v6-pd-pool
  Client Id Length: 10
  Client Id: /0x00030001/0x3c94d598/0x9001
```

- From operational mode, enter the **show route table inet6.0** command.

The following output shows the options for the **show route table inet6.0** command.

```
[edit]
user@host>show route table inet6.0
inet6.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

2001:1:1::/48      *[Access/13] 00:03:45    <<<<<< Route for end device
will be automatically generated
> to fe80::3e94:d50f:fc98:8600 via pp0.0
3000::/64          *[Direct/0] 00:04:04
> via pp0.0
3000::1/128        *[Local/0] 19:53:18
Local via pp0.0
fe80::b2c6:9a0f:fc7d:6900/128
*[Local/0] 19:53:18
Local via pp0.0
```

- From operational mode, enter the **show interfaces pp0.0 terse** command.

The following output shows the options for the **show interfaces pp0.0 terse** command.

```
[edit]
user@host>show interfaces pp0.0 terse
Interface      Admin Link Proto  Local      Remote
pp0.0          up    up    inet6  3000::1/64
               fe80::b2c6:9a0f:fc7d:6900/64
```

Verifying DHCPv6 Client (PD) Configuration

Purpose Verify that the DHCPv6 Client (PD) has been configured.

- Action**
- From operational mode, enter the **show dhcpv6 client binding detail** command.

The following output shows the options for the **show dhcpv6 client binding detail** command.

```
[edit]
user@host>show dhcpv6 client binding detail
Client Interface: pp0.0
  Hardware Address:          3c:94:d5:98:86:01
  State:                     BOUND(DHCPV6_CLIENT_STATE_BOUND) <<<<<
SRX is bound to prefix via pp0.0
  ClientType:                STATEFUL
  Lease Expires:             2016-03-26 10:12:50 JST
  Lease Expires in:         86232 seconds
  Lease Start:              2016-03-25 10:12:50 JST
  Bind Type:                 IA_PD
  Client DUID:               LL0x29-3c:94:d5:98:86:01
  Rapid Commit:             Off
  Server Ip Address:        fe80::b2c6:9a0f:fc7d:6900
  Update Server             Yes
  Client IP Prefix:         2001:1:1::/48
DHCP options:
  Name: server-identifier, Value: VENDOR0x00000583-0x41453530
  Name: dns-recursive-server, Value: 3000::1
```

- From operational mode, enter the **show dhcpv6 server binding detail** command.

The following output shows the options for the **show dhcpv6 server binding detail** command.

```
[edit]
user@host>show dhcpv6 server binding detail
Session Id: 75
  Client IPv6 Prefix:        2001:1:1::/48
  Client DUID:              LL0x1-3c:94:d5:98:90:01
  State:                    BOUND(DHCPV6_LOCAL_SERVER_STATE_BOUND)
  Lease Expires:            2016-03-26 10:12:37 JST
  Lease Expires in:        86213 seconds
  Lease Start:              2016-03-25 10:12:37 JST
  Last Packet Received:     2016-03-25 10:12:50 JST
  Incoming Client Interface: pp0.0
  Server Ip Address:        0.0.0.0
  Client Prefix Pool Name:  v6-pd-pool
  Client Id Length:         10
  Client Id:                /0x00030001/0x3c94d598/0x9001
```

- From operational mode, enter the **show route table inet6.0** command.

The following output shows the options for the **show route table inet6.0** command.

```
[edit]
user@host>show route table inet6.0
inet6.0: 7 destinations, 7 routes (7 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

::/0                *[Access-internal/12] 00:03:35
                   > to fe80::b2c6:9a0f:fc7d:6900 via pp0.0
2001:1:1:1::/64     *[Direct/0] 00:03:48
                   > via ge-0/0/2.0
2001:1:1:1::1/128  *[Local/0] 00:03:48    <<<<<< IPv6 address allocated
by Prefix delegation
                   Local via ge-0/0/2.0
3000::/64           *[Access-internal/12] 00:03:35
```

```

> to fe80::b2c6:9a0f:fc7d:6900 via pp0.0
fe80::/64          *[Direct/0] 00:03:48
> via ge-0/0/2.0
fe80::3e94:d50f:fc98:8600/128
                  *[Local/0] 19:05:19
                  Local via pp0.0
fe80::3e94:d5ff:fe98:8602/128
                  *[Local/0] 00:03:48
                  Local via ge-0/0/2.0

```

- From operational mode, enter the **show interfaces pp0.0 terse** command.

The following output shows the options for the **show interfaces pp0.0 terse** command.

```

[edit]
user@host>show interfaces pp0.0 terse

```

Interface	Admin	Link	Proto	Local	Remote
pp0.0	up	up	inet6	fe80::3e94:d50f:fc98:8600/64	

- From operational mode, enter the **show interfaces ge-0/0/2.0 terse** command.

The following output shows the options for the **show interfaces ge-0/0/2.0 terse** command.

```

[edit]
user@host>show interfaces ge-0/0/2.0 terse

```

Interface	Admin	Link	Proto	Local	Remote
ge-0/0/2.0	up	up	inet6	2000:1:1:1::1/64	
				fe80::3e94:d5ff:fe98:8602/64	

- From operational mode, enter the **show ipv6 router-advertisement** command.

The following output shows the options for the **show ipv6 router-advertisement** command.

```

[edit]
user@host>show ipv6 router-advertisement
Interface: pp0.0
  Advertisements sent: 3, last sent 00:01:56 ago
  Solicits received: 0
  Advertisements received: 10
  Advertisement from fe80::b2c6:9a0f:fc7d:6900, heard 00:00:08 ago
  Managed: 1 [0]
  Other configuration: 1 [0]
  Reachable time: 0 ms
  Default lifetime: 60 sec [1800 sec]
  Retransmit timer: 0 ms
  Current hop limit: 64
  Prefix: 3000::/64
    Valid lifetime: 2592000 sec
    Preferred lifetime: 604800 sec
    On link: 1
    Autonomous: 1
Interface: ge-0/0/2.0
  Advertisements sent: 24, last sent 00:00:03 ago
  Solicits received: 0
  Advertisements received: 0

```


Verifying DHCPv6 client (Auto) Configuration

Purpose Verify that the DHCPv6 client (Auto) has been configured.

- Action**
- From operational mode, enter the **show dhcpv6 client binding detail** command.

The following output shows the options for the **show dhcpv6 client binding detail** command.

```
[edit]
user@host>show dhcpv6 client binding detail
Client Interface: fe-0/0/0.0
  Hardware Address:      00:26:88:38:b5:00
  State:                 BOUND(DHCPV6_CLIENT_STATE_BOUND)
  ClientType:            AUTO
  Lease Expires:         2016-03-26 10:15:35 JST
  Lease Expires in:      86395 seconds
  Lease Start:           2016-03-25 10:15:35 JST
  Bind Type:             IA_NA
  Client DUID:           LL0x3-00:26:88:38:b5:00
  Rapid Commit:          Off
  Server Ip Address:     fe80::3e94:d5ff:fe98:8602
  Client IP Address:     2001:1:1:1:226:88ff:fe38:b500/128
  Client IP Prefix:      2001:1:1:1::/64

DHCP options:
  Name: server-identifier, Value: VENDOR0x00000583-0x414c3131
```

- From operational mode, enter the **show route table inet6.0** command.

The following output shows the options for the **show route table inet6.0** command.

```
[edit]
user@host>show route table inet6.0
inet6.0: 5 destinations, 6 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

::/0                *[Access-internal/12] 00:02:36
                    > to fe80::3e94:d5ff:fe98:8602 via fe-0/0/0.0
2001:1:1:1::/64     *[Access-internal/12] 00:02:36
                    > to fe80::3e94:d5ff:fe98:8602 via fe-0/0/0.0
2001:1:1:1:226:88ff:fe38:b500/128
                    *[Direct/0] 00:02:36
                    > via fe-0/0/0.0
                    [Local/0] 00:02:36
                    Local via fe-0/0/0.0
fe80::/64           *[Direct/0] 1w3d 15:51:19
                    > via fe-0/0/0.0
fe80::226:88ff:fe38:b500/128
                    *[Local/0] 1w3d 15:51:19
                    Local via fe-0/0/0.0
```

- From operational mode, enter the **show ipv6 router-advertisement** command.

The following output shows the options for the **show ipv6 router-advertisement** command.

```
[edit]
user@host>show ipv6 router-advertisement
Interface: fe-0/0/0.0
  Advertisements sent: 1, last sent 00:02:45 ago
  Solicits received: 0
  Advertisements received: 8
  Advertisement from fe80::3e94:d5ff:fe98:8602, heard 00:00:02 ago
  Managed: 0
  Other configuration: 1 [0]
  Reachable time: 0 ms
  Default lifetime: 30 sec [1800 sec]
  Retransmit timer: 0 ms
  Current hop limit: 64
  Prefix: 2001:1:1:1::/64
    Valid lifetime: 86400 sec
    Preferred lifetime: 86400 sec
    On link: 1
    Autonomous: 1
```

Understanding DHCP Server Operation

As a DHCP server, a Juniper Networks device can provide temporary IP addresses from an IP address pool to all clients on a specified subnet, a process known as dynamic binding. Juniper Networks devices can also perform static binding, assigning permanent IP addresses to specific clients based on their media access control (MAC) addresses. Static bindings take precedence over dynamic bindings.

This section contains the following topics:

- [DHCP Options on page 766](#)
- [Compatibility with Autoinstallation on page 766](#)
- [Chassis Cluster Support on page 767](#)

DHCP Options

In addition to its primary DHCP server functions, you can also configure the device to send configuration settings like the following to clients through DHCP:

- IP address of the DHCP server (Juniper Networks device)
- List of Domain Name System (DNS) and NetBIOS servers
- List of gateway routers
- IP address of the boot server and the filename of the boot file to use
- DHCP options defined in RFC 2132, *DHCP Options and BOOTP Vendor Extensions*

Compatibility with Autoinstallation

The functions of a Juniper Networks device acting as a DHCP server are compatible with the autoinstallation feature. The DHCP server automatically checks any autoinstallation settings for conflicts and gives the autoinstallation settings priority over corresponding

DHCP settings. For example, an IP address set by autoinstallation takes precedence over an IP address set by the DHCP server.

Chassis Cluster Support

DHCP server operations are supported on all SRX Series devices in chassis cluster mode.

Related Documentation

- [DHCP Server, Client, and Relay Agent Overview on page 742](#)
- [Example: Configuring the Device as a DHCP Server on page 773](#)
- [Understanding DHCP Client Operation on page 779](#)
- [Understanding DHCP Relay Agent Operation on page 789](#)

DHCP Server Configuration Overview

A typical DHCP server configuration provides the following configuration settings for a particular subnet on a device interface:

- An IP address pool, with one address excluded from the pool.
- Default and maximum lease times.
- Domain search suffixes. These suffixes specify the domain search list used by a client when resolving hostnames with DNS.
- A DNS name server.
- Device solicitation address option (option 32). The IP address excluded from the IP address pool is reserved for this option.

In addition, the DHCP server might assign a static address to at least one client on the subnet. [Table 60 on page 767](#) provides the settings and values for the sample DHCP server configuration.

Table 60: Sample DHCP Server Configuration Settings

Setting	Sample Value
DHCP Subnet Configuration	
Address pool subnet address	192.168.2.0/24
High address in the pool range	192.168.2.254
Low address in the pool range	192.168.2.2
Address pool default lease time, in seconds	1,209,600 (14 days)
Address pool maximum lease time, in seconds	2,419,200 (28 days)
Domain search suffixes	mycompany.net mylab.net

Table 60: Sample DHCP Server Configuration Settings (continued)

Setting	Sample Value
Address to exclude from the pool	192.168.2.33
DNS server address	192.168.10.2
Identifier code for router solicitation address option	32
Type choice for router solicitation address option	Ip address
IP address for router solicitation address option	192.168.2.33
DHCP MAC Address Configuration	
Static binding MAC address	01:03:05:07:09:0B
Fixed address	192.168.2.50

Related Documentation

- [DHCP Server, Client, and Relay Agent Overview on page 742](#)
- [Understanding DHCP Server Operation on page 766](#)
- [Understanding DHCP Client Operation on page 779](#)
- [Understanding DHCP Relay Agent Operation on page 789](#)
- [RFC 3397, Dynamic Host Configuration Protocol \(DHCP\) Domain Search Option](#)

Minimum DHCP Local Server Configuration

The following sample output shows the minimum configuration you must use to configure an SRX300, SRX320, SRX340, SRX345, SRX550M, or SRX1500 device as a DHCP local server. In this output, the server group is named `mobileusers`, and the DHCP local server is enabled on interface `ge-1/0/1.0` within the group. The address pool is named `acmenetwork` from low range of `192.168.1.10/24` to a high range of `192.168.1.20/24`.

```
[edit access]
address-assignment {
  pool acmenetwork {
    family inet {
      network 192.168.1.0/24;
      range r1 {
        low 192.168.1.10;
        high 192.168.1.20;
      }
    }
  }
}
```

```
edit system services
```

```
dhcp-local-server {
  group mobileusers {
    interface ge-1/0/1.0
  }
}
```

```
edit interfaces ge-1/0/1 unit 0
family {
  inet {
    address 192.168.1.1/24
  }
}
```



NOTE: You can configure the DHCP local server in a routing instance by using the `dhcp-local` server, interface, and `address-assignment` statements in the `[edit routing-instances]` hierarchy level.

Related Documentation • [Configuring Address-Assignment Pools on page 769](#)

Configuring Address-Assignment Pools

The address-assignment pool feature for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices enables you to create address pools that can be shared by different client applications such as DHCPv4 or DHCPv6.

To configure an address-assignment pool:

1. Configure the address-assignment pool name and specify the addresses for the pool.
See [“Configuring an Address-Assignment Pool Name and Addresses” on page 770](#).
2. (Optional) Configure named ranges (subsets) of addresses.
See [“Configuring a Named Address Range for Dynamic Address Assignment” on page 770](#).
3. (Optional; IPv4 only) Create static address bindings.
See [“Configuring Static Address Assignments” on page 771](#).
4. (Optional) Configure attributes for DHCP clients.
See [“Configuring DHCP Client-Specific Attributes for Address-Assignment Pools” on page 781](#).

Related Documentation • [Configuring an Address-Assignment Pool Name and Addresses on page 770](#)

Configuring an Address-Assignment Pool Name and Addresses

When configuring an address-assignment pool on SRX300, SRX320, SRX340, SRX345, SRX1500, and SRX550M devices, you must specify the name of the pool and its addresses.

To configure an IPv4 address-assignment pool:

1. Configure the name of the pool and specify the IPv4 family.

```
[edit access]
user@host# edit address-assignment pool blr-pool family inet
```

2. Configure the network address and the prefix length of the addresses in the pool.

```
[edit access address-assignment pool blr-pool family inet]
user@host# set network 192.168.0.0/16
```



NOTE: You can configure an IPv4 address-assignment pool in a routing instance by configuring the address-assignment statements in the `[edit routing-instances]` hierarchy level.

Related Documentation

- [Configuring Address-Assignment Pools on page 769](#)

Configuring a Named Address Range for Dynamic Address Assignment

You can optionally configure multiple named ranges, or subsets, of addresses within an address-assignment pool. During a dynamic address assignment, a client can be assigned an address from a specific named range. To create a named range, you specify a name for the range and define the address range.



NOTE: Supported only on SRX300, SRX320, SRX340, SRX345, SRX1500, and SRX550M devices.

To create a named range within an IPv4 address-assignment pool:

1. Specify the name of the address-assignment pool.

```
[edit access]
user@host# edit address-assignment pool blr-pool family inet
```

2. Configure the name of the range and the lower and upper boundaries of the addresses in the range.

```
[edit access address-assignment pool isp_1 family inet]
user@host# set range southeast low 192.168.102.2 high 192.168.102.254
```



NOTE: To configure named address ranges in a routing instance, configure the address-assignment statements in the [edit routing-instances] hierarchy level.

Related Documentation

- [Configuring Address-Assignment Pools on page 769](#)

Configuring Static Address Assignments

You can optionally create a static IPv4 address binding by reserving a specific address for a particular client. The address is removed from the address-assignment pool so that it is not assigned to another client. When you reserve an address, you identify the client host and create a binding between the client MAC address and the assigned IP address.



NOTE: This feature is supported on SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.

To configure a static IPv4 address binding:

1. Specify the name of the IPv4 address-assignment pool containing the IP address you want to reserve for the client.

```
[edit access]
user@host# edit address-assignment pool blr-pool family inet
```

2. Specify the name of the client for the static binding, the client MAC address, and the IP address to reserve for the client. This configuration specifies that the client with MAC address 01:03:05:07:09:0b is always assigned IP address 192.168.10.2.

```
[edit access address-assignment pool blr-pool family inet]
user@host# set host svale6_boston_net hardware-address 01:03:05:07:09:0b
ip-address 192.168.10.2
```



NOTE: To configure static binding for an IPv4 address in a routing instance, configure the address-assignment statements in the [edit routing-instances] hierarchy.

Related Documentation

- [Configuring Address-Assignment Pools on page 769](#)

Enabling TCP/IP Propagation on a DHCP Local Server

This topic describes how to configure TCP/IP settings on a DHCP local server, which includes a DHCP client and a DHCP local server.



NOTE: This feature is supported on SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.

To enable TCP/IP setting propagation on a DHCP local server:

1. Configure the **update-server** option on the DHCP client.

```
[edit interfaces ge-0/0/1 unit 0 family inet]
dhcp-client {
  update-server;
}
```

2. Configure the address pool to specify the interface (where **update-server** is configured) from which TCP/IP settings can be propagated.

```
[edit access]
address-assignment {
  pool sprint family inet {
    network 192.168.2.0/24;
    dhcp-attributes {
      propagate-settings ge-0/0/1.0;
    }
  }
}
```

3. Configure the DHCP local server.

```
edit system services
dhcp-local-server {
  group bob {
    interface ge-1/0/1.0
  }
}
```

Related Documentation

- [Minimum DHCP Local Server Configuration on page 768](#)

Verifying and Managing DHCP Local Server Configuration

Purpose View or clear information about client address bindings and statistics for the DHCP local server.



NOTE: This feature is supported on SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.

- Action**
- To display the address bindings in the client table on the DHCP local server:

```
user@host> show dhcp server binding
```

- To display DHCP local server statistics:

```
user@host> show dhcp server statistics
```

- To clear the binding state of a DHCP client from the client table on the DHCP local server:

```
user@host> clear dhcp server binding
```

- To clear all DHCP local server statistics:

```
user@host> clear dhcp server statistics
```



NOTE: To clear or view information about client bindings and statistics in a routing instance, run the following commands:

- `show dhcp server binding routing instance <routing-instance name>`
- `show dhcp server statistics routing instance <routing-instance name>`
- `clear dhcp server binding routing instance <routing-instance name>`
- `clear dhcp server statistics routing instance <routing-instance name>`

Related Documentation

- [Minimum DHCP Local Server Configuration on page 768](#)

Example: Configuring the Device as a DHCP Server

This example shows how to configure the device as a DHCP server.

For information on how to configure JDHCP in a routing instance, see [How to configure JDHCP in a routing instance](#).

- [Requirements on page 774](#)
- [Overview on page 774](#)

- [Configuration on page 774](#)
- [Verification on page 778](#)

Requirements

Before you begin:

- Determine the IP address pools and the lease durations to use for each subnet.
- Obtain the MAC addresses of the clients that require permanent IP addresses. Determine the IP addresses to use for these clients.
- List the IP addresses that are available for the servers and devices on your network; for example, DNS, NetBIOS servers, boot servers, and gateway devices. See the *Understanding Management Predefined Policy Applications*.
- Determine the DHCP options required by the subnets and clients in your network.

Overview

In this example, you configure the device as a DHCP server. You specify the IP address pool as 192.168.2.0/24 and from a low range of 192.168.2.2 to a high range of 192.168.2.254. You set the maximum-lease-time to 2,419,200. Then you specify the DNS server IP address as 192.168.10.2.



WARNING: Starting with Junos OS Release 15.1X49-D60 and Junos OS Release 17.3R1, the legacy DHCPD (DHCP daemon) configuration on all SRX Series devices is being deprecated, and only the new JDHCP CLI is supported. When you upgrade to Junos OS Release 15.1X49-D60 and later releases on a device that already has the DHCPD configuration, the following warning messages are displayed:

WARNING: The DHCP configuration command used will be deprecated in future Junos releases.

WARNING: Please see documentation for updated commands.

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 **set access** hierarchy level, and then enter **commit** from configuration mode.

```
set interfaces ge-0/0/2 unit 0 family inet address 192.168.2.1/24
set system services dhcp-local-server group g1 interface ge-0/0/2.0
set access address-assignment pool p1 family inet network 192.168.2.0/24
set access address-assignment pool p1 family inet range r1 low 192.168.2.2
set access address-assignment pool p1 family inet range r1 high 192.168.2.254
```

```
set access address-assignment pool p1 family inet dhcp-attributes maximum-lease-time
2419200
set access address-assignment pool p1 family inet dhcp-attributes name-server
192.168.10.2
```

GUI Step-by-Step Procedure

To configure the device as a DHCP server, specify the DHCP pool information, server information, lease time, and option information:

1. In the J-Web interface, select **Configure > DHCP > DHCP Services**.
2. Select DHCP Pools. Click **Add**.
3. Specify the IP address that is used as the source address the DHCP server includes in IP packets when communicating with clients. The address is included in the DHCP packet in option 54.
4. Specify the subnet information for the IPv4 address-assignment pool. Type **192.168.2.0/24**.
5. In the Address Range Low, type **192.168.2.2**.
6. In the Address Range High, type **192.168.2.254**.
7. In the Exclude Addresses box, type the addresses you want excluded from a DHCP address pool. Type **192.168.2.0/24**
8. Specify the server identifier to assign to any DHCP clients in this address pool. The identifier can be used to identify a DHCP server in a DHCP message.
9. Specify the domain name to assign to any DHCP clients in this address pool.
10. Specify the next server that DHCP clients need to contact. Type **192.168.10.2**
11. Define the maximum amount of time (in seconds) that DHCP should lease an address. Type **2419200**.
12. Define DHCP option 32, the device solicitation address option. You must enter a numeric value for option code. Select the option type from the list that corresponds to the option code.
13. Click **OK**.
14. If you are done configuring the device, click **Commit > Commit**.

**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 *CLI User Guide*.

To configure the device as a DHCP server:

1. Configure an interface with an IP address on which the DHCP server will be reachable.

```
[edit]
user@host# set interfaces ge-0/0/2 unit 0 family inet address 192.168.2.1/24
```

2. Configure the DHCP server.

```
[edit]
user@host# set system services dhcp-local-server group g1 interface ge-0/0/2.0
```

3. Create an address pool for IPv4 addresses that can be assigned to clients. The addresses in the pool must be on the subnet in which the DHCP clients reside. Do not include addresses that are already in use on the network.

```
[edit]]
user@host# set access address-assignment pool p1 family inet network
192.168.2.0/24
```

4. (Optional) Specify the IP address pool range. Define a range of addresses in the address-assignment pool. The range is a subset of addresses within the pool that can be assigned to clients. If no range is specified, then all addresses within the pool are available for assignment. Configure the name of the range and the lower and upper boundaries of the addresses in the range.

```
[edit]]
user@host# set access address-assignment pool p1 192.168.2.0/24 address-range
low 192.168.2.2 high 192.168.2.254
```

5. (Optional) Configure one or more routers as the default gateway on the client's subnet.

```
[edit]
user@host# set access address-assignment pool p1 family inet dhcp-attributes
router 192.168.10.3
```

6. (Optional) Configure the IP address that is used as the source address for the DHCP server in messages exchanged with the client. Clients use this information to distinguish between lease offers.

```
[edit]
user@host# set access address-assignment pool pool1 family inet dhcp-attributes
server-identifier 192.168.10.1
```

7. (Optional) Specify the maximum time period, in seconds, that a client holds the lease for an assigned IP address if the client does not renew the lease.

```
[edit]
user@host# set access address-assignment pool pool1 family inet dhcp-attributes
maximum-lease-time 2419200
```

8. (Optional) Specify user-defined options to be included in DHCP packets

```
[edit]
user@host# set access address-assignment pool pool1 family inet dhcp-attributes
option 98 string test98
```

9. Assign a fixed IP address with the MAC address of the client.

```
[edit]
user@host# set access address-assignment pool pool1 family inet host host1
ip-address 192.168.2.100 hardware-address 2c:56:dc:72:99:f3
```

- Results**
- From configuration mode, confirm your configuration by entering the **show access address-assignment** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show access address-assignment
pool p1 {
  family inet {
    network 192.168.2.0/24;
    range r1 {
      low 192.168.2.2;
      high 192.168.2.254;
    }
    dhcp-attributes {
      maximum-lease-time 2419200;
      name-server {
        192.168.10.2;
      }
    }
  }
}
```

- From configuration mode, confirm your configuration by entering the **show system services dhcp-local-server** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show system services dhcp-local-server
group g1 {
```

```
interface ge-0/0/2.0;  
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

- [Verifying the DHCP Binding Database on page 778](#)
- [Verifying DHCP Server Operation on page 778](#)

Verifying the DHCP Binding Database

Purpose Verify that the DHCP binding database reflects the DHCP server configuration.

Action From operational mode, enter these commands:

- **show dhcp server binding** command to display all active bindings in the database.
- **show dhcp server binding *address* detail** command (where *address* is the IP address of the client) to display more information about a client.

These commands produce following sample output:

```
user@host> show dhcp server binding
```

IP Address	Hardware Address	Type	Lease expires at
30.1.1.20	00:12:1e:a9:7b:81	dynamic	2007-05-11 11:14:43 PDT

```
user@host> show dhcp server binding address detail
```

IP address	192.0.2.2
Hardware address	00:a0:12:00:13:02
Pool	192.0.2.0/24
Interface	fe-0/0/0, relayed by 192.0.2.200

Lease information:

Type	DHCP
Obtained at	2004-05-02 13:01:42 PDT
Expires at	2004-05-03 13:01:42 PDT
State	active

DHCP options:

Name:	name-server, Value: { 6.6.6.6, 6.6.6.7 }
Name:	domain-name, Value: mydomain.tld
Code:	32, Type: ip-address, Value: 192.0.2.33

Verifying DHCP Server Operation

Purpose Verify that the DHCP server operation has been configured.

Action From operational mode, enter the following command:

- **show dhcp server statistics** command to verify the DHCP server statistics.

```
user@host> show dhcp server statistics
```

```
Packets dropped:
  Total                0

Messages received:
  BOOTREQUEST          45
  DHCPDECLINE           0
  DHCPDISCOVER          1
  DHCPINFORM           39
  DHCPRELEASE           0
  DHCPREQUEST           5
  DHCPLEASEQUERY        0
  DHCPBULKLEASEQUERY    0

Messages sent:
  BOOTREPLY             6
  DHCPOFFER             1
  DHCPACK               3
  DHCPNAK               2
  DHCPFORCERENEW        0
  DHCPLEASEUNASSIGNED   0
  DHCPLEASEUNKNOWN      0
  DHCPLEASEACTIVE       0
  DHCPLEASEQUERYDONE    0
```

Release History Table

Release	Description
15.1X49-D60	Starting with Junos OS Release 15.1X49-D60 and Junos OS Release 17.3R1, the legacy DHCPD (DHCP daemon) configuration on all SRX Series devices is being deprecated, and only the new JDHCP CLI is supported.

Related Documentation

- [DHCP Server, Client, and Relay Agent Overview on page 742](#)
- [Understanding DHCP Server Operation on page 766](#)
- [Understanding DHCP Relay Agent Operation on page 789](#)
- [DHCP Settings and Restrictions Overview on page 743](#)

Understanding DHCP Client Operation

A Juniper Networks device can act as a DHCP client, receiving its TCP/IP settings and the IP address for any physical interface in any security zone from an external DHCP server. The device can also act as a DHCP server, providing TCP/IP settings and IP addresses to clients in any zone. When the device operates as a DHCP client and a DHCP server simultaneously, it can transfer the TCP/IP settings learned through its DHCP client module to its default DHCP server module. For the device to operate as a DHCP client,

you configure a logical interface on the device to obtain an IP address from the DHCP server in the network. You set the vendor class ID, lease time, DHCP server address, retransmission attempts, and retry interval. You can renew DHCP client releases.

DHCP client operations are supported on all SRX Series devices in chassis cluster mode.

**Related
Documentation**

- [DHCP Server, Client, and Relay Agent Overview on page 742](#)
- [Understanding DHCP Relay Agent Operation on page 789](#)
- [DHCP Settings and Restrictions Overview on page 743](#)

Minimum DHCP Client Configuration

The following sample output shows the minimum configuration you must use to configure an SRX300, SRX320, SRX340, SRX345, SRX550M, or SRX1500 device as a DHCP client. In this output, the interface is ge-0/0/0 and the logical unit is 0.

```
[edit interfaces]
  ge-0/0/0 {
    unit 0 {
      family inet {
        dhcp-client
      }
    }
  }
```



NOTE: To configure a DHCP client in a routing instance, add the interface in a routing instance using the [edit routing-instances] hierarchy.

**Related
Documentation**

- [Configuring Optional DHCP Client Attributes on page 782](#)

Configuring DHCP Client-Specific Attributes for Address-Assignment Pools

You use the address-assignment pool feature to include application-specific attributes when clients obtain an address. The client application, such as DHCP, uses the attributes to determine how addresses are assigned and to provide optional application-specific characteristics to the client. For example, the DHCP application might specify that a client that matches certain prerequisite information is dynamically assigned an address from a particular named range. Based on which named range is used, DHCP specifies additional DHCP attributes such as the boot file that the client uses, the DNS server, and the maximum lease time.



NOTE: This feature is supported on SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.

You use the **dhcp-attributes** statement to configure DHCP client-specific attributes for address-assignment pools.

To configure address-assignment pool attributes for DHCP clients:

1. Specify the name of the address-assignment pool.

```
[edit access]
user@host# edit address-assignment pool blr-pool family inet
```

2. Configure optional DHCP client attributes.

```
[edit access address-assignment pool blr-pool family inet]
user@host# set dhcp-attributes maximum-lease-time 2419200
user@host# set dhcp-attributes name-server 192.168.10.2
user@host# set dhcp-attributes boot-file boot-file.txt
user@host# set dhcp-attributes boot-file boot-server example.com
```



NOTE: To configure DHCP client-specific attributes in a routing instance, configure the **dhcp-attributes** statements in the **[edit routing-instances]** hierarchy.

Related Documentation

- [Configuring Address-Assignment Pools on page 769](#)

Configuring Optional DHCP Client Attributes

For the device to operate as a DHCP client, you configure a logical interface on the device to obtain an IP address from the DHCP local server in the network. You can then set the client-identifier, options no-hostname, lease time, retransmission attempts, retry interval, preferred DHCP local server address, and vendor class ID.

To configure optional DHCP client attributes on SRX300, SRX320, SRX340, SRX550M, and SRX1500 devices:

1. Configure the DHCP client identifier prefix as the routing instance name.

```
[edit interfaces ge-0/0/1 unit 0 family inet dhcp-client]
user@host# set client-identifier prefix host
```

2. Configure the DHCP options no-hostname if you do not want the client to send hostname (RFC option code 12) in the packets.

```
[edit interfaces ge-0/0/1 unit 0 family inet dhcp-client]
user@host# set options no-hostname
```

3. Set the DHCP lease time.

```
[edit interfaces ge-0/0/1 unit 0 family inet dhcp-client]
user@host# set lease-time 86400
```

4. Set the number of attempts allowed to retransmit a DHCP packet.

```
[edit interfaces ge-0/0/1 unit 0 family inet dhcp-client]
user@host# set retransmission-attempt 6
```

5. Set the interval (in seconds) allowed between retransmission attempts. The range is 4 through 64. The default is 4 seconds.

```
[edit interfaces ge-0/0/1 unit 0 family inet dhcp-client]
user@host# set retransmission-interval 5
```

6. Set the IPv4 address of the preferred DHCP local server.

```
[edit interfaces ge-0/0/1 unit 0 family inet dhcp-client]
user@host# set server-address 10.1.1.1
```

7. Set the vendor class ID for the DHCP client.

```
[edit interfaces ge-0/0/1 unit 0 family inet dhcp-client]
user@host# set vendor-id ether
```



NOTE: To configure the DHCP client in a routing instance, configure the interface in the [edit routing-instances] hierarchy.

Related Documentation

- [Minimum DHCP Client Configuration on page 780](#)

Verifying and Managing DHCP Client Configuration

Purpose View or clear information about client address bindings and statistics for the DHCP client on SRX300, SRX320, SRX340, SRX550M, and SRX1500 devices.

Action

- To display the address bindings in the client table on the DHCP client:

```
user@host> show dhcp client binding
```

- To display DHCP client statistics:

```
user@host> show dhcp client statistics
```

- To clear the binding state of a DHCP client from the client table on the DHCP client:

```
user@host> clear dhcp client binding
```

- To clear all DHCP client statistics:

```
user@host> clear dhcp client statistics
```



NOTE: To clear or view information about client bindings and statistics in a routing instance, run the following commands:

- `show dhcp client binding routing instance <routing-instance name>`
- `show dhcp client statistics routing instance <routing-instance name>`
- `clear dhcp client binding routing instance <routing-instance name>`
- `clear dhcp client statistics routing instance <routing-instance name>`

Related Documentation

- [Example: Configuring the Device as a DHCP Client on page 784](#)

Example: Configuring the Device as a DHCP Client

This example shows how to configure the device as a DHCP client.

- [Requirements on page 784](#)
- [Overview on page 784](#)
- [Configuration on page 785](#)
- [Verification on page 788](#)

Requirements

Before you begin:

- Determine the IP address pools and the lease durations to use for each subnet. You can use the **show system services dhcp pool** CLI command to view information on DHCP address pools.
- Obtain the MAC addresses of the clients that require permanent IP addresses. Determine the IP addresses to use for these clients.
- List the IP addresses that are available for the servers and devices on your network; for example, DNS, NetBIOS servers, boot servers, and gateway devices. See the *Understanding Management Predefined Policy Applications*.
- Determine the DHCP options required by the subnets and clients in your network. See [“Creating User-Defined DHCP Options Not Included in the Default Junos Implementation of the DHCP Server” on page 582](#)

Overview

In this example, you configure the device as a DHCP client. You specify the interface as ge-0/0/2, set the logical unit as 0, and create a DHCP inet family. You then specify the DHCP client identifier as 00:0a:12:00:12:12 in hexadecimal. You use hexadecimal if the client identifier is a MAC address. You set the options no-hostname if you do not want the DHCP client to send the hostname with the packets. You set the DHCP lease time as 86,400 seconds. The range is from 60 through 2,147,483,647 seconds.

Then you set the number of retransmission attempts to 6. The range is from 0 through 50,000, and the default is 4. You set the retransmission interval to 5 seconds. The range is from 4 through 64, and the default is 4 seconds. Set the force-discover option if you want to force the DHCP client to send a DHCP discover packet after one to three failed dhcp-request attempts. The force-discover option ensures that the DHCP server will assign the same or a new IP address to the client. Finally, you set the IPv4 address of the preferred DHCP server to 10.1.1.1 and the vendor class ID to ether.



WARNING: Starting with Junos OS Release 15.1X49-D60 and Junos OS Release 17.3R1, the legacy DHCPD (DHCP daemon) configuration on all SRX Series devices is being deprecated and only the new JDHCP CLI is supported. When you upgrade to Junos OS Release 15.1X49-D60 and later releases on

a device that already has the DHCPD configuration, the following warning messages are displayed:

WARNING: The DHCP configuration command used will be deprecated in future Junos releases.

WARNING: Please see documentation for updated commands.

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 interfaces ge-0/0/2 unit 0 family inet dhcp-client client-identifier prefix host-name
set interfaces ge-0/0/2 unit 0 family inet dhcp-client lease-time 86400
set interfaces ge-0/0/2 unit 0 family inet dhcp-client retransmission-attempt 6
set interfaces ge-0/0/2 unit 0 family inet dhcp-client retransmission-interval 5
set interfaces ge-0/0/2 unit 0 family inet dhcp-client force-discover
set interfaces ge-0/0/2 unit 0 family inet dhcp-client server-address 192.168.2.1
set interfaces ge-0/0/2 unit 0 family inet dhcp-client vendor-id ether
set interfaces ge-0/0/2 unit 0 family inet dhcp-client options no-hostname
```

GUI Step-by-Step Procedure To configure the device as a DHCP client:

1. In the J-Web interface, select **Configure > Services > DHCP > DHCP Client**.
2. Under Interfaces, add **ge-0/0/2.0**.
3. Configure the DHCP client identifier as either an ASCII or hexadecimal value.
4. From the Client identifier choice list, select **hexadecimal**.
5. In the Hexadecimal box, type the client identifier—**00:0a:12:00:12:12**.
6. Set the DHCP lease time in seconds. This is the lease time in seconds requested in a DHCP client protocol packet; the range is 60 through 2,147,483,647. Type **86400**.
7. Set the retransmission number of attempts to 6. This is the number of attempts to retransmit the DHCP client protocol packet. The range is 0 through 6.
8. Set the retransmission interval in seconds to 5. This is the number of seconds between successive transmissions. The range is 4 through 64. The default is 4 seconds.

9. Configure the force-discover option to force the DHCP client to send a DHCP discover packet after one to three failed **dhcp-request** attempts.
10. Set the IPv4 address of the preferred DHCP server. Type **192.168.2.1**.
11. Set the vendor class ID. This is the vendor class identification for the DHCP client. Type **ether**.
12. Configure options no-hostname if you do not want the client to send hostname in the packets (RFC option code 12).
13. Click **OK**.
14. If you are done configuring the device, click **Commit >**.

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 *CLI User Guide*.

To configure the device as a DHCP client:

1. Specify the DHCP client interface.

```
[edit]
user@host# edit interfaces ge-0/0/2 unit 0 family inet dhcp-client
```

2. Configure the DHCP client identifier as a hexadecimal value.

```
[edit interfaces ge-0/0/2 unit 0 family inet dhcp-client]
user@host# set client-identifier prefix host
```

3. Set the DHCP lease time.

```
[edit interfaces ge-0/0/2 unit 0 family inet dhcp-client]
user@host# set lease-time 86400
```

4. Set the number of attempts allowed to retransmit a DHCP packet.

```
[edit interfaces ge-0/0/2 unit 0 family inet dhcp-client]
user@host# set retransmission-attempt 6
```

5. Set the interval (in seconds) allowed between retransmission attempts. The range is 4 through 64. The default is 4 seconds.

```
[edit interfaces ge-0/0/2 unit 0 family inet dhcp-client]
```

```
user@host# set retransmission-interval 5
```

6. Configure the force-discover option.

```
[edit interfaces ge-0/0/2 unit 0 family inet dhcp-client]
user@host# set force-discover.
```

7. Set the IPv4 address of the preferred DHCP server.

```
[edit interfaces ge-0/0/2 unit 0 family inet dhcp-client]
user@host# set server-address 192.168.2.1
```

8. Set the vendor class ID for the DHCP client.

```
[edit interfaces ge-0/0/2 unit 0 family inet dhcp-client]
user@host# set vendor-id ether
```

9. Configure options no-hostname if you do not want the client to send the hostname in packets.

```
[edit interfaces ge-0/0/2 unit 0 family inet dhcp-client]
user@host# set options no-hostname
```

Results From configuration mode, confirm your configuration by entering the **show interfaces ge-0/0/2 unit 0 family inet** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show interfaces ge-0/0/2 unit 0 family inet
dhcp-client {
  client-identifier hexadecimal 00:0a:12:00:12:12;
  options no-hostname;
  lease-time 86400;
  retransmission-attempt 6;
  retransmission-interval 5;
  force-discover;
  server-address 192.168.2.1;
  update-server;
  vendor-id ether;
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

- [Verifying the DHCP Client on page 788](#)

Verifying the DHCP Client

Purpose Verify that the DHCP client information has been configured.

Action From operational mode, enter these commands:

- **show dhcp client binding** command to display the binding state of a Dynamic Host Configuration Protocol (DHCP) client.
- **show dhcp client statistics** command to display client statistics.

These commands produce the following sample output:

```
user@host> show dhcp client binding
```

IP address	Hardware address	Expires	State	Interface
192.168.2.2	88:a2:5e:0a:d6:03	2419093	BOUND	ge-0/0/2.

```
user@host> show dhcp client statistics
```

```
Packets dropped:
  Total                2
  Send error           2

Messages received:
  BOOTREPLY            6
  DHCPPOFFER           4
  DHCPACK              2
  DHCPNAK              0
  DHCPFORCERENEW       0

Messages sent:
  BOOTREQUEST          39
  DHCPDECLINE          0
  DHCPDISCOVER         23
  DHCPREQUEST          16
  DHCPINFORM           0
  DHCPRELEASE          0
  DHCPRENEW            0
  DHCPREBIND           0
```


Release History Table

Release	Description
15.1X49-D60	Starting with Junos OS Release 15.1X49-D60 and Junos OS Release 17.3R1, the legacy DHCPD (DHCP daemon) configuration on all SRX Series devices is being deprecated and only the new JDHCP CLI is supported.

Related Documentation

- [DHCP Server, Client, and Relay Agent Overview on page 742](#)
- [Understanding DHCP Server Operation on page 766](#)
- [Understanding DHCP Client Operation on page 779](#)
- [DHCP Settings and Restrictions Overview on page 743](#)

Understanding DHCP Relay Agent Operation

A Juniper Networks device operating as a DHCP relay agent forwards incoming requests from BOOTP and DHCP clients to a specified BOOTP or DHCP server. Client requests can pass through virtual private network (VPN) tunnels.

You cannot configure a single device interface to operate as both a DHCP client and a DHCP relay.



NOTE: The DHCP requests received on an interface are associated to a DHCP pool that is in the same subnet as the primary IP address/subnet on an interface. If an interface is associated with multiple IP addresses/subnets, the device uses the lowest numerically assigned IP address as the primary IP address/subnet for the interface. To change the IP address/subnet that is listed as the primary address on an interface, use the `set interfaces < interface name > unit 0 family inet xxx.xxx.xxx.xxx/yy primary` command and commit the change.

Related Documentation

- [DHCP Server, Client, and Relay Agent Overview on page 742](#)
- [Understanding DHCP Server Operation on page 766](#)
- [DHCP Settings and Restrictions Overview on page 743](#)

Minimum DHCP Relay Agent Configuration

The following example describes the minimum configuration required to configure an SRX Series device as a DHCP relay agent. The DHCP servers used in this example are 1.2.3.4 and 1.2.3.5. They are configured as part of same server group named **dhcp-server**. The server group is then activated by the group name in the **active-server-group**. The DHCP relay group is enabled on interface `ge-0/0/1.0`.

1. Create a dhcp-relay group that includes at least one interface.

```
[edit]
user@host# set forwarding-options dhcp-relay group dhcp interface ge-0/0/1.0
```

2. Specify the name of the server-group and add the IP address for the DHCP servers belonging to the same group.

```
[edit]
user@host# set forwarding-options dhcp-relay server-group dhcp-server 1.2.3.4
user@host# set forwarding-options dhcp-relay server-group dhcp-server 1.2.3.5
```

3. Specify the name of the active server group.

```
[edit]
user@host# set forwarding-options dhcp-relay active-server-group dhcp-server
```

4. Configure security policy to allow DHCP services on the required security zone.

```
[edit]
user@host# set security zones security-zone trust interfaces ge-0/0/1.0
host-inbound-traffic system-services dhcp
```

```
[edit]
user@host# show forwarding-options
dhcp-relay {
  server-group {
    dhcp-server {
      1.2.3.4;
      1.2.3.5;
    }
  }
  active-server-group dhcp-server;
  group dhcp {
    interface ge-0/0/1.0;
  }
}
```



NOTE: To configure the DHCP relay agent in a routing instance, configure the dhcp-relay statements in the [edit routing-instances] hierarchy level.

Related Documentation

- [Verifying and Managing DHCP Relay Configuration on page 790](#)

Verifying and Managing DHCP Relay Configuration

Purpose View or clear address bindings or statistics for DHCP relay agent clients.

- Action**
- To display the address bindings for DHCP relay agent clients:

```
user@host> show dhcp relay binding
```

- To display DHCP relay agent statistics:

```
user@host> show dhcp relay statistics
```

- To clear the binding state of DHCP relay agent clients:

```
user@host> clear dhcp relay binding
```

- To clear all DHCP relay agent statistics:

```
user@host> clear dhcp relay statistics
```

To clear or view information about client bindings and statistics in a routing instance, run the following commands:

- `show dhcp relay binding routing instance <routing-instance name>`
- `show dhcp relay statistics routing instance <routing-instance name>`
- `clear dhcp relay binding routing instance <routing-instance name>`
- `clear dhcp relay statistics routing instance <routing-instance name>`



NOTE: On all SRX Series devices, DHCP relay is unable to update the binding status based on DHCP_RENEW and DHCP_RELEASE messages.

- Related Documentation**
- [Minimum DHCP Relay Agent Configuration on page 789](#)

Example - Configuring JDHCP Relay Configuration

The DHCP relay agent operates as the interface between DHCP clients and the server. The DHCP Relay Agent relays DHCP messages between DHCP clients and DHCP servers on different IP networks.

This example describes how to configure the DHCP relay agent on the SRX Series device. SRX series device acting as DHCP relay agent is responsible for forwarding the requests and responses between the DHCP clients and the server which are part of different routing instances.

- [Requirements on page 792](#)
- [Overview on page 792](#)
- [Configuration on page 793](#)
- [Verification on page 801](#)

Requirements

This example uses the following hardware and software components:

- SRX Series devices with Junos OS 15.1X49-D10 or later.

Overview

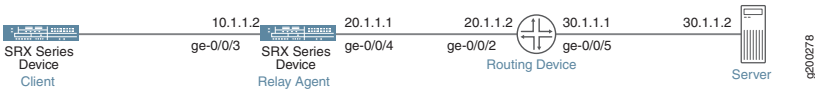
You can configure DHCP relay agent to provide additional security when exchanging DHCP messages between a DHCP server and DHCP clients that reside in different virtual routing instances. This type of configuration is for DHCP relay connection between a DHCP server and a DHCP client, when the DHCP server resides in a network that is isolated from the client network.

Topology

To exchange DHCP messages between different routing instances, you must enable both the server-facing interface and the client-facing interface of the DHCP relay agent to recognize and forward DHCP packets.

The following [Figure 40 on page 792](#) shows DHCP performance as DHCP local server, DHCP client, and DHCP relay agent

Figure 40: Understanding DHCP Services in a Routing Instance



The following list provides an overview of the tasks required to create the DHCP message exchange between the different routing instances:

- Configure the client-facing side of the DHCP relay agent.
- Configure the server-facing side of the DHCP relay agent.
- Configure SRX Series device to function as a DHCP local server.
- Configure the Security Zone to Allow the DHCP protocol.

Table1: DHCP Relay Parameters:

Parameters	Cleint-Side-Details	Server-Side-Details
interface	ge-0/0/3.0	ge-0/0/3.0
routing interface	trust-vr	untrust-vr
ip address	10.1.1.2/24	20.1.1.1/24



NOTE: In order to make this setup work, the DHCP server connecting route and relay agent interface route must be in both routing-instances. For example, in the above topology, the server route 30.1.1.0/24 needs to be shared with the dhcp-relay VR, and the dhcp-relay interface route 10.1.1.0/24 exact needs to be shared with the default routing instance.

Also, a dummy dhcp-relay config must be added in the routing instance with the DHCP server. If this is not configured, dhcp-relay will not be able to receive packets from the DHCP server.

Configuration

CLI Quick Configuration

The following procedures describe the configuration tasks for creating the DHCP message exchange between the DHCP server and clients in different routing instances. 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.

Quick configuration for Client-Facing Support:

```
set routing-instances trust-vr instance-type virtual-router
set routing-instances trust-vr interface ge-0/0/3.0
set interfaces ge-0/0/3 unit 0 family inet address 10.1.1.2/24
```

Quick configuration for Server-Facing Support:

```
set routing-instances untrust-vr instance-type virtual-router
set routing-instances untrust-vr interface ge-0/0/4.0
set interfaces ge-0/0/4 unit 0 family inet address 20.1.1.1/24
```

Quick configuration for DHCP Local Server Support:

```
set routing-instances trust-vr system services dhcp-local-server group GROUP-1 interface
  ge-0/0/15.0
set routing-instances trust-vr access address-assignment pool TRUST-VR-POOL family
  inet network 6.6.6.0/24
set routing-instances trust-vr access address-assignment pool TRUST-VR-POOL family
  inet dhcp-attributes router 6.6.6.1
set routing-instances trust-vr access address-assignment pool TRUST-VR-POOL family
  inet dhcp-attributes name-server 8.8.8.8
set routing-instances trust-vr access address-assignment pool TRUST-VR-POOL family
  inet range TRUST-VR-RANGE low 6.6.6.66
set routing-instances trust-vr access address-assignment pool TRUST-VR-POOL family
  inet range TRUST-VR-RANGE high 6.6.6.67
set routing-instances trust-vr forwarding-options dhcp-relay server-group server-1 30.1.1.2
set routing-instances trust-vr forwarding-options dhcp-relay active-server-group server-1
set routing-instances untrust-vr forwarding-options dhcp-relay server-group
  dummy-config
```

```

set routing-instances trust-vr forwarding-options dhcp-relay group relay-in-vr interface
ge-0/0/3.0
set routing-instances trust-vr routing-options interface-routes rib-group inet untrust-trust
set routing-instances trust-vr routing-options static route 30.1.1.2/32 next-hop 20.1.1.2
set routing-instances trust-vr routing-options instance-import export_dhcp_server_route
set routing-instances untrust-vr routing-options interface-routes rib-group inet
untrust-trust
set routing-instances untrust-vr routing-options instance-import
import_relay_route_to_server_vr
set policy-options policy-statement export_dhcp_server_route term 1 from instance
untrust-vr
set policy-options policy-statement export_dhcp_server_route term 1 from route-filter
30.1.1.0/24 exact
set policy-options policy-statement export_dhcp_server_route term 1 then accept
set policy-options policy-statement export_dhcp_server_route term 2 then reject
set policy-options policy-statement import_relay_route_to_server_vr term 1 from instance
trust-vr
set policy-options policy-statement import_relay_route_to_server_vr term 1 from route-filter
10.1.1.0/24 exact
set policy-options policy-statement import_relay_route_to_server_vr term 1 then accept
set policy-options policy-statement import_relay_route_to_server_vr term 2 then reject
set routing-options static route 30.1.1.2/32 next-table untrust-vr.inet.0
set routing-options rib-groups untrust-trust import-rib untrust-vr.inet.0
set routing-options rib-groups untrust-trust import-rib trust-vr.inet.0

```

Quick configuration for Security Zone to Allow the DHCP Protocol:

```

set security policies default-policy permit-all
set security zones security-zone untrust interfaces ge-0/0/4.0 host-inbound-traffic
system-services all
set security zones security-zone untrust interfaces ge-0/0/4.0 host-inbound-traffic
protocols all
set security zones security-zone trust interfaces ge-0/0/3.0 host-inbound-traffic
system-services all
set security zones security-zone trust interfaces ge-0/0/3.0 host-inbound-traffic protocols
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 *CLI User Guide*.

To configure support on the client-facing side of the DHCP relay agent:

1. Set a routing instance type as virtual router.

```

[edit]
user@host# set routing-instances trust-vr instance-type virtual-router

```

2. Set an interface to the virtual router

```

[edit]
user@host# set routing-instances trust-vr interface ge-0/0/3.0

```

3. Set the IP address to the interface.

```
[edit]
user@host# set interfaces ge-0/0/3 unit 0 family inet address 10.1.1.2/24
```

Step-by-Step Procedure

To configure support on the server-facing side of the DHCP relay agent:

1. Set a virtual router.

```
[edit]
user@host# set routing-instances untrust-vr instance-type virtual-router
```

2. Set an interface to the virtual router.

```
[edit]
user@host# set routing-instances untrust-vr interface ge-0/0/4.0
```

3. Set the IP address to the interface.

```
[edit]
user@host# set interfaces ge-0/0/4 unit 0 family inet address 20.1.1.1/24
```

Step-by-Step Procedure

To configure the DHCP local server to support:

1. Set the DHCP local server configuration

```
[edit ]
user@host# set routing-instances trust-vr system services dhcp-local-server group
GROUP-1 interface ge-0/0/15.0
```

2. Set an IPv4 address-assignment pool in a routing instance.

```
[edit ]
user@host# set routing-instances trust-vr access address-assignment pool
TRUST-VR-POOL family inet network 6.6.6.0/24
user@host# set routing-instances trust-vr access address-assignment pool
TRUST-VR-POOL family inet dhcp-attributes router 6.6.6.1
user@host#set routing-instances trust-vr access address-assignment pool
TRUST-VR-POOL family inet dhcp-attributes name-server 8.8.8.8
user@host#set routing-instances trust-vr access address-assignment pool
TRUST-VR-POOL family inet range TRUST-VR-RANGE low 6.6.6.66
user@host#set routing-instances trust-vr access address-assignment pool
TRUST-VR-POOL family inet range TRUST-VR-RANGE high 6.6.6.67
```

3. Set the server group by specifying the name of the group and DHCP server addresses for the use by the extended DHCP relay agent.

```
[edit ]
user@host# set routing-instances trust-vr forwarding-options dhcp-relay
server-group server-1 30.1.1.2
```

4. Set an active server group to apply a common DHCP relay agent configuration to a named group of DHCP server addresses.

```
[edit ]
user@host# set routing-instances trust-vr forwarding-options dhcp-relay
active-server-group server-1
```

5. Set a dummy dhcp-relay in DHCP server routing instance.

```
[edit ]
user@host# set routing-instances untrust-vr forwarding-options dhcp-relay
server-group dummy-config
user@host# set routing-instances trust-vr forwarding-options dhcp-relay group
relay-in-vr interface ge-0/0/3.0
```

6. Set the configuration in dhcp-relay routing instance.

```
[edit ]
user@host# set routing-instances trust-vr routing-options interface-routes rib-group
inet untrust-trust
user@host# set routing-instances trust-vr routing-options static route 30.1.1.2/32
next-hop 20.1.1.2
user@host# set routing-instances trust-vr routing-options instance-import
export_dhcp_server_route
user@host# set routing-instances untrust-vr routing-options interface-routes
rib-group inet untrust-trust
user@host# set routing-instances untrust-vr routing-options instance-import
import_relay_route_to_server_vr
```

7. Set the configuration to share routes between routing instances.

```
[edit ]
user@host# set policy-options policy-statement export_dhcp_server_route term 1
from instance untrust-vr
user@host# set policy-options policy-statement export_dhcp_server_route term 1
from route-filter 30.1.1.0/24 exact
user@host# set policy-options policy-statement export_dhcp_server_route term 1
then accept
user@host# set policy-options policy-statement export_dhcp_server_route term 2
then reject
user@host# set policy-options policy-statement import_relay_route_to_server_vr
term 1 from instance trust-vr
user@host# set policy-options policy-statement import_relay_route_to_server_vr
term 1 from route-filter 10.1.1.0/24 exact
user@host# set policy-options policy-statement import_relay_route_to_server_vr
term 1 then accept
```



```

user@host# set policy-options policy-statement import_relay_route_to_server_vr
term 2 then reject
user@host# set routing-options static route 30.1.1.2/32 next-table untrust-vr.inet.0
user@host# set routing-options rib-groups untrust-trust import-rib untrust-vr.inet.0

```



NOTE: You can enable an SRX Series device to function as a DHCP local server. The DHCP local server provides an IP address and other configuration information in response to a client request.

Step-by-Step Procedure

To configure the security zone to allow the DHCP Protocol:

1. Set the default security policy to permit all traffic.

```

[edit ]
user@host# set security policies default-policy permit-all

```

2. Set all system services and protocols on interface ge-0/0/4.0.

```

[edit ]
user@host# set security zones security-zone untrust interfaces ge-0/0/4.0
host-inbound-traffic system-services all
user@host# set security zones security-zone untrust interfaces ge-0/0/4.0
host-inbound-traffic protocols all

```

3. Set all system services and protocols on interface ge-0/0/3.0.

```

[edit ]
user@host# set security zones security-zone trust interfaces ge-0/0/3.0
host-inbound-traffic system-services all
user@host# set security zones security-zone trust interfaces ge-0/0/3.0
host-inbound-traffic protocols all

```

Results

- Result for Client-facing Support:

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

```

[edit]
user@host# show routing-instances
trust-vr {
instance-type virtual-router;

```

```
interface ge-0/0/3.0;
}
```

- Result for Server-Facing Support:

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

```
[edit]
user@host# show routing-instances
untrust-vr {
  instance-type virtual-router;
  interface ge-0/0/4.0;
}
```

- Result for DHCP Local Server Support:

From configuration mode, confirm your configuration by entering the **show routing-instances**, **show policy-options** and **show routing-options** commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show routing-instances
trust-vr {
  instance-type virtual-router;
  system {
    services {
      dhcp-local-server {
        group GROUP-1 {
          interface ge-0/0/15.0;
        }
      }
    }
  }
}
access {
  address-assignment {
    pool TRUST-VR-POOL {
      family inet {
        network 6.6.6.0/24;
        range TRUST-VR-RANGE {
          low 6.6.6.66;
          high 6.6.6.67;
        }
        dhcp-attributes {
          name-server {
            8.8.8.8;
          }
          router {
            6.6.6.1;
          }
        }
      }
    }
  }
}
```

```

    }
  }
}
interface ge-0/0/3.0;
routing-options {
  interface-routes {
    rib-group inet untrust-trust;
  }
  static {
    route 30.1.1.2/32 next-hop 20.1.1.2;
  }
  instance-import export_dhcp_server_route;
}
forwarding-options {
  dhcp-relay {
    server-group {
      server-1 {
        30.1.1.2;
      }
    }
    active-server-group server-1;
    group relay-in-vr {
      interface ge-0/0/3.0;
    }
  }
}
}
untrust-vr {
  instance-type virtual-router;
  interface ge-0/0/4.0;
  routing-options {
    interface-routes {
      rib-group inet untrust-trust;
    }
    instance-import import_relay_route_to_server_vr;
  }
  forwarding-options {
    dhcp-relay {
      server-group {
        dummy-config;
      }
    }
  }
}
}
[edit]
user@host# show policy-options
policy-statement export_dhcp_server_route {
  term 1 {
    from {
      instance untrust-vr;
      route-filter 30.1.1.0/24 exact;
    }
    then accept;
  }
}

```

```

term 2 {
    then reject;
}
}
policy-statement import_relay_route_to_server_vr {
    term 1 {
        from {
            instance trust-vr;
            route-filter 10.1.1.0/24 exact;
        }
        then accept;
    }
    term 2 {
        then reject;
    }
}
}
[edit]
user@host# show routing-options
static {
    route 30.1.1.2/32 next-table untrust-vr.inet.0;
}
rib-groups {
    untrust-trust {
        import-rib [ untrust-vr.inet.0 trust-vr.inet.0 ];
    }
}
}

```

- Result for Security Zone to Allow the DHCP Protocol:

From configuration mode, confirm your configuration by entering the **show security policies** and **show security zones** commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```

[edit]
user@host# show security policies
default-policy {
    permit-all;
}
}
[edit]
user@host# show security zones
security-zone HOST {
    interfaces {
        all;
    }
}
security-zone untrust {
    interfaces {
        ge-0/0/4.0 {
            host-inbound-traffic {
                system-services {
                    all;
                }
            }
        }
    }
    protocols {
        all;
    }
}
}

```

```

    }
  }
}
security-zone trust {
  interfaces {
    ge-0/0/3.0 {
      host-inbound-traffic {
        system-services {
          all;
        }
        protocols {
          all;
        }
      }
    }
  }
}
}

```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

Verifying the DHCP Relay Statistics Configuration:

Purpose Verify that the DHCP Relay Statistics has been configured.

Action

- From operational mode, enter the **show dhcp relay statistics routing-instance dhcp-relay** command.

```

Packets dropped:
Total 0

Messages received:
BOOTREQUEST 1
DHCPDECLINE 0
DHCPDISCOVER 0
DHCPINFORM 0
DHCPRELEASE 0
DHCPREQUEST 1

Messages sent:
BOOTREPLY 1
DHCPOFFER 0
DHCPACK 1
DHCPNAK 0
DHCPFORCERENEW 0

```

Verifying DHCP client bindings in the routing instance.

Purpose Verify that the DHCP client bindings in the routing instances has been configured.

Action

- From operational mode, enter the **show dhcp relay binding routing-instance dhcp-relay** command.

IP address	Session Id	Hardware address	Expires	State	Interface
10.10.10.2	14	00:0c:29:e9:6d:00	86381	BOUND	ge-0/0/1.0

Example: Configuring the Device as a BOOTP or DHCP Relay Agent

This example shows how to configure the device as a BOOTP or DHCP relay agent.

- [Requirements on page 802](#)
- [Overview on page 802](#)
- [Configuration on page 803](#)
- [Verification on page 805](#)

Requirements

No special configuration beyond device initialization is required before configuring this feature.

Overview

In this example, you enable the DHCP relay agent to relay BOOTP or DHCP messages to a BOOTP server. You specify the IP time-to-live value to be set in responses to the client as 20. The range is from 1 through 255. You then set the maximum number of hops allowed per packet to 10. The range is from 1 through 16.

Then you specify the minimum number of seconds before requests are forwarded as 300. The range is from 0 through 30,000 seconds.

You then specify the IP time-to-live value to be set in responses to the client as 30. The range is from 1 through 255. You set the description of the server as text and the DHCP option as 82. You set the maximum number of hops allowed per packet to 16 and specify the minimum number of seconds as 400 before requests are forwarded.



WARNING: Starting with Junos OS Release 15.1X49-D60 and Junos OS Release 17.3R1, the legacy DHCPD (DHCP daemon) configuration on all SRX Series devices is being deprecated and only the new JDHCP CLI is supported. When you upgrade to Junos OS Release 15.1X49-D60 and later releases on a device that already has the DHCPD configuration, the following warning messages are displayed:

WARNING: The DHCP configuration command used will be deprecated in future Junos releases.

WARNING: Please see documentation for updated commands.

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 helpers bootp client-response-ttl 20
set forwarding-options helpers bootp maximum-hop-count 10
set forwarding-options helpers bootp minimum-wait-time 300
set forwarding-options helpers bootp description text
set forwarding-options helpers bootp interface ge-0/0/0 client-response-ttl 30
set forwarding-options helpers bootp interface ge-0/0/0 description text
set forwarding-options helpers bootp interface ge-0/0/0 dhcp-option82
set forwarding-options helpers bootp interface ge-0/0/0 maximum-hop-count 16
set forwarding-options helpers bootp interface ge-0/0/0 minimum-wait-time 400
```

GUI Step-by-Step Procedure

To configure the device as a BOOTP/DHCP relay agent:

1. In the Client response TTL box, type **20**.
2. In the Maximum hop count box, type **10**.
3. In the Minimum wait time box, type **300**.
4. In the Description box, type the description of the server.
5. In the Client response TTL box, type **30**.
6. In the Description box, type the description of the server.
7. Select the **Dhcp option 82** check box.
8. In the Maximum hop count box, type **16**.
9. In the Minimum wait time box, type **400**.
10. Click **OK** until you return to the Configuration page.

11. Click **OK** to check your configuration and save it as a candidate configuration.
12. If you are done configuring the device, click **Commit Options>Commit**.

**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 *CLI User Guide*.

To configure the device as a BOOTP or DHCP relay agent:

1. Specify the IP time-to-live value in BOOTP response messages sent to a BOOTP client.

```
[edit forwarding-options helpers bootp]  
user@host# set client-response-ttl 20
```

2. Specify the maximum number of hops allowed per packet.

```
[edit forwarding-options helpers bootp]  
user@host# set maximum-hop-count 10
```

3. Specify the minimum wait time in seconds.

```
[edit forwarding-options helpers bootp]  
user@host# set minimum-wait-time 300
```

4. Specify the description of the server.

```
[edit forwarding-options helpers bootp]  
user@host# set description text
```

5. Define the incoming BootP request forwarding interface.

```
[edit forwarding-options helpers bootp]  
user@host# set interface ge-0/0/0
```

6. Define the IP time-to-live value.

```
[edit forwarding-options helpers bootp interface ge-0/0/0]  
user@host# set client-response-ttl 30
```

7. Specify the description of the server.

```
[edit forwarding-options helpers bootp interface ge-0/0/0]  
user@host# set description text
```


8. Set the DHCP option 82.

```
[edit forwarding-options helpers bootp interface ge-0/0/0]
user@host# set dhcp-option82
```

9. Specify the maximum number of hops allowed per packet.

```
[edit forwarding-options helpers bootp interface ge-0/0/0]
user@host# set forwarding-options helpers bootp interface ge-0/0/0
maximum-hop-count 16
```

10. Specify the minimum wait time.

```
[edit forwarding-options helpers bootp interface ge-0/0/0]
user@host# set minimum-wait-time 400
```

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
helpers {
  bootp {
    description text;
    maximum-hop-count 10;
    minimum-wait-time 300;
    client-response-ttl 20;
    interface {
      ge-0/0/0 {
        description text;
        maximum-hop-count 16;
        minimum-wait-time 400;
        client-response-ttl 30;
        dhcp-option82;
      }
    }
  }
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

Verifying DHCP Relay Statistics

Purpose Verify that the DHCP Relay statistics have been configured.

Action From operational mode, enter the **show system services dhcp relay-statistics** command.

```
user@host> show system services dhcp relay-statistics
```

```
Received Packets:    4 Forwarded Packets          4 Dropped Packets
      4      Due to missing interface in relay database: 4      Due to missing
matching routing instance: 0      Due to an error during packet read: 0      Due
to an error during packet send: 0      Due to invalid server address: 0      Due
to missing valid local address: 0      Due to missing route to server/client: 0
```

Release History Table

Release	Description
15.1X49-D60	Starting with Junos OS Release 15.1X49-D60 and Junos OS Release 17.3R1, the legacy DHCPD (DHCP daemon) configuration on all SRX Series devices is being deprecated and only the new JDHCP CLI is supported.

Related Documentation

- [DHCP Server, Client, and Relay Agent Overview on page 742](#)
- [Understanding DHCP Relay Agent Operation on page 789](#)
- [DHCP Settings and Restrictions Overview on page 743](#)

DHCPv6 Server Overview

A Dynamic Host Configuration Protocol version 6 (DHCPv6) server can automatically allocate IP addresses to IPv6 clients and deliver configuration settings to client hosts on a subnet or to the requesting devices that need an IPv6 prefix. A DHCPv6 server allows network administrators to manage pool of IP addresses centrally among hosts and to automate the assignment of IP addresses in a network.



NOTE: SRX Series devices do not support DHCP client authentication. In a DHCPv6 deployment, security policies control access through the device for any DHCP client that has received an address and other attributes from the DHCPv6 server.

Some features include:

- Configuration for a specific interface or a group of interfaces
- Stateless address autoconfiguration (SLAAC)
- Prefix delegation, including access-internal route installation
- DHCPv6 server groups

The DHCPv6 server configuration usually consists of DHCPv6 options for clients, an IPv6 prefix, an address pool that contains IPv6 address ranges and options, and a security

policy to allow DHCPv6 traffic. In a typical setup the provider Juniper Networks device is configured as an IPv6 prefix delegation server that assigns addresses to the customer edge device. The customer's edge router then provides addresses to internal devices.

To configure DHCPv6 local server on a device, you include the DHCPv6 statement at the **[edit system services dhcp-local-server]** hierarchy level. You then create an address assignment pool for DHCPv6 that is configured in the **[edit access address-assignment pool]** hierarchy level using the **family inet6** statement.

You can also include the **dhcpv6** statement at the **[edit routing-instances routing-instance-name system services dhcp-local-server]** hierarchy.



NOTE: Existing DHCPv4 configurations in the **[edit system services dhcp]** hierarchy are not affected when you upgrade to Junos OS Release 10.4 from an earlier version or enable DHCPv6 server.

Related Documentation

- [Example: Configuring DHCPv6 Server Options on page 808](#)
- [Example: Configuring an Address-Assignment Pool on page 812](#)
- [Configuring a Named Address Range and DHCPv6 Attributes for Dynamic Address Assignment on page 814](#)
- [Creating a Security Policy for DHCPv6 on page 807](#)

Creating a Security Policy for DHCPv6

For the DHCPv6 server to allow DHCPv6 requests, you must create a security policy to enable DHCPv6 traffic. In this example, the zone my-zone allows DHCPv6 traffic from the zone untrust, and the ge-0/0/3.0 interface is configured with the IPv6 address 2001:db8:3001::1.

To create a security zone policy to allow DHCPv6 on SRX1500, SRX5400, SRX5600, and SRX5800 devices:

1. Create the zone and add an interface to that zone.

```
[edit security zones]
user@host# edit security-zone my-zone interfaces ge-0/0/3.0
```

2. Configure host inbound traffic system services to allow DHCPv6.

```
[edit security zones security-zone my-zone interfaces ge-0/0/3.0]
user@host# set host-inbound-traffic system-services dhcpv6
```

3. If you are done configuring the device, enter **commit** from configuration mode.

- Related Documentation**
- [DHCPv6 Server Overview on page 806](#)
 - [Example: Configuring DHCPv6 Server Options on page 808](#)
 - [Example: Configuring an Address-Assignment Pool on page 812](#)

Example: Configuring DHCPv6 Server Options

This example shows how to configure DHCPv6 server options on SRX1500, SRX5400, SRX5600, and SRX5800 devices.

- [Requirements on page 808](#)
- [Overview on page 808](#)
- [Configuration on page 808](#)
- [Verification on page 810](#)

Requirements

Before you begin:

- Determine the IPv6 address pool range.
- Determine the IPv6 prefix. See the *Understanding Address Books*.
- Determine the grace period, maximum lease time, or any custom options that should be applied to clients.
- List the IP addresses that are available for the devices on your network; for example, DNS and SIP servers.

Overview

In this example, you set a default client limit as 100 for all DHCPv6 groups. You then create a group called my-group that contains at least one interface. In this case, the interface is ge-0/0/3.0. You set a range of interfaces using the upto command and set a custom client limit as 200 for group my-group that overrides the default limit. Finally, you configure interface ge-0/0/3.0 with IPv6 address 2001:db8:3001::1/64 and set router advertisement for interface ge-0/0/3.0. Starting with Junos OS Release 15.X49-D70 and Junos OS Release 17.3R1, you can add the option **dynamic-server** to dynamically support prefix and attributes that are updated by the WAN server.



NOTE: A DHCPv6 group must contain at least one 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.

```

set system services dhcp-local-server dhcpv6 overrides interface-client-limit 100
set system services dhcp-local-server dhcpv6 group my-group interface ge-0/0/3.0
set system services dhcp-local-server dhcpv6 group my-group interface ge-0/0/3.0 upto
ge-0/0/6.0
set system services dhcp-local-server dhcpv6 group my-group overrides
interface-client-limit 200
set interfaces ge-0/0/3 unit 0 family inet6 address 2001:db8:3000::1/64
set protocols router-advertisement interface ge-0/0/3.0 prefix 2001:db8:3000::/64

```

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 *CLI User Guide*.

To configure DHCPv6 server options:

1. Configure a DHCP local server.

```

[edit]
user@host# edit system services dhcp-local-server dhcpv6

```

2. Set a default limit for all DHCPv6 groups.

```

[edit system services dhcp-local-server dhcpv6]
user@host# set overrides interface-client-limit 100

```

3. Specify a group name and interface.

```

[edit system services dhcp-local-server dhcpv6]
user@host# set group my-group interface ge-0/0/3.0

```

4. Set a range of interfaces.

```

[edit system services dhcp-local-server dhcpv6]
user@host# set group my-group interface ge-0/0/3.0 upto ge-0/0/6.0

```

5. Set a custom client limit for the group.

```

[edit system services dhcp-local-server dhcpv6]
user@host# set group my-group overrides interface-client-limit 200

```

6. Configure an interface with an IPv6 address.

```

[edit interfaces]
user@host# set ge-0/0/3 unit 0 family inet6 address 2001:db8:3000::1/64

```

7. Set router advertisement for the interface.

```
[edit protocols]
user@host# set router-advertisement interface ge-0/0/3.0 prefix
2001:db8:3000::/64
```

Results From configuration mode, confirm your configuration by entering the **show system services dhcp-local-server**, **show interfaces ge-0/0/3**, and **show protocols** commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show system services dhcp-local-server
dhcpv6 {
  overrides {
    interface-client-limit 100;
  }
  group my-group {
    overrides {
      interface-client-limit 200;
    }
    interface ge-0/0/3.0 {
      upto ge-0/0/6.0;
    }
  }
}

[edit]
user@host# show interfaces ge-0/0/3
unit 0 {
  family inet6 {
    address 2001:db8:3000::1/64;
  }
}

[edit]
user@host# show protocols
router-advertisement {
  interface ge-0/0/3.0 {
    prefix 2001:db8:3000::1/64;
  }
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

Verifying DHCPv6 Local Server Configuration

Purpose Verify that the client address bindings and statistics for the DHCPv6 local server have been configured

Action From operational mode, enter the **show dhcpv6 server binding** command to display the address bindings in the client table on the DHCPv6 local server.

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:bd8:1111:2222::/64 6	LL_TIME0x1-0x2e159c0-00:10:94:00:00:01	86321	BOUND	ge-1/0/0.0	
2001:bd8:1111:2222::/64 7	LL_TIME0x1-0x2e159c0-00:10:94:00:00:02	86321	BOUND	ge-1/0/0.0	
2001:bd8:1111:2222::/64 8	LL_TIME0x1-0x2e159c0-00:10:94:00:00:03	86321	BOUND	ge-1/0/0.0	
2001:bd8:1111:2222::/64 9	LL_TIME0x1-0x2e159c1-00:10:94:00:00:04	86321	BOUND	ge-1/0/0.0	
2001:bd8:1111:2222::/64 10	LL_TIME0x1-0x2e159c1-00:10:94:00:00:05	86321	BOUND	ge-1/0/0.0	

From operational mode, enter the **show dhcpv6 server statistics** command to display the DHCPv6 local server statistics.

```
Dhcpv6 Packets dropped:
  Total                0

Messages received:
  DHCPV6_DECLINE        0
  DHCPV6_SOLICIT        9
  DHCPV6_INFORMATION_REQUEST 0
  DHCPV6_RELEASE        0
  DHCPV6_REQUEST        5
  DHCPV6_CONFIRM        0
  DHCPV6_RENEW          0
  DHCPV6_REBIND         0
  DHCPV6_RELAY_FORW     0

Messages sent:
  DHCPV6_ADVERTISE      9
  DHCPV6_REPLY          5
  DHCPV6_RECONFIGURE    0
  DHCPV6_RELAY_REPL     0
```

- **clear dhcpv6 server bindings all** command to clear all DHCPv6 local server bindings. You can clear all bindings or clear a specific interface, or routing instance.
- **clear dhcpv6 server statistics** command to clear all DHCPv6 local server statistics.

Release History Table

Release	Description
15.1X49-D70	Starting with Junos OS Release 15.X49-D70 and Junos OS Release 17.3R1, you can add the option dynamic-server to dynamically support prefix and attributes that are updated by the WAN server.

Related Documentation

- [DHCPv6 Server Overview on page 806](#)
- [Example: Configuring an Address-Assignment Pool on page 812](#)
- [Configuring a Named Address Range and DHCPv6 Attributes for Dynamic Address Assignment on page 814](#)
- [Creating a Security Policy for DHCPv6 on page 807](#)

Example: Configuring an Address-Assignment Pool

This example shows how to configure an address-assignment pool on SRX1500, SRX5400, SRX5600, and SRX5800 devices.

- [Requirements on page 812](#)
- [Overview on page 812](#)
- [Configuration on page 812](#)
- [Verification on page 814](#)

Requirements

Before you begin:

- Specify the name of the address-assignment pool and configure addresses for the pool.
- Set DHCPv6 attributes for the address-assignment pool.

Overview

In this example, you configure an address-pool called my-pool and specify the IPv6 family as inet6. You configure the IPv6 prefix as 2001:db8:3000:1::/64, the range name as range1, and the IPv6 range for DHCPv6 clients from a low of 2001:db8:3000:1::/64 to a high of 2001:db8:3000:200::/64. You can define the range based on the lower and upper boundaries of the prefixes in the range or based on the length of the prefixes in the range. Finally, you specify the DHCPv6 attribute for the DNS server as 2001:db8:3001::1, the grace period as 3600, and the maximum lease time as 120.

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 access address-assignment pool my-pool family inet6 prefix 2001:db8:3000:1::/64
set access address-assignment pool my-pool family inet6 range range1 low
  2001:db8:3000:1::/64 high 2001:db8:3000:200::/64
set access address-assignment pool my-pool family inet6 dhcp-attributes dns-server
  2001:db8:3001::1
set access address-assignment pool my-pool family inet6 dhcp-attributes grace-period
  3600
set access address-assignment pool my-pool family inet6 dhcp-attributes
  maximum-lease-time 120

```

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 *CLI User Guide*.

To configure an IPv6 address-assignment pool:

1. Configure an address-pool and specify the IPv6 family.

```

[edit access]
user@host# edit address-assignment pool my-pool family inet6

```

2. Configure the IPv6 prefix, the range name, and IPv6 range for DHCPv6 clients.

```

[edit access address-assignment pool my-pool family inet6]
user@host# set prefix 2001:db8:3000:1::/64
user@host# set range range1 low 2001:db8:3000:1::/64 high
  2001:db8:3000:200::/64

```

3. Configure the DHCPv6 attribute for the DNS server for the address pool.

```

[edit access address-assignment pool my-pool family inet6]
user@host# set dhcp-attributes dns-server 2001:db8:3001::1

```

4. Configure the DHCPv6 attribute for the grace period.

```

[edit access address-assignment pool my-pool family inet6]
user@host# set dhcp-attributes grace-period 3600

```

5. Configure the DHCPv6 attribute for the maximum lease time.

```

[edit access address-assignment pool my-pool family inet6]
user@host# set dhcp-attributes maximum-lease-time 120

```

Results From configuration mode, confirm your configuration by entering the **show access address-assignment** command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show access address-assignment
pool my-pool {
  family inet6 {
    prefix 2001:db8:3000:1::/64;
    range range1 {
      low 2001:db8:3000:1::/64 ;
      high 2001:db8:3000:200::/64;
    }
    dhcp-attributes {
      maximum-lease-time 120;
      grace-period 3600;
      dns-server {
        2001:db8:3001::1;
      }
    }
  }
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

Verifying Configuration

Purpose Verify that the address-assignment pool has been configured.

Action From operational mode, enter the **show access address-assignment** command.

Related Documentation

- [DHCPv6 Server Overview on page 806](#)
- [Example: Configuring DHCPv6 Server Options on page 808](#)
- [Configuring a Named Address Range and DHCPv6 Attributes for Dynamic Address Assignment on page 814](#)
- [Creating a Security Policy for DHCPv6 on page 807](#)

Configuring a Named Address Range and DHCPv6 Attributes for Dynamic Address Assignment

You can optionally configure multiple named ranges, or subsets of addresses, within an address-assignment pool. During dynamic address assignment, a client can be assigned an address from a specific named range. To create a named range, you specify a name for the range and define the address range and DHCPv6 attributes.



NOTE: Supported only on SRX1500, SRX5400, SRX5600, and SRX5800 devices.

To configure a named address range for dynamic address assignment:

1. Specify the name of the address-assignment pool and the IPv6 family.

```
[edit access]
user@host# edit address-assignment pool my-pool2 family inet6
```

2. Configure the IPv6 prefix and then define the range name and IPv6 range for DHCPv6 clients. You can define the range based on the lower and upper boundaries of the prefixes in the range, or based on the length of the prefixes in the range.

```
[edit access address-assignment pool my-pool2 family inet6]
user@host# set prefix 2001:db8:3000:5::/64
user@host# set range range2 low 2001:db8:3000:2::/64 high 2001:db8:3000:300::/64
```

3. Configure DHCPv6 attributes for the address pool.

```
[edit access address-assignment pool my-pool2 family inet6]
user@host# set dhcp-attributes dns-server 2001:db8:18:: grace-period 3600
maximum-lease-time 120
```

4. If you are done configuring the device, enter **commit** from configuration mode.

Related Documentation

- [Configuring Address-Assignment Pool Linking on page 815](#)

Configuring Address-Assignment Pool Linking

Address-assignment pool linking enables you to specify a secondary address pool for the device to use when the primary address-assignment pool is fully allocated. When the primary pool has no available addresses remaining, the device automatically switches over to the linked secondary pool and begins allocating addresses from that pool. The device uses a secondary pool only when the primary address-assignment pool is fully allocated.

You can create a chain of multiple linked pools. For example, you can link pool A to pool B, and link pool B to pool C. When pool A has no available addresses, the device switches to pool B for addresses. When pool B is exhausted, the device switches to pool C. There is no limit to the number of linked pools in a chain. However, you cannot create multiple links to or from the same pool—a pool can be linked to only one secondary pool, and a secondary pool can be linked from only one primary pool.

To link a primary address-assignment pool named `pool1` to a secondary pool named `pool2` on SRX1500, SRX5400, SRX5600, or SRX5800 devices:

```
[edit access address-assignment]
user@host# set pool pool1 link pool2
```

**Related
Documentation**

- [Configuring a Named Address Range for Dynamic Address Assignment on page 770](#)

Configuring DHCP Client-Specific Attributes

You use the address-assignment pool feature to include application-specific attributes when clients obtain an address. A client application, such as DHCPv6, uses the attributes to determine how addresses are assigned and to provide optional application-specific characteristics to the client. For example, the DHCPv6 application might specify that a client that matches certain prerequisite information is dynamically assigned an address from a particular named range. Based on which named range is used, DHCPv6 specifies additional DHCPv6 attributes such as the DNS server or the maximum lease time for clients.



NOTE: For SRX1500, SRX5400, SRX5600, and SRX5800 devices only.

You use the **dhcp-attributes** statement to configure DHCPv6 client-specific attributes for address-assignment pools at the **[edit access address-assignment pool *pool-name* family inet6]** hierarchy.

[Table 61 on page 816](#) describes the DHCPv6 client attributes for configuring IPv6 address-assignment pools.

Table 61: DHCPv6 Attributes

Attribute	Description	DHCPv6 Option
dns-server	IPv6 address of DNS server to which clients can send DNS queries	23
grace-period	Grace period offered with the lease	—
maximum-lease-time	Maximum lease time allowed by the DHCPv6 server	—
option	User-defined options	—
sip-server-address	IPv6 address of SIP outbound proxy server	22
sip-server-domain-name	Domain name of the SIP outbound proxy server	21

- Related Documentation**
- [Configuring a Named Address Range and DHCPv6 Attributes for Dynamic Address Assignment on page 814](#)

Configuring an Address-Assignment Pool for Router Advertisement

For SRX1500, SRX5400, SRX5600, and SRX5800 devices, you can create an address-assignment pool that is explicitly used for router advertisement address assignment. You populate the address-assignment pool using the standard procedure, but you additionally specify that the pool is used for router advertisement.

To configure an address-assignment pool that is used for router advertisement:

1. Create the IPv6 address-assignment pool.
2. Specify that the address-assignment pool is used for router advertisement.

```
[edit access address-assignment]
user@host# set neighbor-discovery-router-advertisement router1
```

3. If you are done configuring the device, enter **commit** from configuration mode.

- Related Documentation**
- [Configuring a Named Address Range and DHCPv6 Attributes for Dynamic Address Assignment on page 814](#)

Understanding DHCPv6 Client and Server Identification

Each DHCPv6 client and server is identified by a DHCP unique identifier (DUID). The DUID is unique across all DHCPv6 clients and servers, and it is stable for any specific client or server. DHCPv6 clients use DUIDs to identify a server in messages where a server needs to be identified. DHCPv6 servers use DUIDs to determine the configuration parameters to be used for clients and in the association of addresses with clients.



NOTE: This feature is supported on SRX300, SRX320, SRX340, SRX550M, and SRX1500 devices.

The DUID is a 2-octet type code represented in network byte order, followed by a variable number of octets that make up the actual identifier; for example, 00:02:00:01:02:03:04:05:07:a0. A DUID can be up to 128 octets in length (excluding the type code). The following types are currently defined for the DUID parameter:

- Type 1—Link Layer address plus time (duid-llt)
- Type 2—Vendor-assigned unique ID based on enterprise number (vendor)
- Type 3—Link Layer address (duid-ll)

The duid-llt DUID consists of a 2-octet type field that contains the value 1, a 2-octet hardware type code, 4 octets that signify a time value, followed by the Link Layer address of any one network interface that is connected to the DHCP device at the time that the DUID is generated.

The vendor DUID is assigned by the vendor to the device and contains the vendor's registered private enterprise number as maintained by the identity association for nontemporary addresses (IA_NA) assignment, followed by a unique identifier assigned by the vendor.

The duid-ll DUID contains a 2-octet type field that stores the value 3, and a 2-octet network hardware type code, followed by the Link Layer address of any one network interface that is permanently connected to the client or server device.

- Related Documentation**
- [DHCPv6 Client Overview on page 819](#)

DHCPv6 Client Overview

A Juniper Networks device can act as a Dynamic Host Configuration Protocol version 6 (DHCPv6) client, receiving its TCP/IP settings and the IPv6 address for any physical interface in any security zone from an external DHCPv6 server. When the device operates as a DHCPv6 client and a DHCPv6 server simultaneously, it can transfer the TCP/IP settings learned through its DHCPv6 client module to its default DHCPv6 server module. For the device to operate as a DHCPv6 client, you configure a logical interface on the device to obtain an IPv6 address from the DHCPv6 server in the network.

DHCPv6 client support for Juniper Networks devices includes the following features:

- Identity association for nontemporary addresses (IA_NA)
- Identity association for prefix delegation (IA_PD)
- Rapid commit
- TCP/IP propagation
- Auto-prefix delegation
- Autoconfig mode (stateful and stateless)

To configure the DHCPv6 client on the device, include the **dhcpv6-client** statement at the **[edit interfaces]** hierarchy level.



NOTE: To configure a DHCPv6 client in a routing instance, add the interface in a routing instance using the **[edit routing-instances]** hierarchy.



NOTE: On all SRX Series devices, DHCPv6 client authentication is not supported.



NOTE: On SRX300, SRX320, SRX340, SRX345, and SRX550M devices, DHCPv6 client does not support:

- Temporary addresses
- Reconfigure messages
- Multiple identity association for nontemporary addresses (IA_NA)
- Multiple prefixes in a single identity association for prefix delegation (IA_PD)
- Multiple prefixes in a single router advertisement

Related Documentation

- [Minimum DHCPv6 Client Configuration on page 820](#)

Minimum DHCPv6 Client Configuration

This topic describes the minimum configuration you must use to configure an SRX300, SRX320, SRX340, SRX345, SRX550M, or SRX1500 device as a DHCPv6 client.

To configure the device as a DHCPv6 client:

1. Specify the DHCPv6 client interface.

```
[edit]
user@host# set interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client
```

2. Configure the DHCPv6 client type. The client type can be **autoconfig** or **statefull**.

- To enable DHCPv6 auto configuration mode, configure the client type as **autoconfig**.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-type autoconfig
```

- For stateful address assignment, configure the client type as **statefull**.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-type statefull
```

3. Specify the identity association type.

- To configure identity association for nontemporary address (IA_NA) assignment, specify the **client-ia type** as **ia-na**.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-ia-type ia-na
```

- To configure identity association for prefix delegation (IA_PD), specify the **client-ia-type** as **ia-pd**.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-ia-type ia-pd
```

4. Configure the DHCPv6 client identifier by specifying the DHCP unique identifier (DUID) type. The following DUID types are supported:

- Link Layer address (duid-ll)
- Link Layer address plus time (duid-llt)
- Vendor-assigned unique ID based on enterprise number (vendor)

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-identifier duid-type duid-ll
```




NOTE: To configure a DHCPv6 client in a routing instance, add the interface to a routing instance using the [edit routing-instances] hierarchy.

Related Documentation

- [DHCPv6 Client Overview on page 819](#)

Configuring Optional DHCPv6 Client Attributes

To enable a device to operate as a DHCPv6 client, you configure a logical interface on the device to obtain an IPv6 address from the DHCPv6 local server in the network. You can then specify the retransmission attempts, client requested configuration options, interface used to delegate prefixes, rapid commit, and update server options.

To configure optional DHCPv6 client attributes:

1. Specify one of the following DHCPv6 client requested configuration options:

- dns-server
- domain
- ntp-server
- sip-domain
- sip-server

For example, to specify the DHCPv6 client requested option as **dns-server**:

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set req-option dns-server
```

2. Set the number of attempts allowed to retransmit a DHCPv6 client protocol packet.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set retransmission-attempt 6
```

3. Configure the **update-server** option on the DHCPv6 client.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set update-server
```

4. Specify the interface used to delegate prefixes.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set update-router-advertisement interface ge-0/0/0
```

5. Configure the two-message (rapid commit) exchange option for address assignment.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set rapid-commit
```



NOTE: To configure a DHCPv6 client in a routing instance, add the interface to a routing instance using the [edit routing-instances] hierarchy.



NOTE: On all SRX Series devices, DHCPv6 client authentication is not supported.



NOTE: On SRX300, SRX320, SRX340, and SRX345, and SRX550M devices, DHCPv6 client does not support:

- Temporary addresses
- Reconfigure messages
- Multiple identity association for nontemporary addresses (IA_NA)
- Multiple prefixes in a single identity association for prefix delegation (IA_PD)
- Multiple prefixes in a single router advertisement

**Related
Documentation**

- [Minimum DHCPv6 Client Configuration on page 820](#)

Configuring Nontemporary Address Assignment

Nontemporary address assignment is also known as stateful address assignment. In the stateful address assignment mode, the DHCPv6 client requests global addresses from the DHCPv6 server. Based on the DHCPv6 server's response, the DHCPv6 client assigns the global addresses to interfaces and sets a lease time for all valid responses. When the lease time expires, the DHCPv6 client renews the lease from the DHCPv6 server.



NOTE: This feature is supported on SRX300, SRX320, SRX340, SRX550M, and SRX1500 devices.

To configure nontemporary (stateful) address assignment:

1. Specify the DHCPv6 client interface.

```
[edit]
user@host# set interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client
```

2. Configure the client type as **statefull**.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-type statefull
```

3. Specify the IA_NA assignment.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-ia-type ia-na
```

Related Documentation

- [Minimum DHCPv6 Client Configuration on page 820](#)

Configuring Identity Associations for Nontemporary Addresses and Prefix Delegation

The DHCPv6 client requests IPv6 addresses and prefixes from the DHCPv6 server. Based on the DHCPv6 server's response, the DHCPv6 client assigns the IPv6 addresses to interfaces and sets a lease time for all valid responses. When the lease time expires, the DHCPv6 client renews the lease from the DHCPv6 server.

To configure identity association for nontemporary addresses (IA_NA) and identity association for prefix delegation (IA_PD) on SRX300, SRX320, SRX340, SRX550M, and SRX1500 devices:

1. Specify the DHCPv6 client interface.

```
[edit]
user@host# set interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client
```

2. Configure the client type as **statefull**.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-type statefull
```

3. Specify the IA_NA.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-ia-type ia-na
```

4. Specify the IA_PD.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-ia-type ia-pd
```

Related Documentation

- [Minimum DHCPv6 Client Configuration on page 820](#)

Configuring Auto-Prefix Delegation

You can use DHCPv6 client prefix delegation to automate the delegation of IPv6 prefixes to the customer premises equipment (CPE). With prefix delegation, a delegating router delegates IPv6 prefixes to a requesting router. The requesting router then uses the prefixes to assign global IPv6 addresses to the devices on the subscriber LAN. The requesting router can also assign subnet addresses to subnets on the LAN.

To configure auto-prefix delegation for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices:

1. Configure the DHCPv6 client type as **statefull**.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-type statefull
```

2. Specify the identity association type as **ia-na** for nontemporary addresses.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-ia-type ia-na
```

3. Specify the identity association type as **ia-pd** for prefix delegation.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-ia-type ia-pd
```

4. Configure the DHCPv6 client identifier by specifying the DUID type.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-identifier duid-type duid-ll
```

5. Specify the interface used to delegate prefixes.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set update-router-advertisement interface ge-0/0/0
```

Related Documentation

- [Minimum DHCPv6 Client Configuration on page 820](#)
- [Configuring Optional DHCPv6 Client Attributes on page 821](#)

Configuring the DHCPv6 Client Rapid Commit Option

The DHCPv6 client can obtain configuration parameters from a DHCPv6 server through a rapid two-message exchange (solicit and reply). When the rapid commit option is enabled by both the DHCPv6 client and the DHCPv6 server, the two-message exchange is used, rather than the default four-method exchange (solicit, advertise, request, and reply). The two-message exchange provides faster client configuration and is beneficial in environments in which networks are under a heavy load.

To configure the DHCPv6 client to support the DHCPv6 rapid commit option on SRX300, SRX320, SRX340, SRX550M, and SRX1500 devices:

1. Specify the DHCPv6 client interface.

```
[edit]
user@host# set interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client
```

2. Configure the two-message exchange option for address assignment.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set rapid-commit
```

Related Documentation

- [DHCPv6 Client Overview on page 819](#)

Configuring a DHCPv6 Client in Autoconfig Mode

A DHCPv6 client configured in autoconfig mode acts as a stateful client, a stateless client (DHCPv6 server is required for TCP/IP configuration), and stateless–no DHCP client, based on the managed (M) and other configuration (O) bits in the received router advertisement messages.

If the managed bit is 1 and the other configuration bit is 0, the DHCPv6 client acts as a stateful client. In stateful mode, the client receives IPv6 addresses from the DHCPv6 server, based on the identity association for nontemporary addresses (IA_NA) assignment.

If the managed bit is 0 and the other configuration bit is 1, the DHCPv6 client acts as a stateless client. In stateless mode, the addresses are automatically configured, based on the prefixes in the router advertisement messages received from the router. The stateless client receives configuration parameters from the DHCPv6 server.

If the managed bit is 0 and the other configuration bit is also 0, the DHCPv6 client acts as a stateless–no DHCP client. In the stateless–no DHCP mode, the client receives IPv6 addresses from the router advertisement messages.

To configure DHCPv6 client in autoconfig mode on SRX300, SRX320, SRX340, SRX550M, and SRX1500 devices:

1. Configure the DHCPv6 client type as **autoconfig**.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-type autoconfig
```

2. Specify the identity association type as **ia-na** for nontemporary addresses.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set client-ia-type ia-na
```

3. Specify the interface on which to configure router advertisement.

```
[edit protocols router-advertisement]
user@host# set interface ge-0/0/0
```

**Related
Documentation**

- [Minimum DHCPv6 Client Configuration on page 820](#)
- [Configuring Optional DHCPv6 Client Attributes on page 821](#)

Configuring TCP/IP Propagation on a DHCPv6 Client

You can enable or disable the propagation of TCP/IP settings received on the device acting as a DHCPv6 client. The settings can be propagated to the server pool running on the device. This topic describes how to configure TCP/IP settings on a DHCPv6 client, where both the DHCPv6 client and DHCPv6 server are on the same device.



NOTE: This feature is supported on SRX300, SRX320, SRX340, SRX550M, and SRX1500 devices.

To configure TCP/IP setting propagation on a DHCPv6 client:

1. Configure the **update-server** option on the DHCPv6 client.

```
[edit interfaces ge-0/0/0 unit 0 family inet6 dhcpv6-client]
user@host# set update-server
```

2. Configure the address pool to specify the interface (where **update-server** is configured) from which TCP/IP settings can be propagated.

```
[edit access]
user@host# set address-assignment pool 2 family inet6 dhcp-attributes
propagate-settings ge-0/0/0
```

**Related
Documentation**

- [DHCPv6 Client Overview on page 819](#)
- [Minimum DHCPv6 Client Configuration on page 820](#)

Example: Configuring the Device as a DHCP Server in Chassis Cluster Mode

This example shows how to configure a DHCP server in chassis cluster mode.

- [Requirements on page 827](#)
- [Overview on page 827](#)
- [Configuration on page 828](#)
- [Verification on page 832](#)

Requirements

This example uses the following hardware and software components:

- Two SRX Series devices as DHCP servers
- One SRX Series device as DHCP client
- Junos OS Release 12.1X47-D10 or later for SRX Series Services Gateways

Before you begin:

- Determine the IP address pools and the lease durations to use for each subnet.
- Obtain the MAC addresses of the clients that require permanent IP addresses. Determine the IP addresses to use for these clients.
- List the IP addresses that are available for the servers and devices on your network; for example, DNS, NetBIOS servers, boot servers, and gateway devices.
- Determine the DHCP options required by the subnets and clients in your network.

Overview

In this example, you configure two SRX Series devices as DHCP servers and a third SRX Series device as a DHCP client. Configure the two DHCP servers in chassis cluster mode.

For the DHCP server, configure the SRX Series device as a DHCP local server with minimum DHCP local server configurations. You specify the server group as `g1` and enable the DHCP local server on interface `reth1`.

For the DHCP client, you specify the interface as `ge-0/0/1`, set the logical unit as `0`, and create a DHCP inet family. You then specify the DHCP client identifier as `00:0a:12:00:12:12` in hexadecimal. You use hexadecimal if the client identifier is a MAC address. You set the DHCP lease time as 86,400 seconds. The range is from 60 through 2,147,483,647 seconds.

You set the number of retransmission attempts to 6. The range is from 0 through 6, and the default is 4. You set the retransmission interval to 5 seconds. The range is from 4 through 64, and the default is 4 seconds. Finally, you set the IPv4 address of the preferred DHCP server to 10.1.1.1 and the vendor class ID to ether.



WARNING: Starting with Junos OS Release 15.1X49-D60 and Junos OS Release 17.3R1, the legacy DHCPD (DHCP daemon) configuration on all SRX Series devices has been deprecated and only the new DHCP CLI is supported. When you upgrade to Junos OS Release 15.1X49-D60 and later releases on a device that already has the DHCPD configuration, the following warning messages are displayed:

WARNING: The DHCP configuration command used will be deprecated in future Junos releases.

WARNING: Please see documentation for updated commands.

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.

Configure DHCP Server 1 and Server 2:

```
set system services dhcp-local-server group g1 interface reth1
set access address-assignment pool p1 family inet network 203.0.113.1/10
set access address-assignment pool p1 family inet range r1 low 203.0.113.5
set access address-assignment pool p1 family inet range r1 high 203.0.113.20
```

Configure chassis cluster on DHCP Server 1 and DHCP Server 2:

```
set chassis cluster reth-count 4
set chassis cluster control-link-recovery
set chassis cluster heartbeat-interval 2000
set chassis cluster redundancy-group 0 node 0 priority 200
set chassis cluster redundancy-group 0 node 1 priority 1
set interfaces ge-0/0/1 gigether-options redundant-parent reth1
set interfaces ge-6/0/1 gigether-options redundant-parent reth1
set interfaces reth1 redundant-ether-options redundancy-group 1
set interfaces reth1 unit 0 family inet address 10.1.1.1/24
```

Configure the DHCP client:

```
set interfaces ge-0/0/1 unit 0 family inet dhcp-client
set interfaces ge-0/0/1 unit 0 family inet dhcp-client client-identifier user-id ascii
  00:0a:12:00:12:12
set interfaces ge-0/0/1 unit 0 family inet dhcp-client lease-time 86400
set interfaces ge-0/0/1 unit 0 family inet dhcp-client retransmission-attempt 6
set interfaces ge-0/0/1 unit 0 family inet dhcp-client retransmission-interval 5
set interfaces ge-0/0/1 unit 0 family inet dhcp-client server-address 10.1.1.1
set interfaces ge-0/0/1 unit 0 family inet dhcp-client vendor-id ether
```


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 *CLI User Guide*.

To configure the devices as DHCP servers:

1. Configure the DHCP local server.

```
[edit system services]
user@host# set dhcp-local-server group g1 interface reth1
```

2. Configure an address pool.

```
[edit access]
user@host# set address-assignment pool p1 family inet network 203.0.113.1/10
user@host# set address-assignment pool p1 family inet range r1 low 203.0.113.5
user@host# set address-assignment pool p1 family inet range r1 high 203.0.113.20
```

Step-by-Step Procedure To configure the DHCP servers in chassis cluster mode:

1. Specify the number of redundant Ethernet interfaces for the chassis cluster.

```
{primary:node0}[edit]
user@host# set chassis cluster reth-count 4
```

2. Enable control link recovery.

```
{primary:node0}[edit]
user@host# set chassis cluster control-link-recovery
```

3. Configure heartbeat settings.

```
{primary:node0}[edit]
user@host# set chassis cluster heartbeat-interval 2000
```

4. Configure the redundancy groups.

```
{primary:node0}[edit]
user@host# set chassis cluster redundancy-group 0 node 0 priority 200
user@host# set chassis cluster redundancy-group 0 node 1 priority 1
```

5. Configure redundant Ethernet interfaces.

```
{primary:node0}[edit]
user@host# set interfaces ge-0/0/1 gigether-options redundant-parent reth1
user@host# set interfaces ge-6/0/1 gigether-options redundant-parent reth1
user@host# set interfaces reth1 redundant-ether-options redundancy-group 1
```

```
user@host# set interfaces reth1 unit 0 family inet address 10.1.1.1/24
```

**Step-by-Step
Procedure**

To configure the device as DHCP client:

1. Specify the DHCP client interface.

```
[edit]  
user@host# edit interfaces ge-0/0/1 unit 0 family inet dhcp-client
```

2. Configure the DHCP client identifier as a hexadecimal value.

```
[edit interfaces ge-0/0/1 unit 0 family inet dhcp-client]  
user@host# set client-identifier user-id ascii 00:0a:12:00:12:12
```

3. Set the DHCP lease time.

```
[edit interfaces ge-0/0/1 unit 0 family inet dhcp-client]  
user@host# set lease-time 86400
```

4. Set the number of attempts allowed to retransmit a DHCP packet.

```
[edit interfaces ge-0/0/1 unit 0 family inet dhcp-client]  
user@host# set retransmission-attempt 6
```

5. Set the interval (in seconds) allowed between retransmission attempts. The range is 4 through 64. The default is 4 seconds.

```
[edit interfaces ge-0/0/1 unit 0 family inet dhcp-client]  
user@host# set retransmission-interval 5
```

6. Set the IPv4 address of the preferred DHCP server.

```
[edit interfaces ge-0/0/1 unit 0 family inet dhcp-client]  
user@host# set server-address 10.1.1.1
```

7. Set the vendor class ID for the DHCP client.

```
[edit interfaces ge-0/0/1 unit 0 family inet dhcp-client]  
user@host# set vendor-id ether
```

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

```
[edit]
user@host# show system services
dhcp-local-server {
  group g1 {
    interface reth1.0;
  }
}
```

```
[edit]
user@host# show access address-assignment
pool p1 {
  family inet {
    network 203.0.113.1/10;
    range r1 {
      low 203.0.113.5;
      high 203.0.113.20;
    }
  }
}
```

```
[edit]
user@host# show chassis cluster
control-link-recovery;
reth-count 4;
heartbeat-interval 2000;
redundancy-group 0 {
  node 0 priority 200;
  node 1 priority 1;
}
```

```
[edit]
user@host# show interfaces reth1
redundant-ether-options {
  redundancy-group 1;
}
unit 0 {
  family inet {
    address 10.1.1.24;
  }
}
```

```
[edit]
user@host# show interfaces ge-0/0/1 unit 0 family inet
dhcp-client {
  client-identifier user-id ascii 00:0a:12:00:12:12;
  lease-time 86400;
  retransmission-attempt 6;
  retransmission-interval 5;
  server-address 10.1.1.1;
  vendor-id ether;
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Verifying the DHCP Server in Chassis Cluster Mode

Purpose Verify that the DHCP server is working in chassis cluster mode.

Action From operational mode, enter the `show dhcp server binding` and `show dhcp server statistics` commands.

```
user@host> show dhcp server binding
```

IP address	Session Id	Hardware address	Expires	State	Interface
10.1.1.1	1	64:87:88:79:a3:81	81855	BOUND	reth1

```
user@host> show dhcp server statistics
```

```
Packets dropped:
  Total                0
  dhcp-service total   0

Messages received:
  BOOTREQUEST          2
  DHCPDECLINE          0
  DHCPDISCOVER         1
  DHCPINFORM           0
  DHCPRELEASE          0
  DHCPREQUEST          1

Messages sent:
  BOOTREPLY            2
  DHCPOFFER            1
  DHCPACK              0
  DHCPNAK              0
  DHCPFORCERENEW       0
```

Meaning The sample output shows that DHCP servers configured in the example work in a chassis cluster.

Release History Table

Release	Description
15.1X49-D60	Starting with Junos OS Release 15.1X49-D60 and Junos OS Release 17.3R1, the legacy DHCPD (DHCP daemon) configuration on all SRX Series devices has been deprecated and only the new DHCP CLI is supported.

Related Documentation

- [Understanding DHCP Server Operation on page 766](#)

Example: Configuring the Device as a DHCP Client in Chassis Cluster Mode

This example shows how to configure the device as a DHCP client in chassis cluster mode.

- [Requirements on page 833](#)
- [Overview on page 833](#)
- [Configuration on page 834](#)
- [Verification on page 837](#)

Requirements

This example uses the following hardware and software components:

- Two SRX Series devices as DHCP client
- One SRX Series device as DHCP server
- Junos OS Release 12.1X47-D10 or later for SRX Series Services Gateways

Before you begin:

- Determine the IP address pools and the lease durations to use for each subnet.
- Obtain the MAC addresses of the clients that require permanent IP addresses. Determine the IP addresses to use for these clients.
- List the IP addresses that are available for the servers and devices on your network; for example, DNS, NetBIOS servers, boot servers, and gateway devices.
- Determine the DHCP options required by the subnets and clients in your network.

Overview

In this example, you configure two SRX Series devices as DHCP clients and a third SRX Series device as a DHCP server. Configure the two DHCP clients in chassis cluster mode.

For DHCP clients, you specify the interface as reth1, set the logical unit as 0, and create a DHCP inet family. You then specify the DHCP client identifier as 00:0a:12:00:12:12 in hexadecimal. You use hexadecimal if the client identifier is a MAC address. You set the options no-hostname if you do not want the DHCP client to send the hostname with the packets. You set the DHCP lease time as 86,400 seconds. The range is from 60 through 2,147,483,647 seconds. You set the number of retransmission attempts to 6. The range is from 0 through 6, and the default is 4. You set the retransmission interval to 5 seconds. The range is from 4 through 64, and the default is 4 seconds. Finally, you set the IPv4 address of the preferred DHCP server to 203.0.113.1 and the vendor class ID to ether.

For the DHCP server, configure the SRX Series device as a DHCP local server with minimum DHCP local server configurations. You specify the server group as g1 and enable the DHCP local server on interface ge-0/0/2.0.

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.

Configure DHCP Client 1 and Client 2:

```
set interfaces reth1 unit 0 family inet dhcp-client
set interfaces reth1 unit 0 family inet dhcp-client client-identifier user-id ascii
  00:0a:12:00:12:12
set interfaces reth1 unit 0 family inet dhcp-client options no-hostname
set interfaces reth1 unit 0 family inet dhcp-client lease-time 86400
set interfaces reth1 unit 0 family inet dhcp-client retransmission-attempt 6
set interfaces reth1 unit 0 family inet dhcp-client retransmission-interval 5
set interfaces reth1 unit 0 family inet dhcp-client server-address 203.0.113.1
set interfaces reth1 unit 0 family inet dhcp-client vendor-id ether
```

Configure chassis cluster on Client 1 and Client 2:

```
set chassis cluster reth-count 2
set chassis cluster control-link-recovery
set chassis cluster heartbeat-interval 1000
set chassis cluster redundancy-group 1 node 0 priority 100
set chassis cluster redundancy-group 1 node 1 priority 1
set chassis cluster redundancy-group 0 node 0 priority 100
set chassis cluster redundancy-group 0 node 1 priority 1
set interfaces ge-0/0/1 gigether-options redundant-parent reth1
set interfaces ge-4/0/1 gigether-options redundant-parent reth1
set interfaces reth1 redundant-ether-options redundancy-group 1
```

Configure the DHCP server:

```
set system service dhcp-local-server group g1 interface ge-0/0/2.0
set interfaces ge-0/0/2 unit 0 family inet address 203.0.113.1/24
set access address-assignment pool p1 family inet network 203.0.113.0/24
set access address-assignment pool p1 family inet range r1 low 203.0.113.5
set access address-assignment pool p1 family inet range r1 high 203.0.113.20
```

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 *CLI User Guide*.

To configure the devices as DHCP clients:

1. Specify the DHCP client interface.

```
[edit]
user@host# edit interfaces reth1 unit 0 family inet dhcp-client
```

2. Configure the DHCP client identifier as a hexadecimal value.

```
[edit interfaces reth1 unit 0 family inet dhcp-client]
user@host# set client-identifier user-id ascii 00:0a:12:00:12:12
```

3. Set the hostname if you do not want the DHCP client to send hostname in the packets (RFC option code 12).

```
[edit interfaces reth1 unit 0 family inet dhcp-client]
user@host# set options no-hostname
```

4. Set the DHCP lease time.

```
[edit interfaces reth1 unit 0 family inet dhcp-client]
user@host# set lease-time 86400
```

5. Set the number of attempts allowed to retransmit a DHCP packet.

```
[edit interfaces reth1 unit 0 family inet dhcp-client]
user@host# set retransmission-attempt 6
```

6. Set the interval (in seconds) allowed between retransmission attempts. The range is 4 through 64. The default is 4 seconds.

```
[edit interfaces reth1 unit 0 family inet dhcp-client]
user@host# set retransmission-interval 5
```

7. Set the IPv4 address of the preferred DHCP server.

```
[edit interfaces reth1 unit 0 family inet dhcp-client]
user@host# set server-address 203.0.113.1
```

8. Set the vendor class ID for the DHCP client.

```
[edit interfaces reth1 unit 0 family inet dhcp-client]
user@host# set vendor-id ether
```

Step-by-Step Procedure

To configure the DHCP clients in chassis cluster mode:

1. Specify the number of redundant Ethernet interfaces for the chassis cluster.

```
{primary:node0}[edit]
user@host# set chassis cluster reth-count 2
```

2. Enable control link recovery.

```
{primary:node0}[edit]
user@host# set chassis cluster control-link-recovery
```

3. Configure heartbeat settings.

```
{primary:node0}[edit]
user@host# set chassis cluster heartbeat-interval 1000
```

4. Configure the redundancy groups.

```
{primary:node0}[edit]
user@host# set chassis cluster redundancy-group 1 node 0 priority 100
user@host# set chassis cluster redundancy-group 1 node 1 priority 1
user@host# set chassis cluster redundancy-group 0 node 0 priority 100
user@host# set chassis cluster redundancy-group 0 node 1 priority 1
```

5. Configure redundant Ethernet interfaces.

```
{primary:node0}[edit]
user@host# set interfaces ge-0/0/1 gigether-options redundant-parent reth1
user@host# set interfaces reth1 redundant-ether-options redundancy-group 1
```

Step-by-Step Procedure

To configure the device as DHCP server:

1. Configure the DHCP local server.

```
[edit system services]
user@host# set dhcp-local-server group g1 interface ge-0/0/2.0
```

2. Configure IP address of the server.

```
[edit interfaces]
user@host# set interfaces ge-0/0/2 unit 0 family inet address 203.0.113.1/24
```

3. Configure an address pool.

```
[edit access]
user@host# set address-assignment pool p1 family inet network 203.0.113.0/24
user@host# set address-assignment pool p1 family inet range r1 low 203.0.113.5
user@host# set address-assignment pool p1 family inet range r1 high 203.0.113.20
```

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


```
[edit]
user@host# show interfaces reth1 unit 0 family inet
dhcp-client {
  client-identifier user-id ascii 00:0a:12:00:12:12;
  options no-hostname;
  lease-time 86400;
  retransmission-attempt 6;
  retransmission-interval 5;
  server-address 203.0.113.1;
  vendor-id ether;
}
```

```
[edit]
user@host# show chassis cluster
control-link-recovery;
reth-count 2;
heartbeat-interval 1000;
redundancy-group 0 {
  node 0 priority 100;
  node 1 priority 1;
}
redundancy-group 1 {
  node 0 priority 100;
  node 1 priority 1;
}
```

```
[edit]
user@host# show interfaces reth1
redundant-ether-options {
  redundancy-group 1;
}
```

```
[edit]
user@host# show access address-assignment
pool p1 {
  family inet {
    network 203.0.113.0/24;
    range r1 {
      low 203.0.113.5;
      high 203.0.113.20;
    }
  }
}
```

If you are done configuring the device, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

Verifying the DHCP Client in Chassis Cluster Mode

Purpose Verify that the DHCP client is working in chassis cluster mode.

Action From operational mode, enter the **show dhcp client binding**, **show dhcp client statistics** and **show dhcp client binding interface reth1 detail** commands.

```
user@host> show dhcp client binding
```

IP address	Hardware address	Expires	State	Interface
203.0.113.14	00:1f:12:e3:34:01	84587	BOUND	reth1.0

```
user@host> show dhcp client statistics
```

```
Packets dropped:
  Total          4
  Send error     4

Messages received:
  BOOTREPLY      3
  DHCPOFFER      1
  DHCPACK        2
  DHCPNAK        0
  DHCPFORCERENEW 0

Messages sent:
  BOOTREQUEST    0
  DHCPDECLINE    0
  DHCPDISCOVER   5
  DHCPREQUEST    8
  DHCPINFORM     0
  DHCPRELEASE    1
  DHCPRENEW      0
  DHCPREBIND     0
```

```
user@host> show dhcp client binding interface reth1 detail
```

```
Client Interface: reth1.0
  Hardware Address:      00:10:db:ff:10:01
  State:                 BOUND(LOCAL_CLIENT_STATE_BOUND)
  Lease Expires:         2013-12-18 10:15:36 CST
  Lease Expires in:     30 seconds
  Lease Start:           2013-12-17 10:15:36 CST
  Server Identifier:     203.0.113.1
  Client IP Address:     10.1.1.14
  Update Server          No

DHCP options:
  Name: dhcp-lease-time, Value: 1 day
  Name: server-identifier, Value: 10.1.1.1
  Name: subnet-mask, Value: 255.255.255.0
```

Meaning The sample output shows that DHCP clients configured in the example work in a chassis cluster.

- Related Documentation**
- [Understanding DHCP Client Operation on page 779](#)
 -

CHAPTER 25

Permission Flags for User Access Privileges

- [access on page 842](#)
- [access-control on page 846](#)
- [admin on page 847](#)
- [admin-control on page 850](#)
- [all-control on page 851](#)
- [clear on page 851](#)
- [configure on page 922](#)
- [control on page 923](#)
- [field on page 923](#)
- [firewall on page 924](#)
- [firewall-control on page 928](#)
- [floppy on page 928](#)
- [flow-tap on page 929](#)
- [flow-tap-control on page 932](#)
- [flow-tap-operation on page 933](#)
- [idp-profiler-operation on page 933](#)
- [interface on page 933](#)
- [interface-control on page 937](#)
- [maintenance on page 938](#)
- [network on page 947](#)
- [pgcp-session-mirroring on page 949](#)
- [pgcp-session-mirroring-control on page 952](#)
- [reset on page 953](#)
- [rollback on page 953](#)
- [routing on page 954](#)
- [routing-control on page 961](#)

- [secret on page 965](#)
- [secret-control on page 970](#)
- [security on page 971](#)
- [security-control on page 978](#)
- [shell on page 981](#)
- [snmp on page 981](#)
- [snmp-control on page 985](#)
- [system on page 985](#)
- [system-control on page 991](#)
- [trace on page 992](#)
- [trace-control on page 1001](#)
- [view on page 1006](#)

access

Can view the access configuration in configuration mode.

Commands

```
clear unified-edge
clear unified-edge ggsn-pgw
clear unified-edge ggsn-pgw aaa
clear unified-edge ggsn-pgw aaa radius
clear unified-edge ggsn-pgw aaa radius statistics
<clear-mobile-gateway-aaa-radius-statistics>
clear unified-edge ggsn-pgw aaa statistics
<clear-mobile-gateway-aaa-statistics>
clear unified-edge ggsn-pgw address-assignment
clear unified-edge ggsn-pgw address-assignment pool
<clear-mobile-gateway-sm-ippool-pool-sessions>
clear unified-edge ggsn-pgw address-assignment statistics
<clear-mobile-gateway-sm-ippool-statistics>
clear unified-edge ggsn-pgw call-admission-control
clear unified-edge ggsn-pgw call-admission-control statistics
<clear-mobile-gateway-cac-statistics>
clear unified-edge ggsn-pgw charging
clear unified-edge ggsn-pgw charging cdr
<clear-mobile-gateway-charging-clear-cdr>
clear unified-edge ggsn-pgw charging cdr wfa
<clear-mobile-gateway-charging-clear-cdr-wfa>
clear unified-edge ggsn-pgw charging local-persistent-storage
clear unified-edge ggsn-pgw charging local-persistent-storage statistics
<clear-mobile-gateway-charging-clear-lps-stats>
clear unified-edge ggsn-pgw charging path
clear unified-edge ggsn-pgw charging path statistics
<clear-mobile-gateway-charging-clear-path-stats>
clear unified-edge ggsn-pgw charging transfer
clear unified-edge ggsn-pgw charging transfer statistics
<clear-mobile-gateway-charging-clear-xfer-stats>
clear unified-edge ggsn-pgw diameter
clear unified-edge ggsn-pgw diameter dcca-gy
clear unified-edge ggsn-pgw diameter dcca-gy statistics
<clear-mobile-gateway-aaa-diam-stats-gy>
clear unified-edge ggsn-pgw diameter network-element
```

```

clear unified-edge ggsn-pgw diameter network-element statistics
<clear-mobile-gateway-aaa-diam-ne-statistics>
clear unified-edge ggsn-pgw diameter pcc-gx
clear unified-edge ggsn-pgw diameter pcc-gx statistics
<clear-mobile-gateway-aaa-diam-stats-gx>
clear unified-edge ggsn-pgw diameter peer
clear unified-edge ggsn-pgw diameter peer statistics
<clear-mobile-gateway-aaa-diam-peer-statistics>
clear unified-edge ggsn-pgw gtp
clear unified-edge ggsn-pgw gtp peer
clear unified-edge ggsn-pgw gtp peer statistics
<clear-mobile-gateway-gtp-peer-statistics>
clear unified-edge ggsn-pgw gtp statistics
<clear-mobile-gateway-gtp-statistics>
clear unified-edge ggsn-pgw ip-reassembly
clear unified-edge ggsn-pgw ip-reassembly statistics
<clear-mobile-gateways-ip-reassembly-statistics>
clear unified-edge ggsn-pgw statistics
<clear-mobile-gateway-statistics>
clear unified-edge ggsn-pgw subscribers
<clear-mobile-gateway-subscribers>
clear unified-edge ggsn-pgw subscribers bearer
clear unified-edge ggsn-pgw subscribers charging
<clear-mobile-gateway-subscribers-charging>
clear unified-edge ggsn-pgw subscribers peer
<clear-mobile-gateway-subscribers-peer>
clear unified-edge sgw
clear unified-edge sgw call-admission-control
clear unified-edge sgw call-admission-control statistics
<clear-mobile-sgw-cac-statistics>
clear unified-edge sgw charging
clear unified-edge sgw charging cdr
<clear-mobile-gateway-sgw-charging-clear-cdr>
clear unified-edge sgw charging cdr wfa
<clear-mobile-gateway-sgw-charging-clear-cdr-wfa>
clear unified-edge sgw charging local-persistent-storage
clear unified-edge sgw charging local-persistent-storage statistics
<clear-mobile-gateway-sgw-charging-clear-lps-stats>
clear unified-edge sgw charging path
clear unified-edge sgw charging path statistics
<clear-mobile-gateway-sgw-charging-clear-path-stats>
clear unified-edge sgw charging transfer
clear unified-edge sgw charging transfer statistics
<clear-mobile-gateway-sgw-charging-clear-xfer-stats>
clear unified-edge sgw gtp
clear unified-edge sgw gtp peer
clear unified-edge sgw gtp peer statistics
<clear-mobile-sgw-gtp-peer-statistics>
clear unified-edge sgw gtp statistics
<clear-mobile-sgw-gtp-statistics>
clear unified-edge sgw idle-mode-buffering
clear unified-edge sgw idle-mode-buffering statistics
<clear-mobile-gw-sgw-idle-mode-buffering-statistics>
clear unified-edge sgw ip-reassembly
clear unified-edge sgw ip-reassembly statistics
<clear-mobile-gateways-sgw-ip-reassembly-statistics-sgw>
clear unified-edge sgw statistics
<clear-mobile-sgw-statistics>
clear unified-edge sgw subscribers
<clear-mobile-sgw-subscribers>

```

```
clear unified-edge sgw subscribers charging
<clear-mobile-sgw-subscribers-charging>
clear unified-edge sgw subscribers peer
<clear-mobile-sgw-subscribers-peer>
clear unified-edge tdf
clear unified-edge tdf aaa
clear unified-edge tdf aaa radius
clear unified-edge tdf aaa radius client
clear unified-edge tdf aaa radius client statistics
<clear-radius-client-statistics>
clear unified-edge tdf aaa radius network-element
clear unified-edge tdf aaa radius network-element statistics
<clear-radius-network-element-statistics>
clear unified-edge tdf aaa radius server
clear unified-edge tdf aaa radius server statistics
<clear-radius-server-statistics>
clear unified-edge tdf aaa radius snoop-segment
clear unified-edge tdf aaa radius snoop-segment statistics
<clear-radius-snoop-segment-statistics>
clear unified-edge tdf aaa statistics
<clear-tdf-gateway-aaa-statistics>
clear unified-edge tdf address-assignment
clear unified-edge tdf address-assignment pool
<clear-mobile-gateway-tdf-sm-ippool-pool-sessions>
clear unified-edge tdf address-assignment statistics
<clear-mobile-gateway-tdf-sm-ippool-statistics>
clear unified-edge tdf call-admission-control
clear unified-edge tdf call-admission-control statistics
<clear-tdf-cac-statistics>
clear unified-edge tdf diameter
clear unified-edge tdf diameter network-element
clear unified-edge tdf diameter network-element statistics
<clear-diameter-network-element-statistics>
clear unified-edge tdf diameter pcc-gx
clear unified-edge tdf diameter pcc-gx statistics
<clear-diameter-statistics-gx>
clear unified-edge tdf diameter peer
clear unified-edge tdf diameter peer statistics
<clear-diameter-peer-statistics>
clear unified-edge tdf statistics
<clear-tdf-statistics>
clear unified-edge tdf subscribers
<clear-mobile-tdf-subscribers>
clear unified-edge tdf subscribers peer
<clear-mobile-gateway-tdf-subscribers-peer>
request unified-edge
request unified-edge ggsn-pgw
request unified-edge ggsn-pgw call-trace
<monitor-mobile-gateways-call-trace-start>
request unified-edge ggsn-pgw call-trace clear
<get-mobile-gateways-call-trace-clear>
request unified-edge ggsn-pgw call-trace show
<get-mobile-gateways-call-trace-information>
request unified-edge ggsn-pgw call-trace start
<get-mobile-gateways-call-trace-start-information>
request unified-edge ggsn-pgw call-trace stop
<get-mobile-gateways-call-trace-stop-information>
request unified-edge sgw
request unified-edge sgw call-trace
request unified-edge sgw call-trace clear
```



```

<get-mobile-gateways-sgw-call-trace-clear>
request unified-edge sgw call-trace show
<get-mobile-gateways-sgw-call-trace-information>
request unified-edge sgw call-trace start
<get-mobile-gateways-sgw-call-trace-start-information>
request unified-edge sgw call-trace stop
<get-mobile-gateways-sgw-call-trace-stop-information>
request unified-edge tdf
request unified-edge tdf call-trace
request unified-edge tdf call-trace clear
<get-mobile-gateways-tdf-call-trace-clear>
request unified-edge tdf call-trace show
<get-mobile-gateways-tdf-call-trace-information>
request unified-edge tdf call-trace start
<get-mobile-gateways-tdf-call-trace-start-information>
request unified-edge tdf call-trace stop
<get-mobile-gateways-tdf-call-trace-stop-information>

```

Configuration Hierarchy Levels

```

[edit access]
[edit access diameter]
[edit access ppp-options]
[edit access radius]
[edit dynamic-profile]
[edit logical-systems access]
[edit logical-systems routing-instances instance system services
static-subscribers access-profile]
[edit logical-systems routing-instances instance system services
static-subscribers dynamic-profile]
[edit logical-systems routing-instances instance system services
static-subscribers group access-profile]
[edit logical-systems routing-instances instance system services
static-subscribers group dynamic-profile]
[edit logical-systems system services static-subscribers access-profile]
[edit logical-systems system services static-subscribers dynamic-profile]
[edit logical-systems system services static-subscribers group access-profile]
[edit logical-systems system services static-subscribers group dynamic-profile]
[edit routing-instances instance system services static-subscribers
access-profile]
[edit routing-instances instance system services static-subscribers
dynamic-profile]
[edit routing-instances instance system services static-subscribers group
access-profile]
[edit routing-instances instance system services static-subscribers group
dynamic-profile]
[edit system services extensible-subscriber-services access-profile]
[edit system services static-subscribers access-profile]
[edit system services static-subscribers dynamic-profile]
[edit system services static-subscribers group access-profile]
[edit system services static-subscribers group dynamic-profile]
[edit unified-edge]

```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)

- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [access-control on page 846](#)

access-control

Can view access configuration information. Can edit access configuration at the **[edit access]**, **[edit logical-systems]**, **[edit routing-instances]**, and **[edit system services]** hierarchy levels.

Configuration Hierarchy Levels

```
[edit access]
[edit access ppp-options]
[edit dynamic-profile]
[edit logical-systems access]
[edit logical-systems routing-instances instance system services
static-subscribers access-profile]
[edit logical-systems routing-instances instance system services
static-subscribers dynamic-profile]
[edit logical-systems routing-instances instance system services
static-subscribers group access-profile]
[edit logical-systems routing-instances instance system services
static-subscribers group dynamic-profile]
[edit logical-systems system services static-subscribers access-profile]
[edit logical-systems system services static-subscribers dynamic-profile]
[edit logical-systems system services static-subscribers group access-profile]
[edit logical-systems system services static-subscribers group dynamic-profile]
[edit routing-instances instance system services static-subscribers
access-profile]
[edit routing-instances instance system services static-subscribers
dynamic-profile]
[edit routing-instances instance system services static-subscribers group
access-profile]
[edit routing-instances instance system services static-subscribers group
dynamic-profile]
[edit system services static-subscribers access-profile]
[edit system services static-subscribers dynamic-profile]
[edit system services static-subscribers group access-profile]
[edit system services static-subscribers group dynamic-profile]
```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [access on page 842](#)

admin

Can view user account information in configuration mode.

Commands

```
clear unified-edge
clear unified-edge ggsn-pgw
clear unified-edge ggsn-pgw aaa
clear unified-edge ggsn-pgw aaa radius
clear unified-edge ggsn-pgw aaa radius statistics
<clear-mobile-gateway-aaa-radius-statistics>
clear unified-edge ggsn-pgw aaa statistics
<clear-mobile-gateway-aaa-statistics>
clear unified-edge ggsn-pgw address-assignment
clear unified-edge ggsn-pgw address-assignment pool
<clear-mobile-gateway-sm-ippool-pool-sessions>
clear unified-edge ggsn-pgw address-assignment statistics
<clear-mobile-gateway-sm-ippool-statistics>
clear unified-edge ggsn-pgw call-admission-control
clear unified-edge ggsn-pgw call-admission-control statistics
<clear-mobile-gateway-cac-statistics>
clear unified-edge ggsn-pgw charging
clear unified-edge ggsn-pgw charging cdr
<clear-mobile-gateway-charging-clear-cdr>
clear unified-edge ggsn-pgw charging cdr wfa
<clear-mobile-gateway-charging-clear-cdr-wfa>
clear unified-edge ggsn-pgw charging local-persistent-storage
clear unified-edge ggsn-pgw charging local-persistent-storage statistics
<clear-mobile-gateway-charging-clear-lps-stats>
clear unified-edge ggsn-pgw charging path
clear unified-edge ggsn-pgw charging path statistics
<clear-mobile-gateway-charging-clear-path-stats>
clear unified-edge ggsn-pgw charging transfer
clear unified-edge ggsn-pgw charging transfer statistics
<clear-mobile-gateway-charging-clear-xfer-stats>
clear unified-edge ggsn-pgw diameter
clear unified-edge ggsn-pgw diameter dcca-gy
clear unified-edge ggsn-pgw diameter dcca-gy statistics
<clear-mobile-gateway-aaa-diam-stats-gy>
clear unified-edge ggsn-pgw diameter network-element
clear unified-edge ggsn-pgw diameter network-element statistics
<clear-mobile-gateway-aaa-diam-ne-statistics>
clear unified-edge ggsn-pgw diameter pcc-gx
clear unified-edge ggsn-pgw diameter pcc-gx statistics
<clear-mobile-gateway-aaa-diam-stats-gx>
clear unified-edge ggsn-pgw diameter peer
clear unified-edge ggsn-pgw diameter peer statistics
<clear-mobile-gateway-aaa-diam-peer-statistics>
clear unified-edge ggsn-pgw gtp
clear unified-edge ggsn-pgw gtp peer
clear unified-edge ggsn-pgw gtp peer statistics
<clear-mobile-gateway-gtp-peer-statistics>
clear unified-edge ggsn-pgw gtp statistics
<clear-mobile-gateway-gtp-statistics>
clear unified-edge ggsn-pgw ip-reassembly
clear unified-edge ggsn-pgw ip-reassembly statistics
<clear-mobile-gateways-ip-reassembly-statistics>
clear unified-edge ggsn-pgw statistics
<clear-mobile-gateway-statistics>
```

```
clear unified-edge ggsn-pgw subscribers
<clear-mobile-gateway-subscribers>
clear unified-edge ggsn-pgw subscribers bearer
clear unified-edge ggsn-pgw subscribers charging
<clear-mobile-gateway-subscribers-charging>
clear unified-edge ggsn-pgw subscribers peer
<clear-mobile-gateway-subscribers-peer>
clear unified-edge sgw
clear unified-edge sgw call-admission-control
clear unified-edge sgw call-admission-control statistics
<clear-mobile-sgw-cac-statistics>
clear unified-edge sgw charging
clear unified-edge sgw charging cdr
<clear-mobile-gateway-sgw-charging-clear-cdr>
clear unified-edge sgw charging cdr wfa
<clear-mobile-gateway-sgw-charging-clear-cdr-wfa>
clear unified-edge sgw charging local-persistent-storage
clear unified-edge sgw charging local-persistent-storage statistics
<clear-mobile-gateway-sgw-charging-clear-lps-stats>
clear unified-edge sgw charging path
clear unified-edge sgw charging path statistics
<clear-mobile-gateway-sgw-charging-clear-path-stats>
clear unified-edge sgw charging transfer
clear unified-edge sgw charging transfer statistics
<clear-mobile-gateway-sgw-charging-clear-xfer-stats>
clear unified-edge sgw gtp
clear unified-edge sgw gtp peer
clear unified-edge sgw gtp peer statistics
<clear-mobile-sgw-gtp-peer-statistics>
clear unified-edge sgw gtp statistics
<clear-mobile-sgw-gtp-statistics>
clear unified-edge sgw idle-mode-buffering
clear unified-edge sgw idle-mode-buffering statistics
<clear-mobile-gw-sgw-idle-mode-buffering-statistics>
clear unified-edge sgw ip-reassembly
clear unified-edge sgw ip-reassembly statistics
<clear-mobile-gateways-sgw-ip-reassembly-statistics-sgw>
clear unified-edge sgw statistics
<clear-mobile-sgw-statistics>
clear unified-edge sgw subscribers
<clear-mobile-sgw-subscribers>
clear unified-edge sgw subscribers charging
<clear-mobile-sgw-subscribers-charging>
clear unified-edge sgw subscribers peer
<clear-mobile-sgw-subscribers-peer>
clear unified-edge tdf
clear unified-edge tdf aaa
clear unified-edge tdf aaa radius
clear unified-edge tdf aaa radius client
clear unified-edge tdf aaa radius client statistics
<clear-radius-client-statistics>
clear unified-edge tdf aaa radius network-element
clear unified-edge tdf aaa radius network-element statistics
<clear-radius-network-element-statistics>
clear unified-edge tdf aaa radius server
clear unified-edge tdf aaa radius server statistics
<clear-radius-server-statistics>
clear unified-edge tdf aaa radius snoop-segment
clear unified-edge tdf aaa radius snoop-segment statistics
<clear-radius-snoop-segment-statistics>
```

```
clear unified-edge tdf aaa statistics
<clear-tdf-gateway-aaa-statistics>
clear unified-edge tdf address-assignment
clear unified-edge tdf address-assignment pool
<clear-mobile-gateway-tdf-sm-ippool-pool-sessions>
clear unified-edge tdf address-assignment statistics
<clear-mobile-gateway-tdf-sm-ippool-statistics>
clear unified-edge tdf call-admission-control
clear unified-edge tdf call-admission-control statistics
<clear-tdf-cac-statistics>
clear unified-edge tdf diameter
clear unified-edge tdf diameter network-element
clear unified-edge tdf diameter network-element statistics
<clear-diameter-network-element-statistics>
clear unified-edge tdf diameter pcc-gx
clear unified-edge tdf diameter pcc-gx statistics
<clear-diameter-statistics-gx>
clear unified-edge tdf diameter peer
clear unified-edge tdf diameter peer statistics
<clear-diameter-peer-statistics>
clear unified-edge tdf statistics
<clear-tdf-statistics>
clear unified-edge tdf subscribers
<clear-mobile-tdf-subscribers>
clear unified-edge tdf subscribers peer
<clear-mobile-gateway-tdf-subscribers-peer>
request unified-edge
request unified-edge ggsn-pgw
request unified-edge ggsn-pgw call-trace
<monitor-mobile-gateways-call-trace-start>
request unified-edge ggsn-pgw call-trace clear
<get-mobile-gateways-call-trace-clear>
request unified-edge ggsn-pgw call-trace show
<get-mobile-gateways-call-trace-information>
request unified-edge ggsn-pgw call-trace start
<get-mobile-gateways-call-trace-start-information>
request unified-edge ggsn-pgw call-trace stop
<get-mobile-gateways-call-trace-stop-information>
request unified-edge sgw
request unified-edge sgw call-trace
request unified-edge sgw call-trace clear
<get-mobile-gateways-sgw-call-trace-clear>
request unified-edge sgw call-trace show
<get-mobile-gateways-sgw-call-trace-information>
request unified-edge sgw call-trace start
<get-mobile-gateways-sgw-call-trace-start-information>
request unified-edge sgw call-trace stop
<get-mobile-gateways-sgw-call-trace-stop-information>
request unified-edge tdf
request unified-edge tdf call-trace
request unified-edge tdf call-trace clear
<get-mobile-gateways-tdf-call-trace-clear>
request unified-edge tdf call-trace show
<get-mobile-gateways-tdf-call-trace-information>
request unified-edge tdf call-trace start
<get-mobile-gateways-tdf-call-trace-start-information>
request unified-edge tdf call-trace stop
<get-mobile-gateways-tdf-call-trace-stop-information>
show system audit
```

Configuration Hierarchy Levels

```
[edit protocols uplink-failure-detection]
[edit system]
[edit system accounting]
[edit system diag-port-authentication]
[edit system extensions]
[edit system login]
[edit system pic-console-authentication]
[edit system root-authentication]
[edit system services ssh authorized-keys-command]
[edit system services ssh authorized-keys-command-user]
[edit system services ssh ciphers]
[edit system services ssh client-alive-count-max]
[edit system services ssh client-alive-interval]]
[edit system services ssh fingerprint-hash]
[edit system services ssh hostkey-algorithm]
[edit system services ssh key-exchange]
[edit system services ssh macs]
[edit system services ssh max-sessions-per-connection]
[edit system services ssh no-tcp-fowarding]
[edit system services ssh protocol-version]
[edit system services ssh root-login]
[edit system services ssh tcp-fowarding]
[edit unified-edge]
```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [admin-control on page 850](#)

admin-control

Can view user account information and configure it at the **[edit system]** hierarchy level.

Commands

```
show system audit
```

Configuration Hierarchy Levels

```
[edit protocols uplink-failure-detection]
[edit system]
[edit system accounting]
[edit system diag-port-authentication]
[edit system extensions]
[edit system login]
[edit system pic-console-authentication]
[edit system root-authentication]
[edit system services ssh ciphers]
[edit system services ssh hostkey-algorithm]
[edit system services ssh key-exchange]
```

```
[edit system services ssh macs]
[edit system services ssh protocol-version]
[edit system services ssh root-login]
```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [admin on page 847](#)

all-control

Can access all operational mode commands and configuration mode commands. Can modify configuration in all the configuration hierarchy levels.

Commands All CLI commands.

Configuration Hierarchy Levels All CLI configuration hierarchy levels and statements.

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

clear

Can clear (delete) information learned from the network that is stored in various network databases.

Commands

```
clear
clear access-security
clear access-security router-advertisement-entries
<clear-as-router-advertisement-entry>
clear amt
clear amt statistics
<clear-amt-statistics>
```

```
clear amt tunnel
clear-amt-tunnel
clear amt tunnel gateway-address
<clear amt tunnel gateway-address>
clear amt tunnel statistics
<clear-amt-tunnel-statistics>
clear amt tunnel statistics gateway-address
<clear-amt-tunnel-gateway-address-statistics>
clear amt tunnel statistics tunnel-interface
<clear-amt-tunnel-interface-statistics>
clear amt tunnel tunnel-interface
<clear-amt-tunnel-interface>
clear ancp
clear ancp neighbor
<clear-ancp-neighbor-connection>
clear ancp statistics
<clear-ancp-statistics>
clear ancp subscriber
<clear-ancp-subscriber-connection>
clear-appqos-counter
<clear-appqos-rate-limiters-statistics>
clear-appqos-rate-limiter-statistics
clear-appqos-rule-statistics
clear arp
<clear-arp-table>
clear auto-configuration
clear auto-configuration interfaces
<clear-auto-configuration-interfaces>
clear bfd
clear bfd adaptation
<clear-bfd-adaptation-information>
clear bfd adaptation address
<clear-bfd-adaptation-address>
clear bfd adaptation discriminator
<clear-bfd-adaptation-discriminator>
clear bfd session
<clear-bfd-session-information>
clear bfd session address
<clear-bfd-session-address>
clear bfd session discriminator
<clear-bfd-session-discriminator>
clear bgp
clear bgp damping
<clear-bgp-damping>
clear bgp neighbor
<clear-bgp-neighbor>
clear bgp table
<clear-bgp-table>
clear bridge
clear bridge evpn
clear bridge evpn arp-table
<clear-bridge-evpn-arp-table>
clear bridge evpn nd-table
<clear-bridge-evpn-nd-table>
clear bridge mac-table
<clear-bridge-mac-table>
clear bridge mac-table interface
<clear-bridge-interface-mac-table>
clear bridge recovery-timeout
<clear-bridge-recovery>
```



```
clear bridge recovery-timeout interface
<clear-bridge-recovery-interface>
clear bridge satellite
clear bridge satellite logging
<clear-satellite-control-logging>
clear bridge satellite vlan-auto-sense
<clear-satellite-control-plane-vlan-auto-sense>
clear captive-portal
clear captive-portal firewall
<clear-captive-portal-firewall>
clear captive-portal firewall interface
<clear-captive-portal-firewall-interface>
clear captive-portal interface
<clear-captive-portal-interface-session>
clear captive-portal mac-address
<clear-captive-portal-mac-session>
clear cli
clear cli logical-system
<clear-cli-logical-system>
clear database-replication
clear database-replication statistics
<clear-database-replication-statistics-information>
clear ddos-protection
clear ddos-protection protocols
clear ddos-protection protocols all-fiber-channel-enode
clear ddos-protection protocols all-fiber-channel-enode aggregate
clear ddos-protection protocols all-fiber-channel-enode aggregate culprit-flows
<clear-ddos-all-fc-enode-aggregate-flows>
clear ddos-protection protocols all-fiber-channel-enode aggregate states
<clear-ddos-all-fc-enode-aggregate-states>
clear ddos-protection protocols all-fiber-channel-enode aggregate statistics
<clear-ddos-all-fc-enode-aggregate-statistics>
clear ddos-protection protocols all-fiber-channel-enode culprit-flows
<clear-ddos-all-fc-enode-flows>
clear ddos-protection protocols all-fiber-channel-enode states
<clear-ddos-all-fc-enode-states>
clear ddos-protection protocols all-fiber-channel-enode statistics
<clear-ddos-all-fc-enode-statistics>
clear ddos-protection protocols amtv4
clear ddos-protection protocols amtv4 aggregate
clear ddos-protection protocols amtv4 aggregate culprit-flows
clear ddos-protection protocols amtv4 aggregate states
clear ddos-protection protocols amtv4 aggregate statistics
clear ddos-protection protocols amtv4 culprit-flows
clear ddos-protection protocols amtv4 states
clear ddos-protection protocols amtv4 statistics
clear ddos-protection protocols amtv6
clear ddos-protection protocols amtv6 aggregate
clear ddos-protection protocols amtv6 aggregate culprit-flows
<clear-ddos-amtv6-aggregate-flows>
clear ddos-protection protocols amtv6 aggregate states
<clear-ddos-amtv6-aggregate-states>
clear ddos-protection protocols amtv6 aggregate statistics
<clear-ddos-amtv6-aggregate-statistics>
clear ddos-protection protocols amtv6 culprit-flows
<clear-ddos-amtv6-flows>
clear ddos-protection protocols amtv6 states
<clear-ddos-amtv6-states>
clear ddos-protection protocols amtv6 statistics
<clear-ddos-amtv6-statistics>
```

```
clear ddos-protection protocols ancp aggregate culprit-flows
<clear-ddos-ancp-aggregate-flows>
clear ddos-protection protocols ancp culprit-flows
clear ddos-protection protocols ancp
clear ddos-protection protocols ancp aggregate
clear ddos-protection protocols ancp aggregate states
clear ddos-protection protocols ancp aggregate statistics
<clear-ddos-ancp-aggregate-statistics>
clear ddos-protection protocols ancp states
<clear-ddos-ancp-states>
clear ddos-protection protocols ancp statistics
<clear-ddos-ancp-statistics>
clear ddos-protection protocols ancpv6
clear ddos-protection protocols ancpv6 aggregate
clear ddos-protection protocols ancpv6 aggregate states

clear ddos-protection protocols ancpv6 aggregate culprit-flows
clear ddos-protection protocols arp aggregate statistics
clear-ddos-arp-aggregate-statistics
clear ddos-protection protocols arp aggregate culprit-flows
clear ddos-protection protocols arp states
clear-ddos-arp-states
clear ddos-protection protocols arp statistics
<clear-ddos-arp-statistics>
clear ddos-protection protocols arp-snoop
clear ddos-protection protocols arp-snoop aggregate
clear ddos-protection protocols arp-snoop aggregate culprit-flows
<clear-ddos-arp-snoop-aggregate-flows>
clear ddos-protection protocols arp-snoop aggregate states
<clear-ddos-arp-snoop-aggregate-states>
clear ddos-protection protocols arp-snoop aggregate statistics
<clear-ddos-arp-snoop-aggregate-statistics>
clear ddos-protection protocols arp-snoop culprit-flows
<clear-ddos-arp-snoop-flows>
clear ddos-protection protocols arp-snoop states
<clear-ddos-arp-snoop-states>
clear ddos-protection protocols arp-snoop statistics
<clear-ddos-arp-snoop-statistics>
clear ddos-protection protocols arp culprit-flows
clear ddos-protection protocols atm
clear ddos-protection protocols atm aggregate
clear ddos-protection protocols atm aggregate culprit-flows
clear ddos-protection protocols atm aggregate states
<clear-ddos-atm-aggregate-states>
clear ddos-protection protocols atm aggregate statistics
<clear-ddos-atm-aggregate-statistics>
clear ddos-protection protocols atm culprit-flows
clear ddos-protection protocols bfd aggregate culprit-flows
clear ddos-protection protocols atm states
clear-ddos-atm-states
clear ddos-protection protocols atm statistics
clear-ddos-atm-statistics
clear ddos-protection protocols bfd
clear ddos-protection protocols bfd aggregate
clear ddos-protection protocols bfd culprit-flows
clear ddos-protection protocols bfd aggregate states
clear-ddos-bfd-aggregate-states
clear ddos-protection protocols bfd aggregate statistics
clear-ddos-bfd-aggregate-statistics
clear ddos-protection protocols bfd states
```

```

clear-ddos-bfd-states
clear ddos-protection protocols bfd statistics
clear-ddos-bfd-statistics
clear ddos-protection protocols bfdv6
clear ddos-protection protocols bfdv6 aggregate
clear ddos-protection protocols bfdv6 culprit-flows
clear ddos-protection protocols bfdv6 aggregate states
clear-ddos-bfdv6-aggregate-states
clear ddos-protection protocols bfdv6 aggregate statistics
clear-ddos-bfdv6-aggregate-statistics
clear ddos-protection protocols bfdv6 states
clear-ddos-bfdv6-states
clear ddos-protection protocols bfdv6 statistics
clear-ddos-bfdv6-statistics
clear ddos-protection protocols bgp
clear ddos-protection protocols bgp aggregate
clear ddos-protection protocols bgp aggregate culprit-flows
clear ddos-protection protocols bgp aggregate states
clear-ddos-bgp-aggregate-states
clear ddos-protection protocols bgp aggregate statistics
clear ddos-protection protocols bgp culprit-flows
clear ddos-protection protocols bgp states
clear-ddos-bgp-states
clear ddos-protection protocols bgp statistics
clear-ddos-bgp-statistics
clear ddos-protection protocols bgpv6
clear ddos-protection protocols bgpv6 aggregate
clear ddos-protection protocols bgpv6 aggregate culprit-flows
clear ddos-protection protocols bgpv6 aggregate states
clear-ddos-bgpv6-aggregate-states
clear ddos-protection protocols bgpv6 aggregate statistics
clear-ddos-bgpv6-aggregate-statistics
clear ddos-protection protocols bgpv6 states
clear-ddos-bgp-aggregate-states
clear-ddos-bgp-aggregate-statistics
clear-ddos-bgp-states
clear-ddos-bgp-statistics
clear-ddos-bgpv6-aggregate-states
clear-ddos-bgpv6-aggregate-statistics
clear-ddos-bgpv6-states
clear ddos-protection protocols bgpv6 statistics
<clear-ddos-bgpv6-statistics>
clear ddos-protection protocols bridge-control
clear ddos-protection protocols bridge-control aggregate
clear ddos-protection protocols bridge-control aggregate culprit-flows
<clear-ddos-brg-ctrl-aggregate-flows>
clear ddos-protection protocols bridge-control aggregate states
<clear-ddos-brg-ctrl-aggregate-states>
clear ddos-protection protocols bridge-control aggregate statistics
<clear-ddos-brg-ctrl-aggregate-statistics>
clear ddos-protection protocols bridge-control culprit-flows
<clear-ddos-brg-ctrl-flows>
clear ddos-protection protocols bridge-control states
<clear-ddos-brg-ctrl-states>
clear ddos-protection protocols bridge-control statistics
<clear-ddos-brg-ctrl-statistics>
clear ddos-protection protocols culprit-flows
clear ddos-protection protocols demux-autosense
clear ddos-protection protocols demux-autosense aggregate
clear ddos-protection protocols demux-autosense aggregate culprit-flows

```

```
clear ddos-protection protocols demux-autosense aggregate states
clear-ddos-demuxauto-aggregate-states
clear ddos-protection protocols demux-autosense aggregate statistics
clear ddos-protection protocols demux-autosense culprit-flows
clear ddos-protection protocols demux-autosense states
clear-ddos-demuxauto-states
clear ddos-protection protocols demux-autosense statistics
clear-ddos-demuxauto-statistics
clear ddos-protection protocols dhcpv4
clear ddos-protection protocols dhcpv4 ack
clear ddos-protection protocols dhcpv4 ack culprit-flows
clear ddos-protection protocols dhcpv4 ack states
clear ddos-protection protocols dhcpv4 ack statistics
clear ddos-protection protocols dhcpv4 aggregate
clear ddos-protection protocols dhcpv4v6
clear ddos-protection protocols dhcpv4v6 aggregate
clear ddos-protection protocols dhcpv4v6 aggregate culprit-flows
<clear-ddos-dhcpv4v6-aggregate-flows>
clear ddos-protection protocols dhcpv4v6 aggregate states
<clear-ddos-dhcpv4v6-aggregate-states>
clear ddos-protection protocols dhcpv4v6 aggregate statistics
<clear-ddos-dhcpv4v6-aggregate-statistics>
clear ddos-protection protocols dhcpv4v6 culprit-flows
<clear-ddos-dhcpv4v6-flows>
clear ddos-protection protocols dhcpv4v6 states
<clear-ddos-dhcpv4v6-states>
clear ddos-protection protocols dhcpv4v6 statistics
<clear-ddos-dhcpv4v6-statistics>
clear-ddos-demuxauto-aggregate-states
clear-ddos-demuxauto-aggregate-statistics
clear-ddos-demuxauto-states
clear-ddos-demuxauto-statistics
clear-ddos-dhcpv4-ack-states
clear ddos-protection protocols dhcpv4 ack statistics
clear-ddos-dhcpv4-ack-statistics
clear ddos-protection protocols dhcpv4 aggregate
clear ddos-protection protocols dhcpv4 aggregate states
clear-ddos-dhcpv4-aggregate-states
clear ddos-protection protocols dhcpv4 aggregate statistics
clear-ddos-dhcpv4-aggregate-statistics
clear ddos-protection protocols dhcpv4 bad-packets
clear ddos-protection protocols dhcpv4 bad-packets states
clear-ddos-dhcpv4-bad-pack-states
clear ddos-protection protocols dhcpv4 bad-packets statistics
clear-ddos-dhcpv4-bad-pack-statistics
clear ddos-protection protocols dhcpv4 bootp
clear ddos-protection protocols dhcpv4 bootp states
clear-ddos-dhcpv4-bootp-states
clear ddos-protection protocols dhcpv4 bootp statistics
clear-ddos-dhcpv4-bootp-statistics
clear ddos-protection protocols dhcpv4 decline
clear ddos-protection protocols dhcpv4 decline culprit-flows
clear ddos-protection protocols dhcpv4 decline states
clear-ddos-dhcpv4-decline-states
clear ddos-protection protocols dhcpv4 decline statistics
clear-ddos-dhcpv4-decline-statistics
clear ddos-protection protocols dhcpv4 discover
clear ddos-protection protocols dhcpv4 discover states
clear-ddos-dhcpv4-discover-states
clear ddos-protection protocols dhcpv4 discover statistics
```

```

clear-ddos-dhcpv4-discover-statistics
clear ddos-protection protocols dhcpv4 force-renew
clear ddos-protection protocols dhcpv4 force-renew culprit-flows
clear ddos-protection protocols dhcpv4 force-renew states
clear-ddos-dhcpv4-forcerenew-states
clear ddos-protection protocols dhcpv4 force-renew statistics
clear-ddos-dhcpv4-forcerenew-statistics
clear ddos-protection protocols dhcpv4 inform
clear ddos-protection protocols dhcpv4 inform culprit-flows
clear ddos-protection protocols dhcpv4 inform states
clear-ddos-dhcpv4-decline-states
clear-ddos-dhcpv4-decline-statistics
clear-ddos-dhcpv4-discover-states
clear-ddos-dhcpv4-discover-statistics
clear-ddos-dhcpv4-forcerenew-states
clear-ddos-dhcpv4-forcerenew-statistics
clear ddos-protection protocols dhcpv4 unclassified culprit-flows
clear ddos-protection protocols dhcpv4 unclassified states
clear-ddos-dhcpv4-unclass-states
clear ddos-protection protocols dhcpv4 unclassified statistics
clear-ddos-dhcpv4-unclass-statistics
clear ddos-protection protocols dhcpv6
clear ddos-protection protocols dhcpv6 advertise
clear ddos-protection protocols dhcpv6 advertise culprit-flows
clear ddos-protection protocols dhcpv6 advertise states
clear-ddos-dhcpv6-advertise-states
clear ddos-protection protocols dhcpv6 advertise statistics
clear-ddos-dhcpv6-advertise-statistics
clear ddos-protection protocols dhcpv6 aggregate
clear ddos-protection protocols dhcpv6 aggregate states
clear-ddos-dhcpv6-aggregate-states
clear ddos-protection protocols dhcpv6 aggregate statistics
clear-ddos-dhcpv6-aggregate-statistics
clear ddos-protection protocols dhcpv6 confirm
clear ddos-protection protocols dhcpv6 confirm culprit-flows
clear ddos-protection protocols dhcpv6 confirm states
clear-ddos-dhcpv6-confirm-states
clear ddos-protection protocols dhcpv6 confirm statistics
clear-ddos-dhcpv6-confirm-statistics
clear ddos-protection protocols dhcpv6 decline
clear ddos-protection protocols dhcpv6 decline states
clear-ddos-dhcpv6-decline-states
clear ddos-protection protocols dhcpv6 decline statistics
clear-ddos-dhcpv6-decline-statistics
clear ddos-protection protocols dhcpv6 information-request
clear ddos-protection protocols dhcpv6 information-request states
clear-ddos-dhcpv6-info-req-states
clear ddos-protection protocols dhcpv6 information-request statistics
clear-ddos-dhcpv6-info-req-statistics
clear ddos-protection protocols dhcpv6 leasequery
clear ddos-protection protocols dhcpv6 leasequery states
clear-ddos-dhcpv6-leasequery-states
clear ddos-protection protocols dhcpv6 leasequery statistics
clear-ddos-dhcpv6-leasequery-statistics
clear ddos-protection protocols dhcpv6 leasequery-data
clear ddos-protection protocols dhcpv6 leasequery-data states
clear ddos-protection protocols dhcpv6 leasequery-data statistics
clear ddos-protection protocols garp-reply
clear ddos-protection protocols garp-reply aggregate
clear ddos-protection protocols garp-reply aggregate culprit-flows

```

```
<clear-ddos-garp-reply-aggregate-flows>
clear ddos-protection protocols garp-reply aggregate states
<clear-ddos-garp-reply-aggregate-states>
clear ddos-protection protocols garp-reply aggregate statistics
<clear-ddos-garp-reply-aggregate-statistics>
clear ddos-protection protocols garp-reply culprit-flows
<clear-ddos-garp-reply-flows>
clear ddos-protection protocols garp-reply states
<clear-ddos-garp-reply-states>
clear ddos-protection protocols garp-reply statistics
<clear-ddos-garp-reply-statistics>
clear ddos-protection protocols gre hbc
clear ddos-protection protocols gre hbc culprit-flows
<clear-ddos-gre-hbc-flows>
clear ddos-protection protocols gre hbc states
<clear-ddos-gre-hbc-states>
clear ddos-protection protocols gre hbc statistics
<clear-ddos-gre-hbc-statistics>
clear ddos-protection protocols gre punt
clear ddos-protection protocols gre punt culprit-flows
<clear-ddos-gre-punt-flows>
clear ddos-protection protocols gre punt states
<clear-ddos-gre-punt-states>
clear ddos-protection protocols gre punt statistics
<clear-ddos-gre-punt-statistics>
clear ddos-protection protocols ipmc-reserved
clear ddos-protection protocols ipmc-reserved aggregate
clear ddos-protection protocols ipmc-reserved aggregate culprit-flows
<clear-ddos-ipmc-reserved-aggregate-flows>
clear ddos-protection protocols ipmc-reserved aggregate states
<clear-ddos-ipmc-reserved-aggregate-states>
clear ddos-protection protocols ipmc-reserved aggregate statistics
<clear-ddos-ipmc-reserved-aggregate-statistics>
clear ddos-protection protocols ipmc-reserved culprit-flows
<clear-ddos-ipmc-reserved-flows>
clear ddos-protection protocols ipmc-reserved states
<clear-ddos-ipmc-reserved-states>
clear ddos-protection protocols ipmc-reserved statistics
<clear-ddos-ipmc-reserved-statistics>
clear ddos-protection protocols ipmcast-miss
clear ddos-protection protocols ipmcast-miss aggregate
clear ddos-protection protocols ipmcast-miss aggregate culprit-flows
<clear-ddos-ipmcast-miss-aggregate-flows>
clear ddos-protection protocols ipmcast-miss aggregate states
<clear-ddos-ipmcast-miss-aggregate-states>
clear ddos-protection protocols ipmcast-miss aggregate statistics
<clear-ddos-ipmcast-miss-aggregate-statistics>
clear ddos-protection protocols ipmcast-miss culprit-flows
<clear-ddos-ipmcast-miss-flows>
clear ddos-protection protocols ipmcast-miss states
<clear-ddos-ipmcast-miss-states>
clear ddos-protection protocols ipmcast-miss statistics
<clear-ddos-ipmcast-miss-statistics>
clear ddos-protection protocols l3dest-miss
clear ddos-protection protocols l3dest-miss aggregate
clear ddos-protection protocols l3dest-miss aggregate culprit-flows
<clear-ddos-l3dest-miss-aggregate-flows>
clear ddos-protection protocols l3dest-miss aggregate states
<clear-ddos-l3dest-miss-aggregate-states>
clear ddos-protection protocols l3dest-miss aggregate statistics
```

```

<clear-ddos-l3dest-miss-aggregate-statistics>
clear ddos-protection protocols l3dest-miss culprit-flows
<clear-ddos-l3dest-miss-flows>
clear ddos-protection protocols l3dest-miss states
<clear-ddos-l3dest-miss-states>
clear ddos-protection protocols l3dest-miss statistics
<clear-ddos-l3dest-miss-statistics>
clear ddos-protection protocols l3mc-sgv-hit-icl
clear ddos-protection protocols l3mc-sgv-hit-icl aggregate
clear ddos-protection protocols l3mc-sgv-hit-icl aggregate culprit-flows
<clear-ddos-l3mc-sgv-hit-icl-aggregate-flows>
clear ddos-protection protocols l3mc-sgv-hit-icl aggregate states
<clear-ddos-l3mc-sgv-hit-icl-aggregate-states>
clear ddos-protection protocols l3mc-sgv-hit-icl aggregate statistics
<clear-ddos-l3mc-sgv-hit-icl-aggregate-statistics>
clear ddos-protection protocols l3mc-sgv-hit-icl culprit-flows
clear ddos-protection protocols l3mc-sgv-hit-icl culprit-flows
<clear-ddos-l3mc-sgv-hit-icl-flows>
clear ddos-protection protocols l3mc-sgv-hit-icl states
<clear-ddos-l3mc-sgv-hit-icl-states>
clear ddos-protection protocols l3mc-sgv-hit-icl statistics
<clear-ddos-l3mc-sgv-hit-icl-statistics>
clear ddos-protection protocols l3mtu-fail
clear ddos-protection protocols l3mtu-fail aggregate
clear ddos-protection protocols l3mtu-fail aggregate culprit-flows
<clear-ddos-l3mtu-fail-aggregate-flows>
clear ddos-protection protocols l3mtu-fail aggregate states
<clear-ddos-l3mtu-fail-aggregate-states>
clear ddos-protection protocols l3mtu-fail aggregate statistics
<clear-ddos-l3mtu-fail-aggregate-statistics>
clear ddos-protection protocols l3mtu-fail culprit-flows
<clear-ddos-l3mtu-fail-flows>
clear ddos-protection protocols l3mtu-fail states
<clear-ddos-l3mtu-fail-states>
clear ddos-protection protocols l3mtu-fail statistics
<clear-ddos-l3mtu-fail-statistics>
clear ddos-protection protocols l3nhop
clear ddos-protection protocols l3nhop aggregate
clear ddos-protection protocols l3nhop aggregate culprit-flows
<clear-ddos-l3nhop-aggregate-flows>
clear ddos-protection protocols l3nhop aggregate states
<clear-ddos-l3nhop-aggregate-states>
clear ddos-protection protocols l3nhop aggregate statistics
<clear-ddos-l3nhop-aggregate-statistics>
clear ddos-protection protocols l3nhop culprit-flows
<clear-ddos-l3nhop-flows>
clear ddos-protection protocols l3nhop states
<clear-ddos-l3nhop-states>
clear ddos-protection protocols l3nhop statistics
<clear-ddos-l3nhop-statistics>
clear ddos-protection protocols localnh
clear ddos-protection protocols localnh aggregate
clear ddos-protection protocols localnh aggregate culprit-flows
<clear-ddos-localnh-aggregate-flows>
clear ddos-protection protocols localnh aggregate states
<clear-ddos-localnh-aggregate-states>
clear ddos-protection protocols localnh aggregate statistics
<clear-ddos-localnh-aggregate-statistics>
clear ddos-protection protocols localnh culprit-flows
<clear-ddos-localnh-flows>

```

```
clear ddos-protection protocols localnh states
<clear-ddos-localnh-states>
clear ddos-protection protocols localnh statistics
<clear-ddos-localnh-statistics>
clear-ddos-dhcpv4-unclass-states
clear-ddos-dhcpv4-unclass-statistics
clear-ddos-dhcpv6-advertise-states
clear-ddos-dhcpv6-advertise-statistics
clear-ddos-dhcpv6-aggregate-states
clear-ddos-dhcpv6-aggregate-statistics
clear-ddos-dhcpv6-confirm-states
clear-ddos-dhcpv6-confirm-statistics
clear-ddos-dhcpv6-decline-states
clear-ddos-dhcpv6-decline-statistics
clear-ddos-dhcpv6-info-req-states
clear-ddos-dhcpv6-info-req-statistics
clear-ddos-dhcpv6-leaseq-da-states
clear-ddos-dhcpv6-leasequery-states
clear-ddos-dhcpv6-leasequery-statistics
clear ddos-protection protocols dhcpv6 leasequery-done
clear ddos-protection protocols dhcpv6 leasequery-done states
clear-ddos-dhcpv6-leaseq-do-states
clear ddos-protection protocols dhcpv6 leasequery-done statistics
clear-ddos-dhcpv6-leaseq-do-statistics
clear ddos-protection protocols dhcpv6 leasequery-reply
clear ddos-protection protocols dhcpv6 leasequery-reply states
clear-ddos-dhcpv6-leaseq-re-states
clear ddos-protection protocols dhcpv6 leasequery-reply statistics
clear-ddos-dhcpv6-leaseq-re-statistics
clear ddos-protection protocols dhcpv6 rebind
clear ddos-protection protocols dhcpv6 rebind states
clear-ddos-dhcpv6-rebind-states
clear ddos-protection protocols dhcpv6 rebind statistics
clear-ddos-dhcpv6-rebind-statistics
clear ddos-protection protocols dhcpv6 reconfigure
clear ddos-protection protocols dhcpv6 reconfigure states
clear-ddos-dhcpv6-reconfig-states
clear ddos-protection protocols dhcpv6 reconfigure statistics
clear-ddos-dhcpv6-reconfig-statistics
clear ddos-protection protocols dhcpv6 relay-forward
clear ddos-protection protocols dhcpv6 relay-forward states
clear-ddos-dhcpv6-relay-for-states
clear ddos-protection protocols dhcpv6 relay-forward statistics
clear-ddos-dhcpv6-relay-for-statistics
clear ddos-protection protocols dhcpv6 relay-reply
clear ddos-protection protocols dhcpv6 relay-reply states
clear-ddos-dhcpv6-relay-rep-states
clear ddos-protection protocols dhcpv6 relay-reply statistics
clear-ddos-dhcpv6-relay-rep-statistics
clear ddos-protection protocols dhcpv6 release
clear ddos-protection protocols dhcpv6 release states
clear-ddos-dhcpv6-release-states
clear ddos-protection protocols dhcpv6 release statistics
clear-ddos-dhcpv6-release-statistics
clear ddos-protection protocols dhcpv6 renew
clear ddos-protection protocols dhcpv6 renew states
clear-ddos-dhcpv6-renew-states
clear ddos-protection protocols dhcpv6 renew statistics
clear-ddos-dhcpv6-renew-statistics
clear ddos-protection protocols dhcpv6 reply
```



```
clear ddos-protection protocols dhcpv6 reply states
clear-ddos-dhcpv6-reply-states
clear ddos-protection protocols dhcpv6 reply statistics
clear-ddos-dhcpv6-reply-statistics
clear ddos-protection protocols dhcpv6 request
clear ddos-protection protocols dhcpv6 request culprit-flows
clear ddos-protection protocols dhcpv6 request states
clear-ddos-dhcpv6-request-states
clear ddos-protection protocols dhcpv6 request statistics
clear-ddos-dhcpv6-request-statistics
clear ddos-protection protocols dhcpv6 solicit
clear ddos-protection protocols dhcpv6 solicit culprit-flows
clear ddos-protection protocols dhcpv6 solicit states
clear-ddos-dhcpv6-solicit-states
clear ddos-protection protocols dhcpv6 solicit statistics
clear-ddos-dhcpv6-solicit-statistics
clear ddos-protection protocols dhcpv6 states
clear-ddos-dhcpv6-states
clear ddos-protection protocols dhcpv6 statistics
clear-ddos-dhcpv6-statistics
clear ddos-protection protocols dhcpv6 unclassified
clear ddos-protection protocols dhcpv6 unclassified culprit-flows
clear ddos-protection protocols dhcpv6 unclassified states
clear-ddos-dhcpv6-unclass-states
clear ddos-protection protocols dhcpv6 unclassified statistics
clear-ddos-dhcpv6-unclass-statistics
clear ddos-protection protocols diameter aggregate
clear ddos-protection protocols diameter aggregate culprit-flows
clear ddos-protection protocols diameter aggregate states
clear ddos-protection protocols diameter aggregate statistics
clear-ddos-dhcpv6-leaseq-da-statistics
clear-ddos-dhcpv6-leaseq-do-states
clear-ddos-dhcpv6-leaseq-do-statistics
clear-ddos-dhcpv6-leaseq-re-states
clear-ddos-dhcpv6-leaseq-re-statistics
clear-ddos-dhcpv6-rebind-states
clear-ddos-dhcpv6-rebind-statistics
clear-ddos-dhcpv6-reconfig-states
clear-ddos-dhcpv6-reconfig-statistics
clear-ddos-dhcpv6-relay-for-states
clear-ddos-dhcpv6-relay-for-statistics
clear-ddos-dhcpv6-relay-rep-states
clear-ddos-dhcpv6-relay-rep-statistics
clear-ddos-dhcpv6-release-states
clear-ddos-dhcpv6-release-statistics
clear-ddos-dhcpv6-renew-states
clear-ddos-dhcpv6-renew-statistics
clear-ddos-dhcpv6-reply-states
clear-ddos-dhcpv6-reply-statistics
clear-ddos-dhcpv6-request-states
clear-ddos-dhcpv6-request-statistics
clear-ddos-dhcpv6-solicit-states
clear-ddos-dhcpv6-solicit-statistics
clear-ddos-dhcpv6-states
clear-ddos-dhcpv6-statistics
clear-ddos-dhcpv6-unclass-states
clear-ddos-dhcpv6-unclass-statistics
clear-ddos-diameter-aggregate-states
clear ddos-protection protocols diameter aggregate statistics
```

```
clear-ddos-diameter-aggregate-statistics
clear ddos-protection protocols diameter states
clear-ddos-diameter-states
clear ddos-protection protocols diameter statistics
clear-ddos-diameter-statistics
clear ddos-protection protocols dns
clear ddos-protection protocols dns aggregate
clear ddos-protection protocols dns aggregate states
clear-ddos-dns-aggregate-states
clear ddos-protection protocols dns aggregate statistics
clear-ddos-dns-aggregate-statistics
clear ddos-protection protocols dns states
clear-ddos-dns-states
clear ddos-protection protocols dns statistics
clear-ddos-dns-statistics
clear ddos-protection protocols dtcp
clear ddos-protection protocols dtcp aggregate
clear ddos-protection protocols dtcp aggregate culprit-flows
clear ddos-protection protocols dtcp aggregate states
clear-ddos-dtcp-aggregate-states
clear ddos-protection protocols dtcp aggregate statistics
clear ddos-protection protocols dtcp culprit-flows
clear ddos-protection protocols dtcp states
clear-ddos-dtcp-states
clear ddos-protection protocols dtcp statistics
clear-ddos-dtcp-statistics
clear ddos-protection protocols dynamic-vlan
clear ddos-protection protocols dynamic-vlan aggregate
clear ddos-protection protocols dynamic-vlan aggregate culprit-flows
clear ddos-protection protocols dynamic-vlan aggregate states
clear-ddos-dynvlan-aggregate-states
clear ddos-protection protocols dynamic-vlan aggregate statistics
clear-ddos-dynvlan-aggregate-statistics
clear ddos-protection protocols dynamic-vlan states
clear-ddos-dynvlan-states
clear ddos-protection protocols dynamic-vlan statistics
clear-ddos-dynvlan-statistics
clear ddos-protection protocols egpv6
clear ddos-protection protocols egpv6 aggregate
clear ddos-protection protocols egpv6 aggregate culprit-flows
clear ddos-protection protocols egpv6 aggregate states
clear-ddos-egpv6-aggregate-states
clear ddos-protection protocols egpv6 aggregate statistics
clear-ddos-egpv6-aggregate-statistics
clear ddos-protection protocols egpv6 states
clear-ddos-egpv6-states
clear ddos-protection protocols egpv6 statistics
clear-ddos-egpv6-statistics
clear ddos-protection protocols eoam
clear ddos-protection protocols eoam aggregate
clear ddos-protection protocols eoam aggregate culprit-flows
clear ddos-protection protocols eoam aggregate states
clear-ddos-eoam-aggregate-states
clear ddos-protection protocols eoam aggregate statistics
clear-ddos-eoam-aggregate-statistics
clear ddos-protection protocols eoam states
clear-ddos-eoam-states
clear ddos-protection protocols eoam statistics
clear-ddos-eoam-statistics
clear ddos-protection protocols esmc
```

```

clear ddos-protection protocols esmc aggregate
clear ddos-protection protocols esmc aggregate culprit-flows
clear ddos-protection protocols esmc aggregate states
clear-ddos-esmc-aggregate-states
clear ddos-protection protocols esmc aggregate statistics
clear ddos-protection protocols esmc culprit-flows
clear ddos-protection protocols esmc states
clear-ddos-esmc-states
clear ddos-protection protocols esmc statistics
<clear-ddos-esmc-statistics>
clear ddos-protection protocols ethernet-tcc
clear ddos-protection protocols ethernet-tcc aggregate
clear ddos-protection protocols ethernet-tcc aggregate culprit-flows
<clear-ddos-eth-tcc-aggregate-flows>
clear ddos-protection protocols ethernet-tcc aggregate states
<clear-ddos-eth-tcc-aggregate-states>
clear ddos-protection protocols ethernet-tcc aggregate statistics
<clear-ddos-eth-tcc-aggregate-statistics>
clear ddos-protection protocols ethernet-tcc culprit-flows
<clear-ddos-eth-tcc-flows>
clear ddos-protection protocols ethernet-tcc states
<clear-ddos-eth-tcc-states>
clear ddos-protection protocols ethernet-tcc statistics
<clear-ddos-eth-tcc-statistics>
clear ddos-protection protocols exceptions
clear ddos-protection protocols exceptions aggregate
clear ddos-protection protocols exceptions aggregate culprit-flows
<clear-ddos-exception-aggregate-flows>
clear ddos-protection protocols exceptions aggregate states
<clear-ddos-exception-aggregate-states>
clear ddos-protection protocols exceptions aggregate statistics
<clear-ddos-exception-aggregate-statistics>
clear ddos-protection protocols exceptions culprit-flows
<clear-ddos-exception-flows>
clear ddos-protection protocols exceptions mcast-rpf-err
clear ddos-protection protocols exceptions mcast-rpf-err culprit-flows
<clear-ddos-exception-mcast-rpf-flows>
clear ddos-protection protocols exceptions mcast-rpf-err states
<clear-ddos-exception-mcast-rpf-states>
clear ddos-protection protocols exceptions mcast-rpf-err statistics
<clear-ddos-exception-mcast-rpf-statistics>
clear ddos-protection protocols exceptions mtu-exceeded
clear ddos-protection protocols exceptions mtu-exceeded culprit-flows
<clear-ddos-exception-mtu-exceed-flows>
clear ddos-protection protocols exceptions mtu-exceeded states
<clear-ddos-exception-mtu-exceed-states>
clear ddos-protection protocols exceptions mtu-exceeded statistics
<clear-ddos-exception-mtu-exceed-statistics>
clear ddos-protection protocols exceptions states
<clear-ddos-exception-states>
clear ddos-protection protocols exceptions statistics
<clear-ddos-exception-statistics>
clear ddos-protection protocols exceptions unclassified
clear ddos-protection protocols exceptions unclassified culprit-flows
<clear-ddos-exception-unclass-flows>
clear ddos-protection protocols exceptions unclassified states
<clear-ddos-exception-unclass-states>
clear ddos-protection protocols exceptions unclassified statistics
<clear-ddos-exception-unclass-statistics>
clear ddos-protection protocols fab-probe

```

```
clear ddos-protection protocols fab-probe aggregate
clear ddos-protection protocols fab-probe aggregate states
clear ddos-protection protocols fab-probe aggregate statistics
<clear-ddos-fab-probe-aggregate-statistics>
clear ddos-protection protocols martian-address
clear ddos-protection protocols martian-address aggregate
clear ddos-protection protocols martian-address aggregate culprit-flows
<clear-ddos-martian-address-aggregate-flows>
clear ddos-protection protocols martian-address aggregate states
<clear-ddos-martian-address-aggregate-states>
clear ddos-protection protocols martian-address aggregate statistics
<clear-ddos-martian-address-aggregate-statistics>
clear ddos-protection protocols martian-address culprit-flows
<clear-ddos-martian-address-flows>
clear ddos-protection protocols martian-address states
<clear-ddos-martian-address-states>
clear ddos-protection protocols martian-address statistics
<clear-ddos-martian-address-statistics>
clear-ddos-diameter-statistics
clear-ddos-dns-aggregate-states
clear-ddos-dns-aggregate-statistics
clear-ddos-dns-states
clear-ddos-dns-statistics
clear-ddos-dtcp-aggregate-states
clear-ddos-dtcp-aggregate-statistics
clear-ddos-dtcp-states
clear-ddos-dtcp-statistics
clear-ddos-dynvlan-aggregate-states
clear-ddos-dynvlan-aggregate-statistics
clear-ddos-dynvlan-states
clear-ddos-dynvlan-statistics
clear-ddos-egpv6-aggregate-states
clear-ddos-egpv6-aggregate-statistics
clear-ddos-egpv6-states
clear-ddos-egpv6-statistics
clear-ddos-eoam-aggregate-states
clear-ddos-eoam-aggregate-statistics
clear-ddos-eoam-states
clear-ddos-eoam-statistics
clear-ddos-esmc-aggregate-states
clear-ddos-esmc-aggregate-statistics
clear-ddos-esmc-states
clear ddos-protection protocols fab-probe states
<clear-ddos-fab-probe-states>
clear ddos-protection protocols fab-probe statistics
<clear-ddos-fab-probe-statistics>
clear-ddos-esmc-statistics
clear ddos-protection protocols firewall-host
clear ddos-protection protocols firewall-host aggregate
clear ddos-protection protocols firewall-host aggregate culprit-flows
clear ddos-protection protocols firewall-host aggregate states
clear-ddos-fw-host-aggregate-states
clear ddos-protection protocols firewall-host aggregate statistics
clear ddos-protection protocols firewall-host states
clear ddos-protection protocols firewall-host statistics
clear-ddos-esmc-statistics
clear-ddos-fw-host-aggregate-states
clear-ddos-fw-host-aggregate-statistics
<clear-ddos-fw-host-statistics>
clear-ddos-fw-host-states
```

```
clear ddos-protection protocols frame-relay
clear ddos-protection protocols frame-relay aggregate
clear ddos-protection protocols frame-relay aggregate culprit-flows
clear ddos-protection protocols frame-relay aggregate states
clear ddos-protection protocols frame-relay aggregate statistics
clear ddos-protection protocols frame-relay culprit-flows
clear ddos-protection protocols frame-relay frf15
clear ddos-protection protocols frame-relay frf15 culprit-flows
clear ddos-protection protocols frame-relay frf15 states
clear ddos-protection protocols frame-relay frf15 statistics
clear ddos-protection protocols frame-relay frf16
clear ddos-protection protocols frame-relay frf16 culprit-flows
clear ddos-protection protocols frame-relay frf16 states
clear ddos-protection protocols frame-relay frf16 statistics
clear ddos-protection protocols frame-relay states
clear ddos-protection protocols frame-relay statistics
clear ddos-protection protocols ftp
clear ddos-protection protocols ftp aggregate
clear ddos-protection protocols ftp aggregate culprit-flows
clear ddos-protection protocols ftp aggregate states
clear-ddos-ftp-aggregate-states
clear ddos-protection protocols ftp aggregate statistics
clear-ddos-ftp-aggregate-statistics
clear ddos-protection protocols ftp states
clear-ddos-ftp-states
clear ddos-protection protocols ftp statistics
clear-ddos-ftp-statistics
clear ddos-protection protocols ftpv6
clear ddos-protection protocols ftpv6 aggregate
clear ddos-protection protocols ftpv6 aggregate culprit-flows
clear ddos-protection protocols ftpv6 aggregate states
clear-ddos-ftp6-aggregate-states
clear ddos-protection protocols ftpv6 aggregate statistics
clear-ddos-ftp6-aggregate-statistics
clear ddos-protection protocols ftpv6 states
clear-ddos-ftp6-states
clear ddos-protection protocols ftpv6 statistics
clear-ddos-ftp6-statistics
clear ddos-protection protocols gre
clear ddos-protection protocols gre aggregate
clear ddos-protection protocols gre aggregate culprit-flow
clear ddos-protection protocols gre aggregate states
clear ddos-protection protocols gre culprit-flows
clear-ddos-ftp-statistics
clear-ddos-ftp6-aggregate-states
clear-ddos-ftp6-aggregate-statistics
clear-ddos-ftp6-states
clear-ddos-ftp6-statistics
clear-ddos-gre-aggregate-states
clear ddos-protection protocols gre aggregate statistics
clear-ddos-gre-aggregate-statistics
clear ddos-protection protocols gre states
clear-ddos-gre-states
clear ddos-protection protocols gre statistics
clear-ddos-gre-statistics
clear ddos-protection protocols icmp
clear ddos-protection protocols icmp aggregate
clear ddos-protection protocols icmp aggregate states
clear-ddos-icmp-aggregate-states
clear ddos-protection protocols icmp aggregate statistics
```

```
clear-ddos-icmp-aggregate-statistics
clear ddos-protection protocols icmp states
clear-ddos-icmp-states
clear ddos-protection protocols icmp statistics
clear-ddos-icmp-statistics
clear ddos-protection protocols icmpv6
clear ddos-protection protocols icmpv6 aggregate
clear ddos-protection protocols icmpv6 aggregate culprit-flows
clear ddos-protection protocols icmpv6 aggregate states
<clear-ddos-icmpv6-aggregate-states>
clear ddos-protection protocols icmpv6 aggregate statistics
<clear-ddos-icmp-aggregate-statistics>
<clear-ddos-icmpv6-aggregate-statistics>
clear ddos-protection protocols icmpv6 states
<clear-ddos-icmpv6-states>
clear ddos-protection protocols icmpv6 statistics
<clear-ddos-icmpv6-statistics>
clear ddos-protection protocols igmp
clear ddos-protection protocols igmp aggregate
clear ddos-protection protocols igmp aggregate culprit-flows
clear ddos-protection protocols igmp aggregate states
clear-ddos-igmp-aggregate-states
clear ddos-protection protocols igmp aggregate statistics
clear-ddos-igmp-aggregate-statistics
clear ddos-protection protocols igmp states
clear-ddos-igmp-states
clear ddos-protection protocols igmp statistics
clear-ddos-igmp-statistics
clear ddos-protection protocols igmp-snoop
clear ddos-protection protocols igmp-snoop aggregate
clear ddos-protection protocols igmp-snoop aggregate states
clear-ddos-igmp-snoop-aggregate-states
clear ddos-protection protocols igmp-snoop aggregate statistics
clear-ddos-igmp-snoop-aggregate-statistics
clear ddos-protection protocols igmp-snoop states
clear-ddos-igmp-snoop-states
clear ddos-protection protocols igmp-snoop statistics
clear-ddos-igmp-snoop-statistics
clear ddos-protection protocols igmpv4v6
clear ddos-protection protocols igmpv4v6 aggregate
clear ddos-protection protocols igmpv4v6 aggregate states
clear-ddos-igmpv4v6-aggregate-states
clear ddos-protection protocols igmpv4v6 aggregate statistics
clear ddos-protection protocols igmpv4v6 culprit-flows
clear ddos-protection protocols igmpv4v6 states
clear-ddos-igmpv4v6-states
clear ddos-protection protocols igmpv4v6 statistics
clear-ddos-igmpv4v6-statistics
clear ddos-protection protocols igmpv6
clear ddos-protection protocols igmpv6 aggregate
clear ddos-protection protocols igmpv6 aggregate culprit-flows
clear ddos-protection protocols igmpv6 aggregate states
clear ddos-protection protocols igmpv6 aggregate statistics
clear ddos-protection protocols igmpv6 states
clear ddos-protection protocols igmpv6 statistics
<clear-ddos-igmpv6-statistics>clear-ddos-igmp-snoop-states
clear-ddos-igmp-snoop-statistics
clear-ddos-igmp-statistics
clear-ddos-igmpv4v6-aggregate-states
clear-ddos-igmpv4v6-aggregate-statistics
```

```

clear-ddos-igmpv4v6-states
clear-ddos-igmpv4v6-statistics
clear-ddos-igmpv6-aggregate-states
clear ddos-protection protocols igmpv6 aggregate statistics
clear-ddos-igmpv6-aggregate-statistics
clear ddos-protection protocols igmpv6 states
clear-ddos-igmpv6-states
clear ddos-protection protocols inline-ka
clear ddos-protection protocols inline-ka aggregate
clear ddos-protection protocols inline-ka aggregate culprit-flows
clear ddos-protection protocols inline-ka aggregate states
clear ddos-protection protocols inline-ka aggregate statistics
clear ddos-protection protocols inline-ka culprit-flows
clear ddos-protection protocols inline-ka states
clear ddos-protection protocols inline-ka statistics
clear ddos-protection protocols inline-svcs
clear ddos-protection protocols inline-svcs aggregate
clear ddos-protection protocols inline-svcs aggregate culprit-flows
clear ddos-protection protocols inline-svcs aggregate states
clear ddos-protection protocols inline-svcs aggregate statistics
clear ddos-protection protocols inline-svcs culprit-flows
clear ddos-protection protocols inline-svcs states
clear ddos-protection protocols inline-svcs statistics
clear ddos-protection protocols ip-fragments
clear ddos-protection protocols ip-fragments aggregate
clear ddos-protection protocols ip-fragments aggregate states
clear-ddos-ip-frag-aggregate-states
clear ddos-protection protocols ip-fragments aggregate statistics
clear ddos-protection protocols ip-fragments culprit-flows
clear ddos-protection protocols ip-fragments first-fragment
clear ddos-protection protocols ip-fragments first-fragment states
clear-ddos-ip-frag-first-frag-states
clear ddos-protection protocols ip-fragments first-fragment statistics
clear-ddos-ip-frag-first-frag-statistics
clear ddos-protection protocols ip-fragments states
clear-ddos-ip-frag-states
clear ddos-protection protocols ip-fragments statistics
clear-ddos-ip-frag-statistics
clear ddos-protection protocols ip-fragments trail-fragment
clear ddos-protection protocols ip-fragments trail-fragment culprit-flows
clear ddos-protection protocols ip-fragments trail-fragment states
clear-ddos-ip-frag-trail-frag-states
clear ddos-protection protocols ip-fragments trail-fragment statistics
clear-ddos-ip-frag-trail-frag-statistics
clear ddos-protection protocols ip-options
clear ddos-protection protocols ip-options aggregate
clear ddos-protection protocols ip-options aggregate states
clear-ddos-ip-opt-aggregate-states
clear ddos-protection protocols ip-options aggregate statistics
clear-ddos-ip-opt-aggregate-statistics
clear ddos-protection protocols ip-options non-v4v6
clear ddos-protection protocols ip-options non-v4v6 states
<clear-ddos-ip-opt-non-v4v6-states>
clear-ddos-ip-frag-aggregate-states
clear-ddos-ip-frag-aggregate-statistics
clear-ddos-ip-frag-first-frag-states
clear-ddos-ip-frag-first-frag-statistics
clear-ddos-ip-frag-states
clear-ddos-ip-frag-statistics
clear-ddos-ip-frag-trail-frag-states

```

```
clear-ddos-ip-frag-trail-frag-statistics
clear-ddos-ip-opt-aggregate-states
clear-ddos-ip-opt-aggregate-statistics
clear ddos-protection protocols ip-options non-v4v6 statistics
<clear-ddos-ip-opt-non-v4v6-statistics>
clear ddos-protection protocols ip-options router-alert
clear ddos-protection protocols ip-options router-alert culprit-flows
clear ddos-protection protocols ip-options router-alert states
clear-ddos-ip-opt-rt-alert-states
clear ddos-protection protocols ip-options router-alert statistics
clear-ddos-ip-opt-rt-alert-statistics
clear ddos-protection protocols ip-options states
clear-ddos-ip-opt-states
clear ddos-protection protocols ip-options statistics
clear-ddos-ip-opt-statistics
clear ddos-protection protocols ip-options unclassified
clear ddos-protection protocols ip-options unclassified culprit-flows
clear ddos-protection protocols ip-options unclassified states
clear ddos-protection protocols ip-options unclassified statistics
clear-ddos-ip-opt-unclass-statistics
clear ddos-protection protocols ipv4-unclassified
clear ddos-protection protocols ipv4-unclassified aggregate
clear ddos-protection protocols ipv4-unclassified aggregate states
clear-ddos-ipv4-uncls-aggregate-states
clear ddos-protection protocols ipv4-unclassified aggregate statistics
clear-ddos-ipv4-uncls-aggregate-statistics
clear ddos-protection protocols ipv4-unclassified states
clear-ddos-ipv4-uncls-states
clear ddos-protection protocols ipv4-unclassified statistics
clear-ddos-ipv4-uncls-statistics
clear ddos-protection protocols ipv6-unclassified
clear ddos-protection protocols ipv6-unclassified aggregate
clear ddos-protection protocols ipv6-unclassified aggregate states
clear-ddos-ipv6-uncls-aggregate-states
clear ddos-protection protocols ipv6-unclassified aggregate statistics
clear-ddos-ipv6-uncls-aggregate-statistics
clear ddos-protection protocols ipv6-unclassified states
clear-ddos-ipv6-uncls-states
clear ddos-protection protocols ipv6-unclassified statistics
clear-ddos-ipv6-uncls-statistics
clear ddos-protection protocols isis
clear ddos-protection protocols isis aggregate
clear ddos-protection protocols isis aggregate culprit-flows
clear ddos-protection protocols isis aggregate states
clear-ddos-ip-opt-rt-alert-states
clear-ddos-ip-opt-rt-alert-statistics
clear-ddos-ip-opt-states
clear-ddos-ip-opt-statistics
clear-ddos-ip-opt-unclass-states
clear-ddos-ip-opt-unclass-statistics
clear-ddos-ipv4-uncls-aggregate-states
clear-ddos-isis-aggregate-states
clear ddos-protection protocols isis aggregate statistics
<clear-ddos-isis-aggregate-statistics>
clear ddos-protection protocols isis culprit-flows
clear ddos-protection protocols isis states
clear-ddos-isis-states
clear ddos-protection protocols isis statistics
clear-ddos-isis-statistics
clear ddos-protection protocols iso-tcc
```



```

clear ddos-protection protocols iso-tcc aggregate
clear ddos-protection protocols iso-tcc aggregate culprit-flows
<clear-ddos-iso-tcc-aggregate-flows>
clear ddos-protection protocols iso-tcc aggregate states
<clear-ddos-iso-tcc-aggregate-states>
clear ddos-protection protocols iso-tcc aggregate statistics
<clear-ddos-iso-tcc-aggregate-statistics>
clear ddos-protection protocols iso-tcc culprit-flows
<clear-ddos-iso-tcc-flows>
clear ddos-protection protocols iso-tcc states
<clear-ddos-iso-tcc-states>
clear ddos-protection protocols iso-tcc statistics
<clear-ddos-iso-tcc-statistics>
clear ddos-protection protocols jfm
clear ddos-protection protocols jfm aggregate
clear ddos-protection protocols jfm aggregate culprit-flows
clear ddos-protection protocols jfm aggregate states
clear-ddos-jfm-aggregate-states
clear ddos-protection protocols jfm aggregate statistics
clear-ddos-jfm-aggregate-statistics
clear ddos-protection protocols jfm states
clear-ddos-jfm-states
clear ddos-protection protocols jfm statistics
<clear-ddos-jfm-statistics>
clear ddos-protection protocols keepalive
clear ddos-protection protocols keepalive aggregate
clear ddos-protection protocols keepalive aggregate culprit-flows
clear ddos-protection protocols keepalive aggregate states
clear ddos-protection protocols keepalive aggregate statistics
clear ddos-protection protocols keepalive culprit-flows
clear ddos-protection protocols keepalive states
clear ddos-protection protocols keepalive statistics
clear ddos-protection protocols l2pt
clear ddos-protection protocols l2pt aggregate
clear ddos-protection protocols l2pt aggregate states
clear ddos-protection protocols l2pt aggregate statistics
clear ddos-protection protocols l2pt culprit-flows
clear ddos-protection protocols l2pt states
clear ddos-protection protocols l2pt statistics
clear ddos-protection protocols l2tp
clear ddos-protection protocols l2tp aggregate
clear ddos-protection protocols l2tp aggregate culprit-flows
clear ddos-protection protocols l2tp aggregate states
clear-ddos-l2tp-aggregate-states
clear ddos-protection protocols l2tp aggregate statistics
clear-ddos-l2tp-aggregate-statistics
clear ddos-protection protocols l2tp states
clear-ddos-l2tp-states
clear ddos-protection protocols l2tp statistics
clear-ddos-l2tp-statistics
clear ddos-protection protocols lacp
clear ddos-protection protocols lacp aggregate
clear ddos-protection protocols lacp aggregate culprit-flows
clear ddos-protection protocols lacp aggregate states
clear-ddos-lacp-aggregate-states
clear ddos-protection protocols lacp aggregate statistics
clear-ddos-lacp-aggregate-statistics
clear ddos-protection protocols lacp states
clear-ddos-lacp-states
clear ddos-protection protocols lacp statistics

```

```
clear-ddos-lacp-statistics
clear ddos-protection protocols ldp
clear ddos-protection protocols ldp aggregate
clear ddos-protection protocols ldp aggregate culprit-flows
clear ddos-protection protocols ldp aggregate states
clear-ddos-isis-states
clear-ddos-isis-statistics
clear-ddos-jfm-aggregate-states
clear-ddos-jfm-aggregate-statistics
clear-ddos-jfm-states
clear-ddos-l2tp-aggregate-states
clear-ddos-l2tp-aggregate-statistics
clear-ddos-l2tp-states
clear-ddos-l2tp-statistics
clear-ddos-lacp-aggregate-states
clear-ddos-lacp-aggregate-statistics
clear-ddos-lacp-states
clear-ddos-lacp-statistics
clear-ddos-ldp-aggregate-states
clear ddos-protection protocols ldp aggregate statistics
clear ddos-protection protocols ldp aggregate statistics
clear ddos-protection protocols ldp culprit-flows
clear ddos-protection protocols ldp culprit-flows
clear ddos-protection protocols ldp states
clear ddos-protection protocols ldp states
clear ddos-protection protocols ldp statistics
clear ddos-protection protocols ldp statistics
clear-ddos-ldp-statistics
clear ddos-protection protocols ldpv6
clear ddos-protection protocols ldpv6
clear ddos-protection protocols ldpv6 aggregate
clear ddos-protection protocols ldpv6 aggregate
clear ddos-protection protocols ldpv6 aggregate culprit-flows
clear ddos-protection protocols ldpv6 aggregate culprit-flows
clear ddos-protection protocols ldpv6 aggregate states
clear ddos-protection protocols ldpv6 aggregate states
clear ddos-protection protocols ldpv6 aggregate statistics
clear ddos-protection protocols ldpv6 aggregate statistics
clear-ddos-ldpv6-aggregate-statistics
clear ddos-protection protocols ldpv6 states
clear ddos-protection protocols ldpv6 states
clear ddos-protection protocols ldpv6 statistics
clear ddos-protection protocols ldpv6 statistics
clear ddos-protection protocols lldp
clear ddos-protection protocols lldp
clear ddos-protection protocols lldp aggregate
clear ddos-protection protocols lldp aggregate
clear ddos-protection protocols lldp aggregate culprit-flows
clear ddos-protection protocols lldp aggregate culprit-flows
clear ddos-protection protocols lldp aggregate states
clear ddos-protection protocols lldp aggregate states
clear ddos-protection protocols lldp aggregate statistics
clear ddos-protection protocols lldp aggregate statistics
clear ddos-protection protocols lldp states
clear ddos-protection protocols lldp states
clear-ddos-lldp-states
clear ddos-protection protocols lldp statistics
clear ddos-protection protocols lldp statistics
clear ddos-protection protocols lmp
clear ddos-protection protocols lmp
```

```

clear ddos-protection protocols lmp aggregate
clear ddos-protection protocols lmp aggregate
clear ddos-protection protocols lmp aggregate culprit-flows
clear ddos-protection protocols lmp aggregate culprit-flows
clear ddos-protection protocols lmp aggregate states
clear ddos-protection protocols lmp aggregate states
clear ddos-protection protocols lmp aggregate statistics
clear ddos-protection protocols lmp aggregate statistics
clear ddos-protection protocols lmp states
clear ddos-protection protocols lmp states
clear ddos-protection protocols lmp statistics
clear ddos-protection protocols lmp statistics
clear ddos-protection protocols lmpv6
clear ddos-protection protocols lmpv6
clear ddos-protection protocols lmpv6 aggregate
clear ddos-protection protocols lmpv6 aggregate
clear ddos-protection protocols lmpv6 aggregate culprit-flows
clear ddos-protection protocols lmpv6 aggregate culprit-flows
clear ddos-protection protocols lmpv6 aggregate states
clear ddos-protection protocols lmpv6 aggregate states
clear ddos-protection protocols lmpv6 aggregate statistics
clear ddos-protection protocols lmpv6 aggregate statistics
clear ddos-protection protocols lmpv6 culprit-flows
clear ddos-protection protocols lmpv6 states
clear-ddos-lmpv6-states
clear ddos-protection protocols lmpv6 statistics
clear-ddos-lmpv6-statistics
clear ddos-protection protocols mac-host
clear ddos-protection protocols mac-host aggregate
clear ddos-protection protocols mac-host aggregate culprit-flows
clear ddos-protection protocols mac-host aggregate states
clear-ddos-mac-host-aggregate-states
clear ddos-protection protocols mac-host aggregate statistics
clear-ddos-mac-host-aggregate-statistics
clear ddos-protection protocols mac-host states
clear-ddos-mac-host-states
clear ddos-protection protocols mac-host statistics
clear ddos-protection protocols mcast-snoop
clear ddos-protection protocols mcast-snoop aggregate
clear ddos-protection protocols mcast-snoop aggregate culprit-flows
clear ddos-protection protocols mcast-snoop aggregate states
clear ddos-protection protocols mcast-snoop aggregate statistics
clear ddos-protection protocols mcast-snoop culprit-flows
clear ddos-protection protocols mcast-snoop igmp
clear ddos-protection protocols mcast-snoop igmp culprit-flows
<clear-ddos-mcast-snoop-igmp-flows>
clear ddos-protection protocols mcast-snoop igmp states
<clear-ddos-mcast-snoop-igmp-states>
clear ddos-protection protocols mcast-snoop igmp statistics
<clear-ddos-mcast-snoop-igmp-statistics>
clear ddos-protection protocols mcast-snoop mld
clear ddos-protection protocols mcast-snoop mld culprit-flows
<clear-ddos-mcast-snoop-mld-flows>
clear ddos-protection protocols mcast-snoop mld states
<clear-ddos-mcast-snoop-mld-states>
clear ddos-protection protocols mcast-snoop mld statistics
<clear-ddos-mcast-snoop-mld-statistics>
clear ddos-protection protocols mld
clear ddos-protection protocols mld aggregate
clear ddos-protection protocols mld aggregate culprit-flows

```

```
<clear-ddos-mld-aggregate-flows>
clear ddos-protection protocols mld aggregate states
<clear-ddos-mld-aggregate-states>
clear ddos-protection protocols mld aggregate statistics
<clear-ddos-mld-aggregate-statistics>
clear ddos-protection protocols mld culprit-flows
<clear-ddos-mld-flows>
clear ddos-protection protocols mld states
<clear-ddos-mld-states>
clear ddos-protection protocols mld statistics
<clear-ddos-mld-statistics>
clear ddos-protection protocols mlp
clear ddos-protection protocols mlp add
clear ddos-protection protocols mlp add culprit-flows
<clear-ddos-mlp-add-flows>
clear ddos-protection protocols mlp add states
<clear-ddos-mlp-add-states>
clear ddos-protection protocols mlp add statistics
<clear-ddos-mlp-add-statistics>
clear ddos-protection protocols mlp aggregate
clear ddos-protection protocols mlp aggregate culprit-flows
clear ddos-protection protocols mlp aggregate states
clear-ddos-mlp-aggregate-states
clear ddos-protection protocols mlp aggregate statistics
clear-ddos-mlp-aggregate-statistics
clear ddos-protection protocols mlp aging-exception
clear ddos-protection protocols mlp aging-exception culprit-flows
clear ddos-protection protocols mlp aging-exception states
clear-ddos-mlp-aging-exc-states
clear ddos-protection protocols mlp aging-exception statistics
clear-ddos-mlp-aging-exc-statistics
clear ddos-protection protocols mlp packets
clear ddos-protection protocols mlp packets states
clear-ddos-mlp-packets-states
clear ddos-protection protocols mlp packets statistics
clear-ddos-mlp-packets-statistics
clear ddos-protection protocols mlp macpin-exception
clear ddos-protection protocols mlp macpin-exception culprit-flows
<clear-ddos-mlp-mac-pinning-flows>
clear ddos-protection protocols mlp macpin-exception states
<clear-ddos-mlp-mac-pinning-states>
clear ddos-protection protocols mlp macpin-exception statistics
<clear-ddos-mlp-mac-pinning-statistics>
clear ddos-protection protocols mlp states
clear-ddos-mlp-states
clear ddos-protection protocols mlp statistics
clear-ddos-mlp-statistics
clear ddos-protection protocols mlp unclassified
clear ddos-protection protocols mlp unclassified states
clear-ddos-mlp-unclass-states
clear ddos-protection protocols mlp unclassified statistics
clear-ddos-mlp-unclass-statistics
clear ddos-protection protocols msdp
clear ddos-protection protocols msdp aggregate
clear ddos-protection protocols msdp aggregate states
clear-ddos-msdp-aggregate-states
clear ddos-protection protocols msdp aggregate statistics
clear ddos-protection protocols msdp culprit-flows
clear ddos-protection protocols msdp states
clear-ddos-msdp-states
```

```

clear ddos-protection protocols msdp statistics
clear-ddos-msdp-statistics
clear ddos-protection protocols msdpv6
clear ddos-protection protocols msdpv6 aggregate
clear ddos-protection protocols msdpv6 aggregate culprit-flows
clear ddos-protection protocols msdpv6 aggregate states
clear-ddos-msdpv6-aggregate-states
clear ddos-protection protocols msdpv6 aggregate statistics
clear-ddos-msdpv6-aggregate-statistics
clear ddos-protection protocols msdpv6 states
clear-ddos-msdpv6-states
clear ddos-protection protocols msdpv6 statistics
clear-ddos-msdpv6-statistics
clear ddos-protection protocols multicast-copy
clear ddos-protection protocols multicast-copy aggregate
clear ddos-protection protocols multicast-copy aggregate states
clear-ddos-mcast-copy-aggregate-states
clear ddos-protection protocols multicast-copy aggregate statistics
clear-ddos-mcast-copy-aggregate-statistics
clear ddos-protection protocols multicast-copy states
clear-ddos-mcast-copy-states
clear ddos-protection protocols multicast-copy statistics
clear-ddos-mcast-copy-statistics
clear ddos-protection protocols mvrp
clear ddos-protection protocols mvrp aggregate
clear ddos-protection protocols mvrp aggregate states
clear-ddos-mvrp-aggregate-states
clear ddos-protection protocols mvrp aggregate statistics
clear ddos-protection protocols mvrp culprit-flows
clear ddos-protection protocols mvrp states
clear-ddos-mvrp-states
clear ddos-protection protocols mvrp statistics
clear-ddos-mvrp-statistics
clear ddos-protection protocols ndpv6
clear ddos-protection protocols ndpv6 aggregate
clear ddos-protection protocols ndpv6 aggregate states
clear ddos-protection protocols ndpv6 aggregate statistics
clear ddos-protection protocols ndpv6 neighbor-advertisement
clear ddos-protection protocols ndpv6 neighbor-advertisement culprit-flows
<clear-ddos-ndpv6-neighb-adv-flows>
clear ddos-protection protocols ndpv6 neighbor-advertisement states
<clear-ddos-ndpv6-neighb-adv-states>
clear ddos-protection protocols ndpv6 neighbor-advertisement statistics
<clear-ddos-ndpv6-neighb-adv-statistics>
clear ddos-protection protocols ndpv6 neighbor-solicitation
clear ddos-protection protocols ndpv6 neighbor-solicitation culprit-flows
<clear-ddos-ndpv6-neighb-sol-flows>
clear ddos-protection protocols ndpv6 neighbor-solicitation states
<clear-ddos-ndpv6-neighb-sol-states>
clear ddos-protection protocols ndpv6 neighbor-solicitation statistics
<clear-ddos-ndpv6-neighb-sol-statistics>
clear ddos-protection protocols ndpv6 redirect
clear ddos-protection protocols ndpv6 redirect culprit-flows
<clear-ddos-ndpv6-redirect-flows>
clear ddos-protection protocols ndpv6 redirect states
<clear-ddos-ndpv6-redirect-states>
clear ddos-protection protocols ndpv6 redirect statistics
<clear-ddos-ndpv6-redirect-statistics>
clear ddos-protection protocols ndpv6 router-advertisement
clear ddos-protection protocols ndpv6 router-advertisement culprit-flows

```

```
<clear-ddos-ndpv6-router-adv-flows>
clear ddos-protection protocols ndpv6 router-advertisement states
<clear-ddos-ndpv6-router-adv-states>
clear ddos-protection protocols ndpv6 router-advertisement statistics
<clear-ddos-ndpv6-router-adv-statistics>
clear ddos-protection protocols ndpv6 router-solicitation
clear ddos-protection protocols ndpv6 router-solicitation culprit-flows
<clear-ddos-ndpv6-router-sol-flows>
clear ddos-protection protocols ndpv6 router-solicitation states
<clear-ddos-ndpv6-router-sol-states>
clear ddos-protection protocols ndpv6 router-solicitation statistics
<clear-ddos-ndpv6-router-sol-statistics>
clear ddos-protection protocols ndpv6 states
clear ddos-protection protocols ndpv6 statistics
clear ddos-protection protocols nonucast-switch
clear ddos-protection protocols nonucast-switch aggregate
clear ddos-protection protocols nonucast-switch aggregate culprit-flows
<clear-ddos-nonucast-switch-aggregate-flows>
clear ddos-protection protocols nonucast-switch aggregate states
<clear-ddos-nonucast-switch-aggregate-states>
clear ddos-protection protocols nonucast-switch aggregate statistics
<clear-ddos-nonucast-switch-aggregate-statistics>
clear ddos-protection protocols nonucast-switch culprit-flows
<clear-ddos-nonucast-switch-flows>
clear ddos-protection protocols nonucast-switch states
<clear-ddos-nonucast-switch-states>
clear ddos-protection protocols nonucast-switch statistics
<clear-ddos-nonucast-switch-statistics>
clear ddos-protection protocols ntp aggregate
clear ddos-protection protocols ntp aggregate states
clear-ddos-ntp-aggregate-states
clear ddos-protection protocols ntp aggregate statistics
clear ddos-protection protocols ntp culprit-flows
clear ddos-protection protocols ntp states
clear-ddos-ntp-states
clear ddos-protection protocols ntp statistics
clear-ddos-ntp-statistics
clear ddos-protection protocols oam-cfm
clear ddos-protection protocols oam-cfm aggregate
clear ddos-protection protocols oam-cfm aggregate culprit-flows
<clear-ddos-oam-cfm-aggregate-flows>
clear ddos-protection protocols oam-cfm aggregate states
<clear-ddos-oam-cfm-aggregate-states>
clear ddos-protection protocols oam-cfm aggregate statistics
<clear-ddos-oam-cfm-aggregate-statistics>
clear ddos-protection protocols oam-cfm culprit-flows
<clear-ddos-oam-cfm-flows>
clear ddos-protection protocols oam-cfm states
<clear-ddos-oam-cfm-states>
clear ddos-protection protocols oam-cfm statistics
<clear-ddos-oam-cfm-statistics>
clear ddos-protection protocols oam-lfm
clear ddos-protection protocols oam-lfm aggregate
clear ddos-protection protocols oam-lfm aggregate states
clear-ddos-oam-lfm-aggregate-states
clear ddos-protection protocols oam-lfm aggregate statistics
clear-ddos-oam-lfm-aggregate-statistics
clear ddos-protection protocols oam-lfm states
clear-ddos-oam-lfm-states
clear ddos-protection protocols oam-lfm statistics
```

```
clear-ddos-oam-lfm-statistics
clear ddos-protection protocols ospf
clear ddos-protection protocols ospf aggregate
clear ddos-protection protocols ospf aggregate culprit-flows
clear ddos-protection protocols ospf aggregate states
clear-ddos-ospf-aggregate-states
clear ddos-protection protocols ospf aggregate statistics
clear-ddos-ospf-aggregate-statistics
clear ddos-protection protocols ospf states
clear ddos-protection protocols ospf statistics
clear ddos-protection protocols ospf-hello
clear ddos-protection protocols ospf-hello aggregate
clear ddos-protection protocols ospf-hello aggregate culprit-flows
<clear-ddos-ospf-hello-aggregate-flows>
clear ddos-protection protocols ospf-hello aggregate states
<clear-ddos-ospf-hello-aggregate-states>
clear ddos-protection protocols ospf-hello aggregate statistics
<clear-ddos-ospf-hello-aggregate-statistics>
clear ddos-protection protocols ospf-hello culprit-flows
<clear-ddos-ospf-hello-flows>
clear ddos-protection protocols ospf-hello states
<clear-ddos-ospf-hello-states>
clear ddos-protection protocols ospf-hello statistics
<clear-ddos-ospf-hello-statistics>
clear ddos-protection protocols ospfv3v6
clear ddos-protection protocols ospfv3v6 aggregate
clear ddos-protection protocols ospfv3v6 aggregate culprit-flows
clear ddos-protection protocols ospfv3v6 aggregate states
clear ddos-protection protocols ospfv3v6 aggregate statistics
clear ddos-protection protocols ospfv3v6 states
clear ddos-protection protocols ospfv3v6 statistics
clear-ddos-ldp-states
<clear-ddos-ldp-states>
clear ddos-protection protocols ldp-hello
clear ddos-protection protocols ldp-hello aggregate
clear ddos-protection protocols ldp-hello aggregate culprit-flows
<clear-ddos-ldp-hello-aggregate-flows>
clear ddos-protection protocols ldp-hello aggregate states
<clear-ddos-ldp-hello-aggregate-states>
clear ddos-protection protocols ldp-hello aggregate statistics
<clear-ddos-ldp-hello-aggregate-statistics>
clear ddos-protection protocols ldp-hello culprit-flows
<clear-ddos-ldp-hello-flows>
clear ddos-protection protocols ldp-hello states
<clear-ddos-ldp-hello-states>
clear ddos-protection protocols ldp-hello statistics
<clear-ddos-ldp-hello-statistics>
clear-ddos-ldp-statistics
clear-ddos-ldp-statistics
clear-ddos-ldpv6-aggregate-states
clear-ddos-ldpv6-aggregate-states
clear-ddos-ldpv6-aggregate-statistics
clear-ddos-ldpv6-aggregate-statistics
clear-ddos-ldpv6-states
clear-ddos-ldpv6-states
clear-ddos-ldpv6-statistics
clear-ddos-ldpv6-statistics
clear-ddos-lldp-aggregate-states
clear-ddos-lldp-aggregate-states
clear-ddos-lldp-aggregate-statistics
```

```
clear-ddos-lldp-aggregate-statistics
clear-ddos-lldp-states
clear-ddos-lldp-states
clear-ddos-lldp-statistics
clear-ddos-lldp-statistics
clear-ddos-lmp-aggregate-states
clear-ddos-lmp-aggregate-states
clear-ddos-lmp-aggregate-statistics
clear-ddos-lmp-aggregate-statistics
clear-ddos-lmp-states
clear-ddos-lmp-states
clear-ddos-lmp-statistics
clear-ddos-lmp-statistics
clear-ddos-lmpv6-aggregate-states
clear-ddos-lmpv6-aggregate-states
clear-ddos-lmpv6-states
clear-ddos-lmpv6-statistics
clear-ddos-mac-host-aggregate-states
clear-ddos-mac-host-aggregate-statistics
clear-ddos-mac-host-states
clear-ddos-mac-host-statistics
clear-ddos-mcast-copy-aggregate-states
clear-ddos-mcast-copy-aggregate-statistics
clear-ddos-mcast-copy-states
clear-ddos-mcast-copy-statistics
clear-ddos-mlp-aggregate-states
clear-ddos-mlp-aggregate-statistics
clear-ddos-mlp-aging-exc-states
clear-ddos-mlp-aging-exc-statistics
clear-ddos-mlp-packets-states
clear-ddos-mlp-packets-statistics
clear-ddos-mlp-states
clear-ddos-mlp-statistics
clear-ddos-mlp-unclass-states
clear-ddos-mlp-unclass-statistics
clear-ddos-msdp-aggregate-states
clear-ddos-msdp-aggregate-statistics
clear-ddos-msdp-states
clear-ddos-msdp-statistics
clear-ddos-msdpv6-aggregate-states
clear-ddos-msdpv6-aggregate-statistics
clear-ddos-msdpv6-states
clear-ddos-msdpv6-statistics
clear ddos-protection protocols multihop-bfd
clear ddos-protection protocols multihop-bfd aggregate
clear ddos-protection protocols multihop-bfd aggregate culprit-flows
<clear-ddos-mhop-bfd-aggregate-flows>
clear ddos-protection protocols multihop-bfd aggregate states
<clear-ddos-mhop-bfd-aggregate-states>
clear ddos-protection protocols multihop-bfd aggregate statistics
<clear-ddos-mhop-bfd-aggregate-statistics>
clear ddos-protection protocols multihop-bfd culprit-flows
<clear-ddos-mhop-bfd-flows>
clear ddos-protection protocols multihop-bfd states
<clear-ddos-mhop-bfd-states>
clear ddos-protection protocols multihop-bfd statistics
<clear-ddos-mhop-bfd-statistics>
clear-ddos-mvrp-aggregate-states
clear-ddos-mvrp-aggregate-statistics
clear-ddos-mvrp-states
```



```

clear-ddos-mvrp-statistics
clear-ddos-ntp-aggregate-states
clear-ddos-ntp-aggregate-statistics
clear-ddos-ntp-states
clear-ddos-ntp-statistics
clear-ddos-oam-lfm-aggregate-states
clear-ddos-oam-lfm-aggregate-statistics
clear-ddos-oam-lfm-states
clear-ddos-oam-lfm-statistics
clear-ddos-ospf-aggregate-states
clear-ddos-ospf-aggregate-statistics
clear-ddos-ospf-states
clear-ddos-ospf-statistics
clear-ddos-ospfv3v6-aggregate-states
clear ddos-protection protocols ospfv3v6 aggregate statistics
clear-ddos-ospfv3v6-aggregate-statistics
clear ddos-protection protocols ospfv3v6 states
clear-ddos-ospfv3v6-states
clear ddos-protection protocols pimv6
clear-ddos-pim-statistics
clear ddos-protection protocols pim-ctrl
clear ddos-protection protocols pim-ctrl aggregate
clear ddos-protection protocols pim-ctrl aggregate culprit-flows
<clear-ddos-pim-ctrl-aggregate-flows>
clear ddos-protection protocols pim-ctrl aggregate states
<clear-ddos-pim-ctrl-aggregate-states>
clear ddos-protection protocols pim-ctrl aggregate statistics
<clear-ddos-pim-ctrl-aggregate-statistics>
clear ddos-protection protocols pim-ctrl culprit-flows
<clear-ddos-pim-ctrl-flows>
clear ddos-protection protocols pim-ctrl states
<clear-ddos-pim-ctrl-states>
clear ddos-protection protocols pim-ctrl statistics
<clear-ddos-pim-ctrl-statistics>
clear ddos-protection protocols pim-data
clear ddos-protection protocols pim-data aggregate
clear ddos-protection protocols pim-data aggregate culprit-flows
<clear-ddos-pim-data-aggregate-flows>
clear ddos-protection protocols pim-data aggregate states
<clear-ddos-pim-data-aggregate-states>
clear ddos-protection protocols pim-data aggregate statistics
<clear-ddos-pim-data-aggregate-statistics>
clear ddos-protection protocols pim-data culprit-flows
<clear-ddos-pim-data-flows>
clear ddos-protection protocols pim-data states
<clear-ddos-pim-data-states>
clear ddos-protection protocols pim-data statistics
<clear-ddos-pim-data-statistics>
clear ddos-protection protocols pfe-alive
clear ddos-protection protocols pfe-alive aggregate
clear ddos-protection protocols pfe-alive aggregate states
clear-ddos-pfe-alive-aggregate-states
clear ddos-protection protocols pfe-alive aggregate statistics
clear ddos-protection protocols pfe-alive culprit-flows
clear ddos-protection protocols pfe-alive states
clear-ddos-pfe-alive-states
clear ddos-protection protocols pfe-alive statistics
clear-ddos-pfe-alive-statistics
clear ddos-protection protocols pim
clear ddos-protection protocols pim aggregate

```

```
clear ddos-protection protocols pim aggregate states
clear-ddos-pim-aggregate-states
clear ddos-protection protocols pim aggregate statistics
clear ddos-protection protocols pim culprit-flows
clear ddos-protection protocols pim states
clear-ddos-pim-states
clear ddos-protection protocols pim statistics
clear-ddos-pim-statistics
clear ddos-protection protocols pimv6
clear ddos-protection protocols pimv6 aggregate
clear ddos-protection protocols pimv6 aggregate culprit-flows
clear ddos-protection protocols pimv6 aggregate states
clear ddos-protection protocols pimv6 aggregate statistics
clear ddos-protection protocols pimv6 states
clear ddos-protection protocols pimv6 statistics
clear ddos-protection protocols pkt-inject
clear ddos-protection protocols pkt-inject aggregate
clear ddos-protection protocols pkt-inject aggregate culprit-flows
<clear-ddos-pkt-inject-aggregate-flows>
clear ddos-protection protocols pkt-inject aggregate states
<clear-ddos-pkt-inject-aggregate-states>
clear ddos-protection protocols pkt-inject aggregate statistics
<clear-ddos-pkt-inject-aggregate-statistics>
clear ddos-protection protocols pkt-inject culprit-flows
<clear-ddos-pkt-inject-flows>
clear ddos-protection protocols pkt-inject states
<clear-ddos-pkt-inject-states>
clear ddos-protection protocols pkt-inject statistics
<clear-ddos-pkt-inject-statistics>clear ddos-protection protocols pmvrp
clear ddos-protection protocols pmvrp aggregate
clear ddos-protection protocols pmvrp aggregate states
clear-ddos-pmvrp-aggregate-states
clear ddos-protection protocols pmvrp aggregate statistics
clear ddos-protection protocols pmvrp culprit-flows
clear ddos-protection protocols pmvrp culprit-flows
clear ddos-protection protocols pmvrp culprit-flows
clear ddos-protection protocols pmvrp culprit-flows
clear ddos-protection protocols pmvrp culprit-flows
clear ddos-protection protocols pmvrp culprit-flows
clear ddos-protection protocols pmvrp culprit-flows
clear ddos-protection protocols pmvrp states
clear-ddos-pmvrp-states
clear ddos-protection protocols pmvrp statistics
clear-ddos-pmvrp-statistics
clear ddos-protection protocols pos
clear ddos-protection protocols pos aggregate
clear ddos-protection protocols pos aggregate states
clear-ddos-pos-aggregate-states
clear ddos-protection protocols pos aggregate statistics
clear-ddos-pos-aggregate-statistics
clear ddos-protection protocols pos states
clear-ddos-pos-states
clear ddos-protection protocols pos statistics
clear-ddos-pos-statistics
clear ddos-protection protocols ppp
clear ddos-protection protocols ppp aggregate
clear ddos-protection protocols ppp aggregate states
clear-ddos-ppp-aggregate-states
clear ddos-protection protocols ppp aggregate statistics
clear-ddos-ppp-aggregate-statistics
```

```
clear ddos-protection protocols ppp authentication
clear ddos-protection protocols ppp authentication states
clear-ddos-ppp-auth-states
clear ddos-protection protocols ppp authentication statistics
clear-ddos-ppp-auth-statistics
clear ddos-protection protocols ppp ipcp
clear ddos-protection protocols ppp ipcp states
clear-ddos-ppp-ipcp-states
clear ddos-protection protocols ppp ipcp statistics
clear-ddos-ppp-ipcp-statistics
clear ddos-protection protocols ppp ipv6cp
clear ddos-protection protocols ppp ipv6cp states
clear-ddos-ppp-ipv6cp-states
clear ddos-protection protocols ppp ipv6cp statistics
clear-ddos-ppp-ipv6cp-statistics
clear ddos-protection protocols ppp isis
clear ddos-protection protocols ppp isis states
clear-ddos-ppp-isis-states
clear ddos-protection protocols ppp isis statistics
clear-ddos-ppp-isis-statistics
clear ddos-protection protocols ppp lcp
clear ddos-protection protocols ppp lcp states
clear-ddos-ppp-lcp-states
clear ddos-protection protocols ppp lcp statistics
clear-ddos-ppp-lcp-statistics
clear ddos-protection protocols ppp mplscp
clear ddos-protection protocols ppp mplscp states
clear-ddos-ppp-mplscp-states
clear ddos-protection protocols ppp mplscp statistics
clear-ddos-ppp-mplscp-statistics
clear ddos-protection protocols ppp states
clear-ddos-ppp-states
clear ddos-protection protocols ppp statistics
clear-ddos-ppp-statistics
clear ddos-protection protocols ppp unclassified
clear ddos-protection protocols ppp unclassified states
clear ddos-protection protocols ppp unclassified statistics
<clear-ddos-ppp-unclass-statistics>
clear ddos-protection protocols pppoe
clear ddos-protection protocols pppoe aggregate
clear ddos-protection protocols pppoe aggregate states
clear-ddos-pppoe-aggregate-states
clear ddos-protection protocols pppoe aggregate statistics
clear-ddos-pppoe-aggregate-statistics
clear ddos-protection protocols pppoe padi
clear ddos-protection protocols pppoe padi states
clear-ddos-pppoe-padi-states
clear ddos-protection protocols pppoe padi statistics
clear-ddos-pppoe-padi-statistics
clear ddos-protection protocols pppoe padm
clear ddos-protection protocols pppoe padm states
clear-ddos-pppoe-padm-states
clear ddos-protection protocols pppoe padm statistics
clear-ddos-pppoe-padm-statistics
clear ddos-protection protocols pppoe padn
clear ddos-protection protocols pppoe padn states
clear-ddos-pppoe-padn-states
clear ddos-protection protocols pppoe padn statistics
clear-ddos-pppoe-padn-statistics
clear ddos-protection protocols pppoe pado
```

```
clear ddos-protection protocols pppoe pado states
clear-ddos-pppoe-pado-states
clear ddos-protection protocols pppoe pado statistics
clear-ddos-pppoe-pado-statistics
clear ddos-protection protocols pppoe padr
clear ddos-protection protocols pppoe padr states
clear-ddos-pppoe-padr-states
clear ddos-protection protocols pppoe padr statistics
clear-ddos-pppoe-padr-statistics
clear ddos-protection protocols pppoe pads
clear ddos-protection protocols pppoe pads states
clear-ddos-pppoe-pads-states
clear ddos-protection protocols pppoe pads statistics
clear-ddos-pppoe-pads-statistics
clear ddos-protection protocols pppoe padt
clear ddos-protection protocols pppoe padt states
clear-ddos-pppoe-padt-states
clear ddos-protection protocols pppoe padt statistics
clear-ddos-pppoe-padt-statistics
clear ddos-protection protocols pppoe states
clear-ddos-pppoe-states
clear ddos-protection protocols pppoe statistics
clear-ddos-pppoe-statistics
clear ddos-protection protocols proto-802-1x
clear ddos-protection protocols proto-802-1x aggregate
clear ddos-protection protocols proto-802-1x aggregate culprit-flows
<clear-ddos-8021x-aggregate-flows>
clear ddos-protection protocols proto-802-1x aggregate states
<clear-ddos-8021x-aggregate-states>
clear ddos-protection protocols proto-802-1x aggregate statistics
<clear-ddos-8021x-aggregate-statistics>
clear ddos-protection protocols proto-802-1x culprit-flows
<clear-ddos-8021x-flows>
clear ddos-protection protocols proto-802-1x states
<clear-ddos-8021x-states>
clear ddos-protection protocols proto-802-1x statistics
<clear-ddos-8021x-statistics>
clear ddos-protection protocols ptp
clear ddos-protection protocols ptp aggregate
clear ddos-protection protocols ptp aggregate states
clear-ddos-ntp-aggregate-states
clear ddos-protection protocols ptp aggregate statistics
clear-ddos-ntp-aggregate-statistics
clear ddos-protection protocols ptp states
clear-ddos-ntp-states
clear ddos-protection protocols ptp statistics
clear-ddos-ntp-statistics
clear ddos-protection protocols ptpv6
clear ddos-protection protocols ptpv6 aggregate
clear ddos-protection protocols ptpv6 aggregate culprit-flows
<clear-ddos-ntpv6-aggregate-flows>
clear ddos-protection protocols ptpv6 aggregate states
<clear-ddos-ntpv6-aggregate-states>
clear ddos-protection protocols ptpv6 aggregate statistics
<clear-ddos-ntpv6-aggregate-statistics>
clear ddos-protection protocols ptpv6 culprit-flows
<clear-ddos-ntpv6-flows>
clear ddos-protection protocols ptpv6 states
<clear-ddos-ntpv6-states>
clear ddos-protection protocols ptpv6 statistics
```

```
<clear-ddos-ptpv6-statistics>
clear ddos-protection protocols pvstp
clear ddos-protection protocols pvstp aggregate
clear ddos-protection protocols pvstp aggregate states
clear-ddos-pvstp-aggregate-states
clear ddos-protection protocols pvstp aggregate statistics
clear-ddos-pvstp-aggregate-statistics
clear ddos-protection protocols pvstp states
clear-ddos-pvstp-states
clear ddos-protection protocols pvstp statistics
clear-ddos-pvstp-statistics
clear ddos-protection protocols radius
clear ddos-protection protocols radius accounting
clear ddos-protection protocols radius accounting states
clear-ddos-radius-account-states
clear ddos-protection protocols radius accounting statistics
clear-ddos-radius-account-statistics
clear ddos-protection protocols radius aggregate
clear ddos-protection protocols radius aggregate states
clear-ddos-radius-aggregate-states
clear ddos-protection protocols radius aggregate statistics
clear-ddos-radius-aggregate-statistics
clear ddos-protection protocols radius authorization
clear ddos-protection protocols radius authorization states
clear ddos-protection protocols radius authorization statistics
clear-ddos-ospfv3v6-statistics
clear-ddos-pfe-alive-aggregate-states
clear-ddos-pfe-alive-aggregate-statistics
clear-ddos-pfe-alive-states
clear-ddos-pfe-alive-statistics
clear-ddos-pim-aggregate-states
clear-ddos-pim-aggregate-statistics
clear-ddos-pim-states
clear-ddos-pmvrp-aggregate-states
clear-ddos-pmvrp-aggregate-statistics
clear-ddos-pmvrp-states
clear-ddos-pmvrp-statistics
clear-ddos-pos-aggregate-states
clear-ddos-pos-aggregate-statistics
clear-ddos-pos-states
clear-ddos-pos-statistics
clear-ddos-ppp-aggregate-states
clear-ddos-ppp-aggregate-statistics
clear-ddos-ppp-auth-states
clear-ddos-ppp-ipcp-states
clear-ddos-ppp-ipcp-statistics
clear-ddos-ppp-ipv6cp-states
clear-ddos-ppp-ipv6cp-statistics
clear-ddos-ppp-isis-states
clear-ddos-ppp-isis-statistics
clear-ddos-ppp-lcp-states
clear-ddos-ppp-lcp-statistics
clear-ddos-ppp-mplscp-states
clear-ddos-ppp-mplscp-statistics
clear-ddos-pppoe-aggregate-states
clear-ddos-pppoe-aggregate-statistics
clear-ddos-pppoe-padi-states
clear-ddos-pppoe-padi-statistics
clear-ddos-pppoe-padm-states
clear-ddos-pppoe-padm-statistics
```

```
clear-ddos-pppoe-padn-states
clear-ddos-pppoe-padn-statistics
clear-ddos-pppoe-pado-states
clear-ddos-pppoe-pado-statistics
clear-ddos-pppoe-padr-states
clear-ddos-pppoe-padr-statistics
clear-ddos-pppoe-pads-states
clear-ddos-pppoe-pads-statistics
clear-ddos-pppoe-padt-states
clear-ddos-pppoe-padt-statistics
clear-ddos-pppoe-states
clear-ddos-pppoe-statistics
clear-ddos-ppp-states
clear-ddos-ppp-statistics
clear-ddos-ntp-aggregate-states
clear-ddos-ntp-aggregate-statistics
clear-ddos-ntp-states
clear-ddos-ntp-statistics
clear-ddos-pvstp-aggregate-states
clear-ddos-pvstp-aggregate-statistics
clear-ddos-pvstp-states
clear-ddos-pvstp-statistics
clear-ddos-radius-account-states
clear-ddos-radius-account-statistics
clear-ddos-radius-aggregate-states
clear-ddos-radius-aggregate-statistics
clear-ddos-radius-auth-states
clear ddos-protection protocols radius authorization statistics
clear-ddos-radius-auth-statistics
clear ddos-protection protocols pmvrp culprit-flows
clear ddos-protection protocols radius server
clear ddos-protection protocols radius server states
clear-ddos-radius-server-states
clear ddos-protection protocols radius server statistics
clear-ddos-radius-server-statistics
clear ddos-protection protocols radius states
clear-ddos-radius-states
clear ddos-protection protocols radius statistics
clear-ddos-radius-statistics
clear ddos-protection protocols redirect
clear ddos-protection protocols redirect aggregate
clear ddos-protection protocols redirect aggregate states
clear-ddos-redirect-aggregate-states
clear ddos-protection protocols redirect aggregate statistics
clear-ddos-redirect-aggregate-statistics
clear ddos-protection protocols redirect states
clear-ddos-redirect-states
clear ddos-protection protocols redirect statistics
clear-ddos-redirect-statistics
clear ddos-protection protocols reject
clear ddos-protection protocols reject aggregate
clear ddos-protection protocols reject aggregate states
clear ddos-protection protocols reject aggregate statistics
clear ddos-protection protocols reject states
clear ddos-protection protocols reject statistics
clear ddos-protection protocols rip
clear ddos-protection protocols rip aggregate
clear ddos-protection protocols rip aggregate states
clear-ddos-rip-aggregate-states
clear ddos-protection protocols rip aggregate statistics
```

```

clear-ddos-rip-aggregate-statistics
clear ddos-protection protocols rip states
clear-ddos-rip-states
clear ddos-protection protocols rip statistics
clear-ddos-rip-statistics
clear ddos-protection protocols ripv6
clear ddos-protection protocols ripv6 aggregate
clear ddos-protection protocols ripv6 aggregate states
clear-ddos-ripv6-aggregate-states
clear ddos-protection protocols ripv6 aggregate statistics
clear-ddos-ripv6-aggregate-statistics
clear ddos-protection protocols ripv6 states
clear-ddos-ripv6-states
clear ddos-protection protocols ripv6 statistics
clear-ddos-ripv6-statistics
clear ddos-protection protocols rsvp
clear ddos-protection protocols rsvp aggregate
clear ddos-protection protocols rsvp aggregate states
clear-ddos-rsvp-aggregate-states
clear ddos-protection protocols rsvp aggregate statistics
clear-ddos-rsvp-aggregate-statistics
clear ddos-protection protocols rsvp states
clear-ddos-rsvp-states
clear ddos-protection protocols rsvp statistics
clear-ddos-rsvp-statistics
clear ddos-protection protocols rsvpv6
clear ddos-protection protocols rsvpv6 aggregate
clear ddos-protection protocols rsvpv6 aggregate states
clear-ddos-rsvpv6-aggregate-states
clear ddos-protection protocols rsvpv6 aggregate statistics
clear-ddos-rsvpv6-aggregate-statistics
clear ddos-protection protocols rsvpv6 states
clear-ddos-rsvpv6-states
clear ddos-protection protocols rsvpv6 statistics
clear-ddos-rsvpv6-statistics
clear ddos-protection protocols sample
clear ddos-protection protocols sample aggregate
clear ddos-protection protocols sample aggregate states
<clear-ddos-sample-aggregate-states>
clear ddos-protection protocols sample aggregate statistics
<clear-ddos-sample-aggregate-statistics>
clear ddos-protection protocols sample host
clear ddos-protection protocols sample host states
<clear-ddos-sample-host-states>
clear ddos-protection protocols sample host statistics
<clear-ddos-sample-host-statistics>
clear ddos-protection protocols sample pfe
clear ddos-protection protocols sample pfe culprit-flows
clear ddos-protection protocols sample pfe states
<clear-ddos-sample-pfe-states>
clear ddos-protection protocols sample pfe statistics
clear ddos-protection protocols sample sflow
clear ddos-protection protocols sample sflow culprit-flows
<clear-ddos-sample-sflow-flows>
clear ddos-protection protocols sample sflow states
<clear-ddos-sample-sflow-states>
clear ddos-protection protocols sample sflow statistics
<clear-ddos-sample-sflow-statistics>
clear ddos-protection protocols sample states
<clear-ddos-sample-states>

```

```
clear ddos-protection protocols sample statistics
<clear-ddos-sample-statistics>
clear ddos-protection protocols sample syslog
clear ddos-protection protocols sample syslog culprit-flows
clear ddos-protection protocols sample syslog states
<clear-ddos-sample-syslog-states>
clear ddos-protection protocols sample syslog statistics
<clear-ddos-sample-syslog-statistics>
clear ddos-protection protocols sample tap
clear ddos-protection protocols sample tap states
clear ddos-protection protocols sample-dest
clear ddos-protection protocols sample-dest aggregate
clear ddos-protection protocols sample-dest aggregate culprit-flows
<clear-ddos-sample-dest-aggregate-flows>
clear ddos-protection protocols sample-dest aggregate states
<clear-ddos-sample-dest-aggregate-states>
clear ddos-protection protocols sample-dest aggregate statistics
<clear-ddos-sample-dest-aggregate-statistics>
clear ddos-protection protocols sample-dest culprit-flows
<clear-ddos-sample-dest-flows>
clear ddos-protection protocols sample-dest states
<clear-ddos-sample-dest-states>
clear ddos-protection protocols sample-dest statistics
<clear-ddos-sample-dest-statistics>
clear ddos-protection protocols sample-source
clear ddos-protection protocols sample-source aggregate
clear ddos-protection protocols sample-source aggregate culprit-flows
<clear-ddos-sample-source-aggregate-flows>
clear ddos-protection protocols sample-source aggregate states
<clear-ddos-sample-source-aggregate-states>
clear ddos-protection protocols sample-source aggregate statistics
<clear-ddos-sample-source-aggregate-statistics>
clear ddos-protection protocols sample-source culprit-flows
<clear-ddos-sample-source-flows>
clear ddos-protection protocols sample-source states
<clear-ddos-sample-source-states>
clear ddos-protection protocols sample-source statistics
<clear-ddos-sample-source-statistics>
clear ddos-protection protocols sample tap statistics
<clear-ddos-sample-tap-statistics>
clear ddos-protection protocols services
clear ddos-protection protocols services aggregate
clear ddos-protection protocols services aggregate states
clear-ddos-services-aggregate-states
clear ddos-protection protocols services aggregate statistics
clear ddos-protection protocols services bsdt
clear ddos-protection protocols services bsdt culprit-flows
<clear-ddos-services-BSDT-flows>
clear ddos-protection protocols services bsdt states
<clear-ddos-services-BSDT-states>
clear ddos-protection protocols services bsdt statistics
<clear-ddos-services-BSDT-statistics>
clear ddos-protection protocols services culprit-flows
<clear-ddos-services-flows>
clear ddos-protection protocols services packet
clear ddos-protection protocols services packet culprit-flows
<clear-ddos-services-packet-flows>
clear ddos-protection protocols services packet states
<clear-ddos-services-packet-states>
clear ddos-protection protocols services packet statistics
```



```
<clear-ddos-services-packet-statistics>
clear ddos-protection protocols services states
clear-ddos-services-states
clear ddos-protection protocols services statistics
clear-ddos-services-statistics
clear ddos-protection protocols snmp
clear ddos-protection protocols snmp aggregate
clear ddos-protection protocols snmp aggregate states
clear-ddos-snmp-aggregate-states
clear ddos-protection protocols snmp aggregate statistics
clear ddos-protection protocols snmp culprit-flows
clear ddos-protection protocols snmp states
clear-ddos-snmp-states
clear ddos-protection protocols snmp statistics
clear-ddos-snmp-statistics
clear ddos-protection protocols snmpv6
clear ddos-protection protocols snmpv6 aggregate
clear ddos-protection protocols snmpv6 aggregate states
clear-ddos-snmpv6-aggregate-states
clear ddos-protection protocols snmpv6 aggregate statistics
clear-ddos-snmpv6-aggregate-statistics
clear ddos-protection protocols snmpv6 states
clear-ddos-snmpv6-states
clear ddos-protection protocols snmpv6 statistics
clear-ddos-snmpv6-statistics
clear ddos-protection protocols ssh
clear ddos-protection protocols ssh aggregate
clear ddos-protection protocols ssh aggregate states
clear-ddos-ssh-aggregate-states
clear ddos-protection protocols ssh aggregate statistics
clear-ddos-ssh-aggregate-statistics
clear ddos-protection protocols ssh states
clear-ddos-ssh-states
clear ddos-protection protocols ssh statistics
clear-ddos-ssh-statistics
clear ddos-protection protocols sshv6
clear ddos-protection protocols sshv6 aggregate
clear ddos-protection protocols sshv6 aggregate states
clear-ddos-sshv6-aggregate-states
clear ddos-protection protocols sshv6 aggregate statistics
clear ddos-protection protocols sshv6 culprit-flows
clear ddos-protection protocols sshv6 states
clear-ddos-sshv6-states
clear ddos-protection protocols sshv6 statistics
clear-ddos-sshv6-statistics
clear ddos-protection protocols states
clear-ddos-protocols-states
clear ddos-protection protocols statistics
clear-ddos-protocols-statistics
clear ddos-protection protocols stp
clear ddos-protection protocols stp aggregate
clear ddos-protection protocols stp aggregate states
clear-ddos-stp-aggregate-states
clear ddos-protection protocols stp aggregate statistics
clear-ddos-stp-aggregate-statistics
clear ddos-protection protocols stp states
clear-ddos-stp-states
clear ddos-protection protocols stp statistics
clear-ddos-stp-statistics
clear ddos-protection protocols tacacs
```

```
clear ddos-protection protocols tacacs aggregate
clear ddos-protection protocols tacacs aggregate states
clear-ddos-tacacs-aggregate-states
clear ddos-protection protocols tacacs aggregate statistics
clear-ddos-tacacs-aggregate-statistics
clear ddos-protection protocols tacacs states
clear-ddos-tacacs-states
clear ddos-protection protocols tacacs statistics
clear-ddos-tacacs-statistics
clear ddos-protection protocols tcc
clear ddos-protection protocols tcc aggregate
clear ddos-protection protocols tcc aggregate culprit-flows
<clear-ddos-tcc-aggregate-flows>
clear ddos-protection protocols tcc aggregate states
<clear-ddos-tcc-aggregate-states>
clear ddos-protection protocols tcc aggregate statistics
<clear-ddos-tcc-aggregate-statistics>
clear ddos-protection protocols tcc culprit-flows
<clear-ddos-tcc-flows>
clear ddos-protection protocols tcc ethernet-tcc
clear ddos-protection protocols tcc ethernet-tcc culprit-flows
<clear-ddos-tcc-ethernet-tcc-flows>
clear ddos-protection protocols tcc ethernet-tcc states
<clear-ddos-tcc-ethernet-tcc-states>
clear ddos-protection protocols tcc ethernet-tcc statistics
<clear-ddos-tcc-ethernet-tcc-statistics>
clear ddos-protection protocols tcc iso-tcc
clear ddos-protection protocols tcc iso-tcc culprit-flows
<clear-ddos-tcc-iso-tcc-flows>
clear ddos-protection protocols tcc iso-tcc states
<clear-ddos-tcc-iso-tcc-states>
clear ddos-protection protocols tcc iso-tcc statistics
<clear-ddos-tcc-iso-tcc-statistics>
clear ddos-protection protocols tcc states
<clear-ddos-tcc-states>
clear ddos-protection protocols tcc statistics
<clear-ddos-tcc-statistics>
clear ddos-protection protocols tcc unclassified
clear ddos-protection protocols tcc unclassified culprit-flows
<clear-ddos-tcc-unclass-flows>
clear ddos-protection protocols tcc unclassified states
<clear-ddos-tcc-unclass-states>
clear ddos-protection protocols tcc unclassified statistics
<clear-ddos-tcc-unclass-statistics>
clear ddos-protection protocols tcp-flags
clear ddos-protection protocols tcp-flags aggregate
clear ddos-protection protocols tcp-flags aggregate states
clear-ddos-tcp-flags-aggregate-states
clear ddos-protection protocols tcp-flags aggregate statistics
clear-ddos-tcp-flags-aggregate-statistics
clear ddos-protection protocols tcp-flags established
clear ddos-protection protocols tcp-flags established states
clear-ddos-tcp-flags-establish-states
clear ddos-protection protocols tcp-flags established statistics
clear-ddos-tcp-flags-establish-statistics
clear ddos-protection protocols tcp-flags initial
clear ddos-protection protocols tcp-flags initial culprit-flows
clear ddos-protection protocols tcp-flags initial states
clear-ddos-tcp-flags-initial-states
clear ddos-protection protocols tcp-flags initial statistics
```

```
clear-ddos-tcp-flags-initial-statistics
clear ddos-protection protocols tcp-flags states
clear-ddos-tcp-flags-states
clear ddos-protection protocols tcp-flags statistics
clear-ddos-tcp-flags-statistics
clear ddos-protection protocols tcp-flags unclassified
clear ddos-protection protocols tcp-flags unclassified states
clear-ddos-tcp-flags-unclass-states
clear ddos-protection protocols tcp-flags unclassified statistics
clear-ddos-tcp-flags-unclass-statistics
clear ddos-protection protocols telnet
clear ddos-protection protocols telnet aggregate
clear ddos-protection protocols telnet aggregate culprit-flows
clear ddos-protection protocols telnet aggregate states
clear-ddos-telnet-aggregate-states
clear ddos-protection protocols telnet aggregate statistics
clear-ddos-telnet-aggregate-statistics
clear ddos-protection protocols telnet states
clear-ddos-telnet-states
clear ddos-protection protocols telnet statistics
clear-ddos-telnet-statistics
clear ddos-protection protocols telnetv6
clear ddos-protection protocols telnetv6 aggregate
clear ddos-protection protocols telnetv6 aggregate states
clear-ddos-telnetv6-aggregate-states
clear ddos-protection protocols telnetv6 aggregate statistics
clear-ddos-telnetv6-aggregate-statistics
clear ddos-protection protocols telnetv6 states
clear-ddos-telnetv6-states
clear ddos-protection protocols telnetv6 statistics
clear-ddos-telnetv6-statistics
clear ddos-protection protocols ttl
clear ddos-protection protocols ttl aggregate
clear ddos-protection protocols ttl aggregate culprit-flows
clear ddos-protection protocols ttl aggregate states
clear-ddos-ttl-aggregate-states
clear ddos-protection protocols ttl aggregate statistics
clear-ddos-ttl-aggregate-statistics
clear ddos-protection protocols ttl states
clear-ddos-ttl-states
clear ddos-protection protocols ttl statistics
clear-ddos-ttl-statistics
clear ddos-protection protocols tunnel-fragment
clear ddos-protection protocols tunnel-fragment aggregate
clear ddos-protection protocols tunnel-fragment aggregate states
clear-ddos-tun-frag-aggregate-states
clear ddos-protection protocols tunnel-fragment aggregate statistics
clear-ddos-tun-frag-aggregate-statistics
clear ddos-protection protocols tunnel-fragment states
clear-ddos-tun-frag-states
clear ddos-protection protocols tunnel-fragment statistics
clear-ddos-tun-frag-statistics
clear ddos-protection protocols unclassified
clear ddos-protection protocols unclassified aggregate
clear ddos-protection protocols unclassified aggregate states
clear ddos-protection protocols unclassified aggregate statistics
clear ddos-protection protocols unclassified control-layer2
clear ddos-protection protocols unclassified control-layer2 culprit-flows
clear ddos-protection protocols unclassified control-layer2 states
clear ddos-protection protocols unclassified control-layer2 statistics
```

```
clear ddos-protection protocols unclassified control-v4
clear ddos-protection protocols unclassified control-v4 culprit-flows
clear ddos-protection protocols unclassified control-v4 states
clear ddos-protection protocols unclassified control-v4 statistics
clear ddos-protection protocols unclassified control-v6
clear ddos-protection protocols unclassified control-v6 culprit-flows
clear ddos-protection protocols unclassified control-v6 states
clear ddos-protection protocols unclassified control-v6 statistics
clear ddos-protection protocols unclassified filter-v4 culprit-flows
clear ddos-protection protocols unclassified filter-v4 states
clear ddos-protection protocols unclassified filter-v4 statistics
clear ddos-protection protocols unclassified filter-v6
clear ddos-protection protocols unclassified filter-v6 culprit-flows
clear ddos-protection protocols unclassified filter-v6 states
clear ddos-protection protocols unclassified filter-v6 statistics
clear ddos-protection protocols unclassified fw-host
clear ddos-protection protocols unclassified fw-host culprit-flows
<clear-ddos-uncls-fw-host-flows>
clear ddos-protection protocols unclassified fw-host states
<clear-ddos-uncls-fw-host-states>
clear ddos-protection protocols unclassified fw-host statistics
<clear-ddos-uncls-fw-host-statistics>
clear ddos-protection protocols unclassified host-route-v4
clear ddos-protection protocols unclassified host-route-v4 culprit-flows
clear ddos-protection protocols unclassified host-route-v4 states
clear ddos-protection protocols unclassified host-route-v4 states
clear ddos-protection protocols unclassified host-route-v4 statistics
clear ddos-protection protocols unclassified host-route-v6
clear ddos-protection protocols unclassified host-route-v6 culprit-flows
clear ddos-protection protocols unclassified host-route-v6 states
clear ddos-protection protocols unclassified host-route-v6 statistics
clear ddos-protection protocols unclassified mcast-copy
clear ddos-protection protocols unclassified mcast-copy culprit-flows
<clear-ddos-uncls-mcast-copy-flows>
clear ddos-protection protocols unclassified mcast-copy states
<clear-ddos-uncls-mcast-copy-states>
clear ddos-protection protocols unclassified mcast-copy statistics
<clear-ddos-uncls-mcast-copy-statistics>
clear ddos-protection protocols unknown-l2mc
clear ddos-protection protocols unknown-l2mc aggregate
clear ddos-protection protocols unknown-l2mc aggregate culprit-flows
<clear-ddos-unknown-l2mc-aggregate-flows>
clear ddos-protection protocols unknown-l2mc aggregate states
<clear-ddos-unknown-l2mc-aggregate-states>
clear ddos-protection protocols unknown-l2mc aggregate statistics
<clear-ddos-unknown-l2mc-aggregate-statistics>
clear ddos-protection protocols unknown-l2mc culprit-flows
<clear-ddos-unknown-l2mc-flows>
clear ddos-protection protocols unknown-l2mc states
<clear-ddos-unknown-l2mc-states>
clear ddos-protection protocols unknown-l2mc statistics
<clear-ddos-unknown-l2mc-statistics>
clear ddos-protection protocols urpf-fail
clear ddos-protection protocols urpf-fail aggregate
clear ddos-protection protocols urpf-fail aggregate culprit-flows
<clear-ddos-urpf-fail-aggregate-flows>
clear ddos-protection protocols urpf-fail aggregate states
<clear-ddos-urpf-fail-aggregate-states>
clear ddos-protection protocols urpf-fail aggregate statistics
<clear-ddos-urpf-fail-aggregate-statistics>
```

```

clear ddos-protection protocols urpf-fail culprit-flows
<clear-ddos-urpf-fail-flows>
clear ddos-protection protocols urpf-fail states
<clear-ddos-urpf-fail-states>
clear ddos-protection protocols urpf-fail statistics
<clear-ddos-urpf-fail-statistics>
clear ddos-protection protocols vcipc-udp
clear ddos-protection protocols vcipc-udp aggregate
clear ddos-protection protocols vcipc-udp aggregate culprit-flows
<clear-ddos-vcipc-udp-aggregate-flows>
clear ddos-protection protocols vcipc-udp aggregate states
<clear-ddos-vcipc-udp-aggregate-states>
clear ddos-protection protocols vcipc-udp aggregate statistics
<clear-ddos-vcipc-udp-aggregate-statistics>
clear ddos-protection protocols vcipc-udp culprit-flows
<clear-ddos-vcipc-udp-flows>
clear ddos-protection protocols vcipc-udp states
<clear-ddos-vcipc-udp-states>
<clear-ddos-vcipc-udp-statistics>
clear ddos-protection protocols unclassified other
clear ddos-protection protocols unclassified other culprit-flows
clear ddos-protection protocols unclassified other states
clear ddos-protection protocols unclassified other statistics
clear ddos-protection protocols unclassified resolve-v4
clear ddos-protection protocols unclassified resolve-v4 culprit-flows
clear ddos-protection protocols unclassified resolve-v4 states
clear ddos-protection protocols unclassified resolve-v4 statistics
clear ddos-protection protocols unclassified resolve-v6
clear ddos-protection protocols unclassified resolve-v6 culprit-flows
clear ddos-protection protocols unclassified resolve-v6 states
clear ddos-protection protocols unclassified resolve-v6 statistics
clear ddos-protection protocols unclassified states
clear ddos-protection protocols unclassified statistics
<clear-ddos-uncls-statistics>
clear ddos-protection protocols virtual-chassis
clear ddos-protection protocols virtual-chassis aggregate
clear ddos-protection protocols virtual-chassis aggregate culprit-flows
clear ddos-protection protocols virtual-chassis aggregate states
clear-ddos-protocols-states
clear-ddos-protocols-statistics
clear-ddos-radius-server-states
clear-ddos-radius-server-statistics
clear-ddos-radius-states
clear-ddos-radius-statistics
clear ddos-protection protocols re-services
clear ddos-protection protocols re-services aggregate
clear ddos-protection protocols re-services aggregate culprit-flows
<clear-ddos-re-services-aggregate-flows>
clear ddos-protection protocols re-services aggregate states
<clear-ddos-re-services-aggregate-states>
clear ddos-protection protocols re-services aggregate statistics
<clear-ddos-re-services-aggregate-statistics>
clear ddos-protection protocols re-services captive-portal
clear ddos-protection protocols re-services captive-portal culprit-flows
<clear-ddos-re-services-captive-portal-flows>
clear ddos-protection protocols re-services captive-portal states
<clear-ddos-re-services-captive-portal-states>
clear ddos-protection protocols re-services captive-portal statistics
<clear-ddos-re-services-captive-portal-statistics>
clear ddos-protection protocols re-services culprit-flows

```

```
<clear-ddos-re-services-flows>
clear ddos-protection protocols re-services states
<clear-ddos-re-services-states>
clear ddos-protection protocols re-services statistics
<clear-ddos-re-services-statistics>
clear ddos-protection protocols re-services-v6
clear ddos-protection protocols re-services-v6 aggregate
clear ddos-protection protocols re-services-v6 aggregate culprit-flows
<clear-ddos-re-services-v6-aggregate-flows>
clear ddos-protection protocols re-services-v6 aggregate states
<clear-ddos-re-services-v6-aggregate-states>
clear ddos-protection protocols re-services-v6 aggregate statistics
<clear-ddos-re-services-v6-aggregate-statistics>
clear ddos-protection protocols re-services-v6 captive-portal
clear ddos-protection protocols re-services-v6 captive-portal culprit-flows
<clear-ddos-re-services-v6-captive-portal-v6-flows>
clear ddos-protection protocols re-services-v6 captive-portal states
<clear-ddos-re-services-v6-captive-portal-v6-states>
clear ddos-protection protocols re-services-v6 captive-portal statistics
<clear-ddos-re-services-v6-captive-portal-v6-statistics>
clear ddos-protection protocols re-services-v6 culprit-flows
<clear-ddos-re-services-v6-flows>
clear ddos-protection protocols re-services-v6 states
<clear-ddos-re-services-v6-states>
clear ddos-protection protocols re-services-v6 statistics
<clear-ddos-re-services-v6-statistics>
clear-ddos-redirect-aggregate-states
clear-ddos-redirect-states
clear-ddos-redirect-statistics
clear-ddos-rip-aggregate-states
clear-ddos-rip-aggregate-statistics
clear-ddos-rip-states
clear-ddos-rip-statistics
clear-ddos-ripv6-aggregate-states
clear-ddos-ripv6-aggregate-statistics
clear-ddos-ripv6-states
clear-ddos-ripv6-statistics
clear-ddos-rsvp-aggregate-states
clear-ddos-rsvp-aggregate-statistics
clear-ddos-rsvp-states
clear-ddos-rsvp-statistics
clear-ddos-rsvpv6-aggregate-states
clear-ddos-rsvpv6-aggregate-statistics
clear-ddos-rsvpv6-states
clear-ddos-rsvpv6-statistics
clear-ddos-services-aggregate-states
clear-ddos-services-aggregate-statistics
clear-ddos-services-states
clear-ddos-services-statistics
clear-ddos-snmp-aggregate-states
clear-ddos-snmp-aggregate-statistics
clear-ddos-snmp-states
clear-ddos-snmp-statistics
clear-ddos-snmv6-aggregate-states
clear-ddos-snmv6-aggregate-statistics
clear-ddos-snmv6-states
clear-ddos-snmv6-statistics
clear-ddos-ssh-aggregate-states
clear-ddos-ssh-aggregate-statistics
clear-ddos-ssh-states
```

```
clear-ddos-ssh-statistics
clear-ddos-sshv6-aggregate-states
clear-ddos-sshv6-aggregate-statistics
clear-ddos-sshv6-states
clear-ddos-sshv6-statistics
clear-ddos-stp-aggregate-states
clear-ddos-stp-aggregate-statistics
clear-ddos-stp-states
clear-ddos-stp-statistics
clear ddos-protection protocols syslog
clear ddos-protection protocols syslog aggregate
clear ddos-protection protocols syslog aggregate culprit-flows
<clear-ddos-syslog-aggregate-flows>
clear ddos-protection protocols syslog aggregate states
<clear-ddos-syslog-aggregate-states>
clear ddos-protection protocols syslog aggregate statistics
<clear-ddos-syslog-aggregate-statistics>
clear ddos-protection protocols syslog culprit-flows
<clear-ddos-syslog-flows>
clear ddos-protection protocols syslog states
<clear-ddos-syslog-states>
clear ddos-protection protocols syslog statistics
<clear-ddos-syslog-statistics>
clear-ddos-tacacs-aggregate-states
clear-ddos-tacacs-aggregate-statistics
clear-ddos-tacacs-states
clear-ddos-tacacs-statistics
clear-ddos-tcp-flags-aggregate-states
clear-ddos-tcp-flags-aggregate-statistics
clear-ddos-tcp-flags-establish-states
clear-ddos-tcp-flags-establish-statistics
clear-ddos-tcp-flags-initial-states
clear-ddos-tcp-flags-initial-statistics
clear-ddos-tcp-flags-states
clear-ddos-tcp-flags-statistics
clear-ddos-tcp-flags-unclass-states
clear-ddos-tcp-flags-unclass-statistics
clear-ddos-telnet-aggregate-states
clear-ddos-telnet-aggregate-statistics
clear-ddos-telnet-states
clear-ddos-telnet-statistics
clear-ddos-telnetv6-aggregate-states
clear-ddos-telnetv6-aggregate-statistics
clear-ddos-telnetv6-states
clear-ddos-telnetv6-statistics
clear-ddos-ttl-aggregate-states
clear-ddos-ttl-aggregate-statistics
clear-ddos-ttl-states
clear-ddos-ttl-statistics
clear-ddos-tun-frag-aggregate-states
clear-ddos-tun-frag-aggregate-statistics
clear-ddos-tun-frag-states
clear-ddos-tun-frag-statistics
clear ddos-protection protocols tunnel-ka
clear ddos-protection protocols tunnel-ka aggregate
clear ddos-protection protocols tunnel-ka aggregate culprit-flows
<clear-ddos-tunnel-ka-aggregate-flows>
clear ddos-protection protocols tunnel-ka aggregate states
<clear-ddos-tunnel-ka-aggregate-states>
clear ddos-protection protocols tunnel-ka aggregate statistics
```

```
<clear-ddos-tunnel-ka-aggregate-statistics>
clear ddos-protection protocols tunnel-ka culprit-flows
<clear-ddos-tunnel-ka-flows>
clear ddos-protection protocols tunnel-ka states
<clear-ddos-tunnel-ka-states>
clear ddos-protection protocols tunnel-ka statistics
<clear-ddos-tunnel-ka-statistics>
clear-ddos-vchassis-aggregate-states
clear ddos-protection protocols virtual-chassis aggregate statistics
clear-ddos-vchassis-aggregate-statistics
clear ddos-protection protocols virtual-chassis control-high
clear ddos-protection protocols virtual-chassis control-high states
clear-ddos-vchassis-control-hi-states
clear ddos-protection protocols virtual-chassis control-high statistics
clear-ddos-vchassis-control-hi-statistics
clear ddos-protection protocols virtual-chassis control-low
clear ddos-protection protocols virtual-chassis control-low states
clear-ddos-vchassis-control-lo-states
clear ddos-protection protocols virtual-chassis control-low statistics
clear-ddos-vchassis-control-lo-statistics
clear ddos-protection protocols virtual-chassis states
clear-ddos-vchassis-states
clear ddos-protection protocols virtual-chassis statistics
clear-ddos-vchassis-statistics
clear ddos-protection protocols virtual-chassis unclassified
clear ddos-protection protocols virtual-chassis unclassified culprit-flows
clear ddos-protection protocols virtual-chassis unclassified states
clear-ddos-vchassis-unclass-states
clear ddos-protection protocols virtual-chassis unclassified statistics
clear-ddos-vchassis-unclass-statistics
clear ddos-protection protocols virtual-chassis vc-packets
clear ddos-protection protocols virtual-chassis vc-packets states
clear-ddos-vchassis-vc-packets-states
clear ddos-protection protocols virtual-chassis vc-packets statistics
clear-ddos-vchassis-vc-packets-statistics
clear ddos-protection protocols virtual-chassis vc-ttl-errors
clear ddos-protection protocols virtual-chassis vc-ttl-errors states
clear-ddos-vchassis-vc-ttl-err-states
clear ddos-protection protocols virtual-chassis vc-ttl-errors statistics
clear-ddos-vchassis-vc-ttl-err-statistics
clear ddos-protection protocols vrrp
clear ddos-protection protocols vrrp aggregate
clear ddos-protection protocols vrrp aggregate states
clear-ddos-vrrp-aggregate-states
clear ddos-protection protocols vrrp aggregate statistics
clear ddos-protection protocols vrrp culprit-flows
clear ddos-protection protocols vrrp statistics
clear-ddos-vrrp-statistics
clear ddos-protection protocols vrrpv6
clear ddos-protection protocols vrrpv6 aggregate
clear ddos-protection protocols vrrpv6 aggregate states
clear-ddos-vrrpv6-aggregate-states
clear ddos-protection protocols vrrpv6 aggregate statistics
clear-ddos-vrrpv6-aggregate-statistics
clear ddos-protection protocols vrrpv6 states
clear-ddos-vrrpv6-states
clear ddos-protection protocols vrrpv6 statistics
clear-ddos-uncls-host-rt-v4-flows
clear-ddos-vchassis-aggregate-statistics
clear-ddos-vchassis-control-hi-states
```



```

clear-ddos-vchassis-control-hi-statistics
clear-ddos-vchassis-control-lo-states
clear-ddos-vchassis-control-lo-statistics
clear-ddos-vchassis-states
clear-ddos-vchassis-statistics
clear-ddos-vchassis-unclass-states
clear-ddos-vchassis-unclass-statistics
clear-ddos-vchassis-vc-packets-states
clear-ddos-vchassis-vc-packets-statistics
clear-ddos-vchassis-vc-ttl-err-states
clear-ddos-vchassis-vc-ttl-err-statistics
clear-ddos-vrrp-aggregate-states
clear-ddos-vrrp-aggregate-statistics
clear-ddos-vrrp-states
clear-ddos-vrrp-statistics
clear-ddos-vrrpv6-aggregate-states
clear-ddos-vrrpv6-aggregate-statistics
clear-ddos-vrrpv6-states
clear-ddos-vrrpv6-statistics
clear ddos-protection protocols vxlan
clear ddos-protection protocols vxlan aggregate
clear ddos-protection protocols vxlan aggregate culprit-flows
clear-ddos-vxlan-aggregate-flows
clear ddos-protection protocols vxlan aggregate states
<clear-ddos-vxlan-aggregate-states>
clear ddos-protection protocols vxlan aggregate statistics
<clear-ddos-vxlan-aggregate-statistics>
clear ddos-protection protocols vxlan culprit-flows
<clear-ddos-vxlan-flows>
clear ddos-protection protocols vxlan states
<clear-ddos-vxlan-states>
clear ddos-protection protocols vxlan statistics
<clear-ddos-vxlan-statistics>
clear dhcp
clear dhcp client
clear dhcp client binding
<clear-dhcp-client-binding-information>
clear dhcp client statistics
<clear-client-statistics-information>
clear dhcp proxy-client
clear dhcp proxy-client statistics
clear dhcp relay
clear dhcp relay binding
<clear-dhcp-relay-binding-information>
clear dhcp relay binding interface
<clear-dhcp-interface-bindings>
clear dhcp relay statistics
<clear-dhcp-relay-statistics-information>
<clear-dhcp-security-binding>
<clear-dhcp-security-binding-interface>
<clear-dhcp-security-binding-ip-address>
<clear-dhcp-security-binding-statistics>
<clear-dhcp-security-binding-vlan>
clear dhcp relay statistics bulk-leasequery-connections
<clear-dhcp-relay-bulk-leasequery-conn-statistics>
clear dhcp relay statistics leasequery
<clear-dhcp-relay-leasequery-statistics>
clear dhcp server
clear dhcp server binding
<clear-dhcp-server-binding-information>

```

```
clear dhcp server binding interface
<clear-dhcp-server-binding-interface>
clear dhcp server statistics
  <clear-server-statistics-information>
clear dhcp statistics
<clear-dhcp-service-statistics-information>
clear dhcp-security statistics
<clear-dhcp-security-statistics>
clear dhcpv6
clear dhcpv6 client
clear dhcpv6 client binding
<clear-dhcpv6-client-binding-information>
clear dhcpv6 client statistics
<clear-dhcpv6-client-statistics-information>
clear dhcpv6 proxy-client
clear dhcpv6 proxy-client statistics
  <clear-dhcpv6-proxy-client-statistics-information>
clear dhcpv6 relay
clear dhcpv6 relay binding
clear dhcpv6 relay binding interface
clear dhcpv6 relay statistics
<clear-dhcpv6-relay-statistics-information>
clear dhcpv6 relay statistics bulk-leasequery-connections
<clear-dhcpv6-relay-bulk-leasequery-conn-statistics>
clear dhcpv6 relay statistics leasequery
<clear-dhcpv6-relay-leasequery-statistics>
clear dhcpv6 server
clear dhcpv6 server binding
<clear-dhcpv6-server-binding-information>
clear dhcpv6 server binding interface
<clear-dhcpv6-server-binding-interface>
clear dhcpv6 server statistics
<clear-dhcpv6-server-statistics-information>
clear dhcpv6 server statistics bulk-leasequery-connections
<clear-dhcpv6-server-bulk-leasequery-statistics>
clear dhcpv6 statistics
<clear-dhcpv6-service-statistics-information>
clear diameter
clear diameter function
  <clear-diameter-function>
clear diameter peer
  <clear-diameter-peer>
<clear-dhcp-binding-information>
<clear-dhcp-conflict-information>
<clear-dhcp-statistics-information>
clear system subscriber-management
clear system subscriber-management arp
<clear-subscriber-management-arp>
clear system subscriber-management arp address
<clear-subscriber-management-arp-address>
clear system subscriber-management arp interface
<clear-subscriber-management-arp-interface>
clear system subscriber-management ipv6-neighbors
<clear-subscriber-management-ipv6-neighbors>
clear system subscriber-management ipv6-neighbors address
<clear-subscriber-management-ipv6-neighbor-address><clear system
subscriber-management ipv6-neighbors interface
<clear-subscriber-management-ipv6-neighbor-interface>
clear system subscriber-management statistics
<clear-subscriber-management-statistics>
```

```
clear dot1x
clear dot1x eapol-block
clear dot1x eapol-block interface
<clear-dot1x-eapol-block-interface-session>
clear dot1x eapol-block mac-address
<clear-dot1x-eapol-block-mac-session>
clear dot1x firewall
<clear-dot1x-firewall>
clear dot1x firewall interface
<clear-dot1x-firewall-interface>
clear dot1x interface
<clear-dot1x-interface-session>
clear dot1x mac-address
<clear-dot1x-mac-session>
clear dot1x statistics
<clear-dot1x-statistics>
clear dot1x statistics interface
<clear-dot1x-statistics-interface>
clear error
clear error bpdu
clear error bpdu interface
<clear-bpdu-error>
clear error loop-detect
clear error loop-detect interface
<clear-loop-detect-error>
clear error mac-rewrite
clear error mac-rewrite interface
<clear-mac-rewrite-error>
clear esis
clear esis adjacency
<clear-esis-adjacency>
clear esis statistics
<clear-esis-statistics>
clear ethernet-switching
clear ethernet-switching evpn
clear ethernet-switching evpn arp-table
<clear-ethernet-switching-evpn-arp-table>
clear ethernet-switching mac-learning-log
<clear-ethernet-switching-mac-learning-log>
clear ethernet-switching recovery-timeout
<clear-ethernet-switching-recovery>
clear ethernet-switching recovery-timeout interface
<clear-ethernet-switching-recovery-interface>
clear ethernet-switching satellite
clear ethernet-switching satellite logging
<clear-satellite-control-logging>
clear ethernet-switching satellite vlan-auto-sense
<clear-satellite-control-plane-vlan-auto-sense>
clear ethernet-switching table
<clear-ethernet-switching-table>
clear ethernet-switching table interface
<clear-ethernet-switching-interface-table>
clear ethernet-switching table persistent-learning
<clear-ethernet-switching-table-persistent-learning>
clear ethernet-switching table persistent-learning interface
<clear-ethernet-switching-table-persistent-learning>
clear ethernet-switching table persistent-learning mac
<clear-ethernet-switching-table-persistent-learning-mac>
clear evpn
clear evpn arp-table
```

```
<clear-evpn-arp-table>
clear evpn mac-table
<clear-evpn-mac-table>
clear evpn mac-table interface
<clear-evpn-interface-mac-table>
clear evpn nd-table
<clear-evpn-nd-table>
clear extensible-subscriber-services
clear extensible-subscriber-services counters
<clear-extensible-subscriber-services-counters>
clear extensible-subscriber-services sessions
<clear-extensible-subscriber-services-sessions>
clear fabric
<clear-fabric>
clear fabric statistics
<clear-fabric-statistics>
clear firewall
<clear-firewall-counters>
clear firewall all
<clear-all-firewall-conters>
clear firewall log
<clear-firewall-log>
clear firewall policer
clear firewall policer counter
clear firewall policer counter all
<clear-interface-aggregate-fwd-options>
<clear-interface-aggregate-fwd-options-all>
clear helper
clear helper statistics
  <clear-helper-statistics-information>
clear igmp
clear igmp membership
<clear-igmp-membership>
clear igmp snooping
clear igmp snooping membership
<clear-igmp-snooping-membership>
clear igmp snooping membership bridge-domain
<clear-igmp-snooping-bridge-domain-membership>
clear igmp snooping membership vlan
<clear-igmp-snooping-vlan-membership>
clear igmp snooping statistics
<clear-igmp-snooping-statistics>
clear igmp snooping statistics bridge-domain
<clear-igmp-snooping-bridge-domain-statistics>
clear igmp snooping statistics vlan
<clear-igmp-snooping-vlan-statistics>
clear igmp statistics
<clear-igmp-statistics>
clear ike
clear ike security-associations
<clear-ike-security-associations>
clear ike statistics
<clear-ike-statistics>
clear ilmi
clear ilmi statistics
<clear-ilmi-statistics>
clear interfaces
clear interfaces interface-set
clear interfaces interface-set statistics
<clear-interface-set-statistics>
```

```
clear interfaces interface-set statistics all
<clear-interface-set-statistics-all>
clear interfaces interval
<clear-interfaces-interval>
clear interfaces mac-database
<clear-interfaces-mac-database>
clear interfaces mac-database statistics
<clear-interface-mac-database-statistics>
clear interfaces mac-database statistics all
<clear-interface-mac-database-statistics-all>
clear interfaces statistics
<clear-interfaces-statistics>
clear interfaces statistics all
<clear-interfaces-statistics-all>
clear interfaces transport
<clear-interface-transport-information>
clear interfaces transport optics
<clear-interface-transport-optics-information>
clear interfaces transport optics interval
<clear-interface-transport-optics-interval-information>
clear ipsec
clear ipsec security-associations
<clear-ipsec-security-associations>
clear ipv6
clear ipv6 neighbors
<clear-ipv6-nd-information>
clear ipv6 neighbors all
<clear-ipv6-all-neighbors>
clear isis
clear isis adjacency
<clear-isis-adjacency-information>
clear isis database
<clear-isis-database-information>
clear isis layer2-map
<clear-isis-layer2-map-information>
clear isis overload
<clear-isis-overload-information>
clear isis statistics
<clear-isis-statistics-information>
clear ipv6 router-advertisement
clear lacp
clear lacp statistics
clear l2-learning
clear l2-learning evpn
clear l2-learning evpn arp-statistics
<clear-evpn-arp-statistics>
clear l2-learning evpn arp-statistics interface
<clear-evpn-arp-statistics-interface>
clear l2-learning evpn nd-statistics
<clear-evpn-nd-statistics>
clear l2-learning evpn nd-statistics interface
<clear-evpn-nd-statistics-interface>
clear l2-learning mac-move-buffer
<clear-l2-learning-mac-move-buffer>
clear l2-learning mac-move-buffer active
<clear-l2-learning-mac-move-buffer-active>
clear l2-learning redundancy-group
<clear-l2-learning-redundancy-group-statistics>
clear l2-learning remote-backbone-edge-bridges
<clear-l2-learning-remote-backbone-edge-bridges>
```

```
clear l2circuit
clear ldp
clear ldp statistics
<clear-ldp-statistics>
clear ldp statistics interface
<clear-ldp-interface-hello-statistics>
clear ldp neighbor
<clear-ldp-neighbors>
clear ldp session
<clear-ldp-sessions>
clear lldp
clear lldp neighbors
<clear-lldp-neighbors>
clear lldp neighbors interface
<clear-lldp-interface-neighbors>
clear lldp statistics
<clear-lldp-statistics>
clear lldp statistics interface
<clear-lldp-interface-statistics>
clear loop-detect
clear loop-detect statistics
clear loop-detect statistics interface
<clear-loop-detect-statistics-information>
clear mld
clear mld membership
<clear-mld-membership>
clear mld snooping
clear mld snooping membership
<clear-mld-snooping-membership>
clear mld snooping membership bridge-domain
<clear-mld-snooping-bridge-domain-membership>
clear mld snooping membership vlan
<clear-mld-snooping-vlan-membership>
clear mld snooping statistics
<clear-mld-snooping-statistics>
clear mld snooping statistics bridge-domain
<clear-mld-snooping-bridge-domain-statistics>
clear mld snooping statistics vlan
<clear-mld-snooping-vlan-statistics>
clear mld statistics
<clear-mld-statistics>
clear mobile-ip
clear mobile-ip binding
clear mobile-ip binding all
<clear-binding-all>
clear mobile-ip binding ip-address
<clear-binding-ip>
clear mobile-ip binding nai
<clear-binding-nai>
clear mobile-ip visitor
clear mobile-ip visitor all
<clear-visitor-all>
clear mobile-ip visitor ip-address
<clear-visitor-ip>
clear mobile-ip visitor nai
<clear-visitor-nai>
clear mpls
clear mpls lsp
<clear-mpls-lsp-information>
clear mpls static-lsp
```

```

<clear-mpls-static-lsp-information>
clear mpls traceroute
clear mpls traceroute database
clear mpls traceroute database ldp
<clear-mpls-traceroute-database-ldp>
clear msdp
clear msdp cache
<clear-msdp-cache>
clear msdp statistics
<clear-msdp-statistics>
clear multicast
clear multicast bandwidth-admission
<clear-multicast-bandwidth-admission>
clear multicast forwarding-cache
clear multicast scope
<clear-multicast-scope-statistics>
clear multicast sessions
<clear-multicast-sessions>
clear multicast statistics
<clear-multicast-statistics>
clear mvrp
clear mvrp statistics
<clear-mvrp-interface-statistics>
clear network-access
clear network-access aaa
clear network-access aaa statistics
<clear-aaa-statistics-table>
clear network-access aaa statistics address-assignment
clear network-access aaa statistics address-assignment client
<clear-aaa-address-assignment-client-statistics>
clear network-access aaa statistics address-assignment pool
<clear-aaa-address-assignment-pool-statistics>
clear network-access aaa subscriber
<clear-aaa-subscriber-table>
clear network-access aaa subscriber statistics
<clear-aaa-subscriber-table-specific-statistics>
clear network-access address-assignment
clear network-access address-assignment preserved
<clear-address-assignment-preserved>
clear network-access ocs
clear network-access ocs statistics
<clear-ocs-statistics-information>
clear network-access pcrf
clear network-access pcrf statistics
<clear-pcrf-statistics-information>
clear network-access pcrf subscribers
<clear-pcrf-subscribers>
clear network-access requests
clear network-access requests pending
<clear-authentication-pending-table>
clear network-access requests statistics
<clear-authentication-statistics>
clear network-access securid-node-secret-file
<clear-node-secret-file>
clear oam
clear oam ethernet
clear oam ethernet connectivity-fault-management
clear oam ethernet connectivity-fault-management continuity-measurement
<clear-cfm-continuity-measurement>
clear oam ethernet connectivity-fault-management delay-statistics

```

```
<clear-cfm-delay-statistics>
clear oam ethernet connectivity-fault-management event
<clear-cfm-action-profile-event>
clear oam ethernet connectivity-fault-management loss-statistics
<clear-cfm-loss-statistics>
clear oam ethernet connectivity-fault-management path-database
<clear-cfm-linktrace-path-database>
clear oam ethernet connectivity-fault-management policer
<clear-cfm-policer-statistics>
clear oam ethernet connectivity-fault-management sla-iterator-history
<clear-cfm-iterator-history>
clear oam ethernet connectivity-fault-management sla-iterator-statistics
<clear-cfm-iterator-statistics>
clear oam ethernet connectivity-fault-management statistics
<clear-cfm-statistics>
clear oam ethernet connectivity-fault-management synthetic-loss-statistics
<clear-cfm-slm-statistics>
clear oam ethernet link-fault-management
clear oam ethernet link-fault-management state
<clear-lfmd-state>
clear oam ethernet link-fault-management statistics
<clear-lfmd-statistics>
clear oam ethernet link-fault-management statistics action-profile
<clear-lfmd-action-profile-statistics>
clear oam ethernet lmi
clear oam ethernet lmi statistics
<clear-elmi-statistics>
clear ospf
clear ospf database
<clear-ospf-database-information>
clear ospf database-protection
<clear-ospf-database-protection>
clear ospf io-statistics
<clear-ospf-io-statistics-information>
clear ospf neighbor
<clear-ospf-neighbor-information>
clear ospf overload
<clear-ospf-overload-information>
clear ospf statistics
<clear-ospf-statistics-information>
clear ospf3
clear ospf3 database
<clear-ospf3-database-information>
clear ospf3 database-protection
<clear-ospf3-database-protection>
clear ospf3 io-statistics
<clear-ospf3-io-statistics-information>
clear ospf3 neighbor
<clear-ospf3-neighbor-information>
clear ospf3 overload
<clear-ospf3-overload-information>
clear ospf3 statistics
<clear-ospf3-io-statistics-information>
clear ovsdb
clear ovsdb commit
clear ovsdb commit failures
<clear-ovsdb-commit-failure-information>
clear ovsdb statistics
clear ovsdb statistics interface
clear ovsdb statistics interface all
```



```

<clear-ovsdb-interfaces-statistics-all>
clear performance-monitoring
clear performance-monitoring mpls
clear performance-monitoring mpls lsp
<clear-pm-mpls-lsp-information>
clear pfe
clear pfe statistics
clear pfe statistics fabric
clear pfe statistics traffic detail
clear pfe statistics traffic egress-queues fpc
clear pfe statistics traffic multicast
clear pfe statistics traffic multicast fpc
clear pfe tcam-errors
clear pfe tcam-errors all-tcam-stages
<clear-pfe-tcam-errors-all-tcam-stages>
clear pfe tcam-errors app
<clear-pfe-tcam-errors-app>
clear pfe tcam-errors app bd-dtag-validate
<clear-pfe-tcam-errors-app-bd-dtag-validate>
clear pfe tcam-errors app bd-dtag-validate detail
clear pfe tcam-errors app bd-dtag-validate list-related-apps
clear pfe tcam-errors app bd-dtag-validate list-shared-apps
clear pfe tcam-errors app bd-dtag-validate shared-usage
clear pfe tcam-errors app bd-dtag-validate shared-usage detail
clear pfe tcam-errors app bd-tpid-swap
<clear-pfe-tcam-errors-app-bd-tpid-swap>
clear pfe tcam-errors app bd-tpid-swap detail
clear pfe tcam-errors app bd-tpid-swap list-related-apps
clear pfe tcam-errors app bd-tpid-swap list-shared-apps
clear pfe tcam-errors app bd-tpid-swap shared-usage
clear pfe tcam-errors app bd-tpid-swap shared-usage detail
clear pfe tcam-errors app cfm-bd-filter
<clear-pfe-tcam-errors-app-cfm-bd-filter>
clear pfe tcam-errors app cfm-bd-filter detail
clear pfe tcam-errors app cfm-bd-filter list-related-apps
clear pfe tcam-errors app cfm-bd-filter list-shared-apps
clear pfe tcam-errors app cfm-bd-filter shared-usage
clear pfe tcam-errors app cfm-bd-filter shared-usage detail
clear pfe tcam-errors app cfm-filter
<clear-pfe-tcam-errors-app-cfm-filter>
clear pfe tcam-errors app cfm-filter detail
clear pfe tcam-errors app cfm-filter list-related-apps
clear pfe tcam-errors app cfm-filter list-shared-apps
clear pfe tcam-errors app cfm-filter shared-usage
clear pfe tcam-errors app cfm-filter shared-usage detail
clear pfe tcam-errors app cfm-vpls-filter
<clear-pfe-tcam-errors-app-cfm-vpls-filter>
clear pfe tcam-errors app cfm-vpls-filter detail
clear pfe tcam-errors app cfm-vpls-filter list-related-apps
clear pfe tcam-errors app cfm-vpls-filter list-shared-apps
clear pfe tcam-errors app cfm-vpls-filter shared-usage
clear pfe tcam-errors app cfm-vpls-filter shared-usage detail
clear pfe tcam-errors app cfm-vpls-ifl-filter
<clear-pfe-tcam-errors-app-cfm-vpls-ifl-filter>
clear pfe tcam-errors app cfm-vpls-ifl-filter detail
clear pfe tcam-errors app cfm-vpls-ifl-filter list-related-apps
clear pfe tcam-errors app cfm-vpls-ifl-filter list-shared-apps
clear pfe tcam-errors app cfm-vpls-ifl-filter shared-usage
clear pfe tcam-errors app cfm-vpls-ifl-filter shared-usage detail
clear pfe tcam-errors app cos-fc

```

```
<clear-pfe-tcam-errors-app-cos-fc>
clear pfe tcam-errors app cos-fc detail
clear pfe tcam-errors app cos-fc list-related-apps
clear pfe tcam-errors app cos-fc list-shared-apps
clear pfe tcam-errors app cos-fc shared-usage
clear pfe tcam-errors app cos-fc shared-usage detail
clear pfe tcam-errors app fw-ccc-in
<clear-pfe-tcam-errors-app-fw-ccc-in>
clear pfe tcam-errors app fw-ccc-in detail
clear pfe tcam-errors app fw-ccc-in list-related-apps
clear pfe tcam-errors app fw-ccc-in list-shared-apps
clear pfe tcam-errors app fw-ccc-in shared-usage
clear pfe tcam-errors app fw-ccc-in shared-usage detail
clear pfe tcam-errors app fw-family-out
<clear-pfe-tcam-errors-app-fw-family-out>
clear pfe tcam-errors app fw-family-out detail
clear pfe tcam-errors app fw-family-out list-related-apps
clear pfe tcam-errors app fw-family-out list-shared-apps
clear pfe tcam-errors app fw-family-out shared-usage
clear pfe tcam-errors app fw-family-out shared-usage detail
clear pfe tcam-errors app fw-fbf
<clear-pfe-tcam-errors-app-fw-fbf>
clear pfe tcam-errors app fw-fbf detail
clear pfe tcam-errors app fw-fbf list-related-apps
clear pfe tcam-errors app fw-fbf list-shared-apps
clear pfe tcam-errors app fw-fbf shared-usage
clear pfe tcam-errors app fw-fbf shared-usage detail
clear pfe tcam-errors app fw-fbf-inet6
<clear-pfe-tcam-errors-app-fw-fbf-inet6>
clear pfe tcam-errors app fw-fbf-inet6 detail
clear pfe tcam-errors app fw-fbf-inet6 list-related-apps
clear pfe tcam-errors app fw-fbf-inet6 list-shared-apps
clear pfe tcam-errors app fw-fbf-inet6 shared-usage
clear pfe tcam-errors app fw-fbf-inet6 shared-usage detail
clear pfe tcam-errors app fw-ifl-in
<clear-pfe-tcam-errors-app-fw-ifl-in>
clear pfe tcam-errors app fw-ifl-in detail
clear pfe tcam-errors app fw-ifl-in list-related-apps
clear pfe tcam-errors app fw-ifl-in list-shared-apps
clear pfe tcam-errors app fw-ifl-in shared-usage
clear pfe tcam-errors app fw-ifl-in shared-usage detail
clear pfe tcam-errors app fw-ifl-out
<clear-pfe-tcam-errors-app-fw-ifl-out>
clear pfe tcam-errors app fw-ifl-out detail
clear pfe tcam-errors app fw-ifl-out list-related-apps
clear pfe tcam-errors app fw-ifl-out list-shared-apps
clear pfe tcam-errors app fw-ifl-out shared-usage
clear pfe tcam-errors app fw-ifl-out shared-usage detail
clear pfe tcam-errors app fw-inet-ftf
<clear-pfe-tcam-errors-app-fw-inet-ftf>
clear pfe tcam-errors app fw-inet-ftf detail
clear pfe tcam-errors app fw-inet-ftf list-related-apps
clear pfe tcam-errors app fw-inet-ftf list-shared-apps
clear pfe tcam-errors app fw-inet-ftf shared-usage
clear pfe tcam-errors app fw-inet-ftf shared-usage detail
clear pfe tcam-errors app fw-inet-in
<clear-pfe-tcam-errors-app-fw-inet-in>
clear pfe tcam-errors app fw-inet-in detail
clear pfe tcam-errors app fw-inet-in list-related-apps
clear pfe tcam-errors app fw-inet-in list-shared-apps
```

```

clear pfe tcam-errors app fw-inet-in shared-usage
clear pfe tcam-errors app fw-inet-in shared-usage detail
clear pfe tcam-errors app fw-inet-pm
<clear-pfe-tcam-errors-app-fw-inet-pm>
clear pfe tcam-errors app fw-inet-pm detail
clear pfe tcam-errors app fw-inet-pm list-related-apps
clear pfe tcam-errors app fw-inet-pm list-shared-apps
clear pfe tcam-errors app fw-inet-pm shared-usage
clear pfe tcam-errors app fw-inet-pm shared-usage detail
clear pfe tcam-errors app fw-inet-rpf
<clear-pfe-tcam-errors-app-fw-inet-rpf>
clear pfe tcam-errors app fw-inet-rpf detail
clear pfe tcam-errors app fw-inet-rpf list-related-apps
clear pfe tcam-errors app fw-inet-rpf list-shared-apps
clear pfe tcam-errors app fw-inet-rpf shared-usage
clear pfe tcam-errors app fw-inet-rpf shared-usage detail
clear pfe tcam-errors app fw-inet-rpf
<clear-pfe-tcam-errors-app-fw-inet-rpf>
clear pfe tcam-errors app fw-inet-rpf detail
clear pfe tcam-errors app fw-inet-rpf list-related-apps
clear pfe tcam-errors app fw-inet-rpf list-shared-apps
clear pfe tcam-errors app fw-inet-rpf shared-usage
clear pfe tcam-errors app fw-inet-rpf shared-usage detail
clear pfe tcam-errors app fw-inet6-family-out
<clear-pfe-tcam-errors-app-fw-inet6-family-out>
clear pfe tcam-errors app fw-inet6-family-out detail
clear pfe tcam-errors app fw-inet6-family-out list-related-apps
clear pfe tcam-errors app fw-inet6-family-out list-shared-apps
clear pfe tcam-errors app fw-inet6-family-out shared-usage
clear pfe tcam-errors app fw-inet6-family-out shared-usage detail
clear pfe tcam-errors app fw-inet6-ftf
<clear-pfe-tcam-errors-app-fw-inet6-ftf>
clear pfe tcam-errors app fw-inet6-ftf detail
clear pfe tcam-errors app fw-inet6-ftf list-related-apps
clear pfe tcam-errors app fw-inet6-ftf list-shared-apps
clear pfe tcam-errors app fw-inet6-ftf shared-usage
clear pfe tcam-errors app fw-inet6-ftf shared-usage detail
clear pfe tcam-errors app fw-inet6-in
<clear-pfe-tcam-errors-app-fw-inet6-in>
clear pfe tcam-errors app fw-inet6-in detail
clear pfe tcam-errors app fw-inet6-in list-related-apps
clear pfe tcam-errors app fw-inet6-in list-shared-apps
clear pfe tcam-errors app fw-inet6-in shared-usage
clear pfe tcam-errors app fw-inet6-in shared-usage detail
clear pfe tcam-errors app fw-inet6-rpf
<clear-pfe-tcam-errors-app-fw-inet6-rpf>
clear pfe tcam-errors app fw-inet6-rpf detail
clear pfe tcam-errors app fw-inet6-rpf list-related-apps
clear pfe tcam-errors app fw-inet6-rpf list-shared-apps
clear pfe tcam-errors app fw-inet6-rpf shared-usage
clear pfe tcam-errors app fw-inet6-rpf shared-usage detail
clear pfe tcam-errors app fw-l2-in
<clear-pfe-tcam-errors-app-fw-l2-in>
clear pfe tcam-errors app fw-l2-in detail
clear pfe tcam-errors app fw-l2-in list-related-apps
clear pfe tcam-errors app fw-l2-in list-shared-apps
clear pfe tcam-errors app fw-l2-in shared-usage
clear pfe tcam-errors app fw-l2-in shared-usage detail
clear pfe tcam-errors app fw-mpls-in
<clear-pfe-tcam-errors-app-fw-mpls-in>

```

```
clear pfe tcam-errors app fw-mpls-in detail
clear pfe tcam-errors app fw-mpls-in list-related-apps
clear pfe tcam-errors app fw-mpls-in list-shared-apps
clear pfe tcam-errors app fw-mpls-in shared-usage
clear pfe tcam-errors app fw-mpls-in shared-usage detail
clear pfe tcam-errors app fw-semantics
<clear-pfe-tcam-errors-app-fw-semantics>
clear pfe tcam-errors app fw-semantics detail
clear pfe tcam-errors app fw-semantics list-related-apps
clear pfe tcam-errors app fw-semantics list-shared-apps
clear pfe tcam-errors app fw-semantics shared-usage
clear pfe tcam-errors app fw-semantics shared-usage detail
clear pfe tcam-errors app fw-vpls-in
<clear-pfe-tcam-errors-app-fw-vpls-in>
clear pfe tcam-errors app fw-vpls-in detail
clear pfe tcam-errors app fw-vpls-in list-related-apps
clear pfe tcam-errors app fw-vpls-in list-shared-apps
clear pfe tcam-errors app fw-vpls-in shared-usage
clear pfe tcam-errors app fw-vpls-in shared-usage detail
clear pfe tcam-errors app gr-ifl-stats-egr
<clear-pfe-tcam-errors-app-gr-ifl-statistics-egr>
clear pfe tcam-errors app gr-ifl-stats-egr detail
clear pfe tcam-errors app gr-ifl-stats-egr list-related-apps
clear pfe tcam-errors app gr-ifl-stats-egr list-shared-apps
clear pfe tcam-errors app gr-ifl-stats-egr shared-usage
clear pfe tcam-errors app gr-ifl-stats-egr shared-usage detail
clear pfe tcam-errors app gr-ifl-stats-ing
<clear-pfe-tcam-errors-app-gr-ifl-statistics-ing>
clear pfe tcam-errors app gr-ifl-stats-ing detail
clear pfe tcam-errors app gr-ifl-stats-ing list-related-apps
clear pfe tcam-errors app gr-ifl-stats-ing list-shared-apps
clear pfe tcam-errors app gr-ifl-stats-ing shared-usage
clear pfe tcam-errors app gr-ifl-stats-ing shared-usage detail
clear pfe tcam-errors app gr-ifl-stats-preing
<clear-pfe-tcam-errors-app-gr-ifl-statistics-preing>
clear pfe tcam-errors app gr-ifl-stats-preing detail
clear pfe tcam-errors app gr-ifl-stats-preing list-related-apps
clear pfe tcam-errors app gr-ifl-stats-preing list-shared-apps
clear pfe tcam-errors app gr-ifl-stats-preing shared-usage
clear pfe tcam-errors app gr-ifl-stats-preing shared-usage detail
< clear pfe tcam-errors app ifd-src-mac-fil
<clear-pfe-tcam-errors-app-ifd-src-mac-fil>
clear pfe tcam-errors app ifd-src-mac-fil detail
clear pfe tcam-errors app ifd-src-mac-fil list-related-apps
clear pfe tcam-errors app ifd-src-mac-fil list-shared-apps
clear pfe tcam-errors app ifd-src-mac-fil shared-usage
clear pfe tcam-errors app ifd-src-mac-fil shared-usage detail
clear pfe tcam-errors app ifl-statistics-in
<clear-pfe-tcam-errors-app-ifl-statistics-in>
clear pfe tcam-errors app ifl-statistics-in detail
clear pfe tcam-errors app ifl-statistics-in list-related-apps
clear pfe tcam-errors app ifl-statistics-in list-shared-apps
clear pfe tcam-errors app ifl-statistics-in shared-usage
clear pfe tcam-errors app ifl-statistics-in shared-usage detail
clear pfe tcam-errors app ifl-statistics-out
<clear-pfe-tcam-errors-app-ifl-statistics-out>
clear pfe tcam-errors app ifl-statistics-out detail
clear pfe tcam-errors app ifl-statistics-out list-related-apps
clear pfe tcam-errors app ifl-statistics-out list-shared-apps
clear pfe tcam-errors app ifl-statistics-out shared-usage
```

```

clear pfe tcam-errors app ifl-statistics-out shared-usage detail
clear pfe tcam-errors app ing-out-iff
<clear-pfe-tcam-errors-app-ing-out-iff>
clear pfe tcam-errors app ing-out-iff detail
clear pfe tcam-errors app ing-out-iff list-related-apps
clear pfe tcam-errors app ing-out-iff list-shared-apps
clear pfe tcam-errors app ing-out-iff shared-usage
clear pfe tcam-errors app ing-out-iff shared-usage detail
clear pfe tcam-errors app ip-mac-val
<clear-pfe-tcam-errors-app-ip-mac-val>
clear pfe tcam-errors app ip-mac-val detail
clear pfe tcam-errors app ip-mac-val list-related-apps
clear pfe tcam-errors app ip-mac-val list-shared-apps
clear pfe tcam-errors app ip-mac-val shared-usage
clear pfe tcam-errors app ip-mac-val shared-usage detail
clear pfe tcam-errors app ip-mac-val-bcast
<clear-pfe-tcam-errors-app-ip-mac-val-bcast>
clear pfe tcam-errors app ip-mac-val-bcast detail
clear pfe tcam-errors app ip-mac-val-bcast list-related-apps
clear pfe tcam-errors app ip-mac-val-bcast list-shared-apps
clear pfe tcam-errors app ip-mac-val-bcast shared-usage
clear pfe tcam-errors app ip-mac-val-bcast shared-usage detail
clear pfe tcam-errors app ipsec-reverse-fil
<clear-pfe-tcam-errors-app-ipsec-reverse-fil>
clear pfe tcam-errors app ipsec-reverse-fil detail
clear pfe tcam-errors app ipsec-reverse-fil list-related-apps
clear pfe tcam-errors app ipsec-reverse-fil list-shared-apps
clear pfe tcam-errors app ipsec-reverse-fil shared-usage
clear pfe tcam-errors app ipsec-reverse-fil shared-usage detail
clear pfe tcam-errors app irb-cos-rw
<clear-pfe-tcam-errors-app-irb-cos-rw>
clear pfe tcam-errors app irb-cos-rw detail
clear pfe tcam-errors app irb-cos-rw list-related-apps
clear pfe tcam-errors app irb-cos-rw list-shared-apps
clear pfe tcam-errors app irb-cos-rw shared-usage
clear pfe tcam-errors app irb-cos-rw shared-usage detail
clear pfe tcam-errors app irb-fixed-cos
<clear-pfe-tcam-errors-app-irb-fixed-cos>
clear pfe tcam-errors app irb-fixed-cos detail
clear pfe tcam-errors app irb-fixed-cos list-related-apps
clear pfe tcam-errors app irb-fixed-cos list-shared-apps
clear pfe tcam-errors app irb-fixed-cos shared-usage
clear pfe tcam-errors app irb-fixed-cos shared-usage detail
clear pfe tcam-errors app irb-inet6-fil
<clear-pfe-tcam-errors-app-irb-inet6-fil>
clear pfe tcam-errors app irb-inet6-fil detail
clear pfe tcam-errors app irb-inet6-fil list-related-apps
clear pfe tcam-errors app irb-inet6-fil list-shared-apps
clear pfe tcam-errors app irb-inet6-fil shared-usage
clear pfe tcam-errors app irb-inet6-fil shared-usage detail
clear pfe tcam-errors app lfm-802.3ah-in
<clear-pfe-tcam-errors-app-lfm-802.3ah-in>
clear pfe tcam-errors app lfm-802.3ah-in detail
clear pfe tcam-errors app lfm-802.3ah-in list-related-apps
clear pfe tcam-errors app lfm-802.3ah-in list-shared-apps
clear pfe tcam-errors app lfm-802.3ah-in shared-usage
clear pfe tcam-errors app lfm-802.3ah-in shared-usage detail
clear pfe tcam-errors app lfm-802.3ah-out
<clear-pfe-tcam-errors-app-lfm-802.3ah-out>
clear pfe tcam-errors app lfm-802.3ah-out detail

```

```
clear pfe tcam-errors app lfm-802.3ah-out list-related-apps
clear pfe tcam-errors app lfm-802.3ah-out list-shared-apps
clear pfe tcam-errors app lfm-802.3ah-out shared-usage
clear pfe tcam-errors app lfm-802.3ah-out shared-usage detail
clear pfe tcam-errors app lo0-inet-fil
<clear-pfe-tcam-errors-app-lo0-inet-fil>
clear pfe tcam-errors app lo0-inet-fil detail
clear pfe tcam-errors app lo0-inet-fil list-related-apps
clear pfe tcam-errors app lo0-inet-fil list-shared-apps
clear pfe tcam-errors app lo0-inet-fil shared-usage
clear pfe tcam-errors app lo0-inet-fil shared-usage detail
clear pfe tcam-errors app lo0-inet6-fil
<clear-pfe-tcam-errors-app-lo0-inet6-fil>
clear pfe tcam-errors app lo0-inet6-fil detail
clear pfe tcam-errors app lo0-inet6-fil list-related-apps
clear pfe tcam-errors app lo0-inet6-fil list-shared-apps
clear pfe tcam-errors app lo0-inet6-fil shared-usage
clear pfe tcam-errors app lo0-inet6-fil shared-usage detail
clear pfe tcam-errors app mac-drop-cnt
<clear-pfe-tcam-errors-app-mac-drop-cnt>
clear pfe tcam-errors app mac-drop-cnt detail
clear pfe tcam-errors app mac-drop-cnt list-related-apps
clear pfe tcam-errors app mac-drop-cnt list-shared-apps
clear pfe tcam-errors app mac-drop-cnt shared-usage
clear pfe tcam-errors app mac-drop-cnt shared-usage detail
clear pfe tcam-errors app mrouter-port-in
<clear-pfe-tcam-errors-app-mrouter-port-in>
clear pfe tcam-errors app mrouter-port-in detail
clear pfe tcam-errors app mrouter-port-in list-related-apps
clear pfe tcam-errors app mrouter-port-in list-shared-apps
clear pfe tcam-errors app mrouter-port-in shared-usage
clear pfe tcam-errors app mrouter-port-in shared-usage detail
clear pfe tcam-errors app napt-reverse-fil
<clear-pfe-tcam-errors-app-napt-reverse-fil>
clear pfe tcam-errors app napt-reverse-fil detail
clear pfe tcam-errors app napt-reverse-fil list-related-apps
clear pfe tcam-errors app napt-reverse-fil list-shared-apps
clear pfe tcam-errors app napt-reverse-fil shared-usage
clear pfe tcam-errors app napt-reverse-fil shared-usage detail
clear pfe tcam-errors app no-local-switching
<clear-pfe-tcam-errors-app-no-local-switching>
clear pfe tcam-errors app no-local-switching detail
clear pfe tcam-errors app no-local-switching list-related-apps
clear pfe tcam-errors app no-local-switching list-shared-apps
clear pfe tcam-errors app no-local-switching shared-usage
clear pfe tcam-errors app no-local-switching shared-usage detail
clear pfe tcam-errors app ptpoe-cos-rw
<clear-pfe-tcam-errors-app-ptpoe-cos-rw>
clear pfe tcam-errors app ptpoe-cos-rw detail
clear pfe tcam-errors app ptpoe-cos-rw list-related-apps
clear pfe tcam-errors app ptpoe-cos-rw list-shared-apps
clear pfe tcam-errors app ptpoe-cos-rw shared-usage
clear pfe tcam-errors app ptpoe-cos-rw shared-usage detail
clear pfe tcam-errors app rfc2544-layer2-in
<clear-pfe-tcam-errors-app-rfc2544-layer2-in>
clear pfe tcam-errors app rfc2544-layer2-in detail
clear pfe tcam-errors app rfc2544-layer2-in list-related-apps
clear pfe tcam-errors app rfc2544-layer2-in list-shared-apps
clear pfe tcam-errors app rfc2544-layer2-in shared-usage
clear pfe tcam-errors app rfc2544-layer2-in shared-usage detail
```

```

clear pfe tcam-errors app rfc2544-layer2-out
<clear-pfe-tcam-errors-app-rfc2544-layer2-out>
clear pfe tcam-errors app rfc2544-layer2-out detail
clear pfe tcam-errors app rfc2544-layer2-out list-related-apps
clear pfe tcam-errors app rfc2544-layer2-out list-shared-apps
clear pfe tcam-errors app rfc2544-layer2-out shared-usage
clear pfe tcam-errors app rfc2544-layer2-out shared-usage detail
clear pfe tcam-errors app vpls-mesh-group-mcast
<get-upper-level-xml-name-vpls-mesh-group-mcast>
clear pfe tcam-errors app vpls-mesh-group-mcast detail
clear pfe tcam-errors app vpls-mesh-group-mcast list-related-apps
clear pfe tcam-errors app vpls-mesh-group-mcast list-shared-apps
clear pfe tcam-errors app vpls-mesh-group-mcast shared-usage
clear pfe tcam-errors app vpls-mesh-group-mcast shared-usage detail
clear pfe tcam-errors app vpls-mesh-group-ucast
<get-upper-level-xml-name-vpls-mesh-group-ucast>
clear pfe tcam-errors app vpls-mesh-group-ucast detail
clear pfe tcam-errors app vpls-mesh-group-ucast list-related-apps
clear pfe tcam-errors app vpls-mesh-group-ucast list-shared-apps
clear pfe tcam-errors app vpls-mesh-group-ucast shared-usage
clear pfe tcam-errors app vpls-mesh-group-ucast shared-usage detail
clear pfe tcam-errors tcam-stage
clear pfe tcam-errors tcam-stage egress
<clear-pfe-tcam-errors-egress-tcam-stage>
clear pfe tcam-errors tcam-stage egress app
clear-pfe-tcam-errors-egress-app
clear pfe tcam-errors tcam-stage egress app bd-dtag-validate
<clear-pfe-tcam-errors-egress-app-bd-dtag-validate>
clear pfe tcam-errors tcam-stage egress app bd-dtag-validate detail
clear pfe tcam-errors tcam-stage egress app bd-dtag-validate
list-related-apps
clear pfe tcam-errors tcam-stage egress app bd-dtag-validate
list-shared-apps
clear pfe tcam-errors tcam-stage egress app bd-dtag-validate shared-usage
clear pfe tcam-errors tcam-stage egress app bd-dtag-validate shared-usage
detail
clear pfe tcam-errors tcam-stage egress app bd-tpid-swap
<clear-pfe-tcam-errors-egress-app-bd-tpid-swap>
clear pfe tcam-errors tcam-stage egress app bd-tpid-swap detail
clear pfe tcam-errors tcam-stage egress app bd-tpid-swap list-related-apps
clear pfe tcam-errors tcam-stage egress app bd-tpid-swap list-shared-apps
clear pfe tcam-errors tcam-stage egress app bd-tpid-swap shared-usage
clear pfe tcam-errors tcam-stage egress app bd-tpid-swap shared-usage detail
clear pfe tcam-errors tcam-stage egress app fw-family-out
<clear-pfe-tcam-errors-egress-app-fw-family-out>
clear pfe tcam-errors tcam-stage egress app fw-family-out detail
clear pfe tcam-errors tcam-stage egress app fw-family-out list-related-apps
clear pfe tcam-errors tcam-stage egress app fw-family-out list-shared-apps
clear pfe tcam-errors tcam-stage egress app fw-family-out shared-usage
clear pfe tcam-errors tcam-stage egress app fw-family-out shared-usage detail
clear pfe tcam-errors tcam-stage egress app fw-ifl-out
<clear-pfe-tcam-errors-egress-app-fw-ifl-out>
clear pfe tcam-errors tcam-stage egress app fw-ifl-out detail
clear pfe tcam-errors tcam-stage egress app fw-ifl-out list-related-apps
clear pfe tcam-errors tcam-stage egress app fw-ifl-out list-shared-apps
clear pfe tcam-errors tcam-stage egress app fw-ifl-out shared-usage
clear pfe tcam-errors tcam-stage egress app fw-ifl-out shared-usage detail
clear pfe tcam-errors tcam-stage egress app fw-inet6-family-out
<clear-pfe-tcam-errors-egress-app-fw-inet6-family-out>
clear pfe tcam-errors tcam-stage egress app fw-inet6-family-out detail
clear pfe tcam-errors tcam-stage egress app fw-inet6-family-out

```

```

list-related-apps
clear pfe tcam-errors tcam-stage egress app fw-inet6-family-out list-shared-apps
clear pfe tcam-errors tcam-stage egress app fw-inet6-family-out shared-usage
clear pfe tcam-errors tcam-stage egress app fw-inet6-family-out shared-usage
detail
clear pfe tcam-errors tcam-stage egress app ifl-statistics-out
<clear-pfe-tcam-errors-egress-app-ifl-statistics-out>
clear pfe tcam-errors tcam-stage egress app ifl-statistics-out detail
clear pfe tcam-errors tcam-stage egress app ifl-statistics-out list-related-apps
clear pfe tcam-errors tcam-stage egress app ifl-statistics-out list-shared-apps
clear pfe tcam-errors tcam-stage egress app ifl-statistics-out shared-usage
clear pfe tcam-errors tcam-stage egress app ifl-statistics-out shared-usage
detail
clear pfe tcam-errors tcam-stage egress app irb-cos-rw
<clear-pfe-tcam-errors-egress-app-irb-cos-rw>
clear pfe tcam-errors tcam-stage egress app irb-cos-rw detail
clear pfe tcam-errors tcam-stage egress app irb-cos-rw list-related-apps
clear pfe tcam-errors tcam-stage egress app irb-cos-rw list-shared-apps
clear pfe tcam-errors tcam-stage egress app irb-cos-rw shared-usage
clear pfe tcam-errors tcam-stage egress app irb-cos-rw shared-usage detail
clear pfe tcam-errors tcam-stage egress app lfm-802.3ah-out
<clear-pfe-tcam-errors-egress-app-lfm-802.3ah-out>
clear pfe tcam-errors tcam-stage egress app lfm-802.3ah-out detail
clear pfe tcam-errors tcam-stage egress app lfm-802.3ah-out list-related-apps
clear pfe tcam-errors tcam-stage egress app lfm-802.3ah-out list-shared-apps
clear pfe tcam-errors tcam-stage egress app lfm-802.3ah-out shared-usage
clear pfe tcam-errors tcam-stage egress app lfm-802.3ah-out shared-usage detail
clear pfe tcam-errors tcam-stage egress app ptpoe-cos-rw
<clear-pfe-tcam-errors-egress-app-ptpoe-cos-rw>
clear pfe tcam-errors tcam-stage egress app ptpoe-cos-rw detail
clear pfe tcam-errors tcam-stage egress app ptpoe-cos-rw list-related-apps
clear pfe tcam-errors tcam-stage egress app ptpoe-cos-rw list-shared-apps
clear pfe tcam-errors tcam-stage egress app ptpoe-cos-rw shared-usage
clear pfe tcam-errors tcam-stage egress app ptpoe-cos-rw shared-usage detail
clear pfe tcam-errors tcam-stage egress app rfc2544-layer2-out
<clear-pfe-tcam-errors-egress-app-rfc2544-layer2-out>
clear pfe tcam-errors tcam-stage egress app rfc2544-layer2-out detail
clear pfe tcam-errors tcam-stage egress app rfc2544-layer2-out list-related-apps
clear pfe tcam-errors tcam-stage egress app rfc2544-layer2-out list-shared-apps
clear pfe tcam-errors tcam-stage egress app rfc2544-layer2-out shared-usage
clear pfe tcam-errors tcam-stage egress app rfc2544-layer2-out shared-usage
detail
clear pfe tcam-errors tcam-stage ingress
<clear-pfe-tcam-errors-ingress-tcam-stage>
clear pfe tcam-errors tcam-stage ingress app
<clear-pfe-tcam-errors-ingress-app>
clear pfe tcam-errors tcam-stage ingress app cfm-bd-filter
<clear-pfe-tcam-errors-ingress-app-cfm-bd-filter>
clear pfe tcam-errors tcam-stage ingress app cfm-bd-filter detail
clear pfe tcam-errors tcam-stage ingress app cfm-bd-filter list-related-apps
clear pfe tcam-errors tcam-stage ingress app cfm-bd-filter list-shared-apps
clear pfe tcam-errors tcam-stage ingress app cfm-bd-filter shared-usage
clear pfe tcam-errors tcam-stage ingress app cfm-bd-filter shared-usage detail
clear pfe tcam-errors tcam-stage ingress app cfm-filter
<clear-pfe-tcam-errors-ingress-app-cfm-filter>
clear pfe tcam-errors tcam-stage ingress app cfm-filter detail
clear pfe tcam-errors tcam-stage ingress app cfm-filter list-related-apps
clear pfe tcam-errors tcam-stage ingress app cfm-filter list-shared-apps
clear pfe tcam-errors tcam-stage ingress app cfm-filter shared-usage
clear pfe tcam-errors tcam-stage ingress app cfm-filter shared-usage detail

```



```

clear pfe tcam-errors tcam-stage ingress app cfm-vpls-filter
<clear-pfe-tcam-errors-ingress-app-cfm-vpls-filter>
clear pfe tcam-errors tcam-stage ingress app cfm-vpls-filter detail
clear pfe tcam-errors tcam-stage ingress app cfm-vpls-filter list-related-apps
clear pfe tcam-errors tcam-stage ingress app cfm-vpls-filter list-shared-apps
clear pfe tcam-errors tcam-stage ingress app cfm-vpls-filter shared-usage
clear pfe tcam-errors tcam-stage ingress app cfm-vpls-filter shared-usage
detail
clear pfe tcam-errors tcam-stage ingress app cfm-vpls-ifl-filter
<clear-pfe-tcam-errors-ingress-app-cfm-vpls-ifl-filter>
clear pfe tcam-errors tcam-stage ingress app cfm-vpls-ifl-filter detail
clear pfe tcam-errors tcam-stage ingress app cfm-vpls-ifl-filter
list-related-apps
clear pfe tcam-errors tcam-stage ingress app cfm-vpls-ifl-filter
list-shared-apps
clear pfe tcam-errors tcam-stage ingress app cfm-vpls-ifl-filter shared-usage
clear pfe tcam-errors tcam-stage ingress app cfm-vpls-ifl-filter shared-usage
detail
clear pfe tcam-errors tcam-stage ingress app fw-ccc-in
<clear-pfe-tcam-errors-ingress-app-fw-ccc-in>
clear pfe tcam-errors tcam-stage ingress app fw-ccc-in detail
clear pfe tcam-errors tcam-stage ingress app fw-ccc-in list-related-apps
clear pfe tcam-errors tcam-stage ingress app fw-ccc-in list-shared-apps
clear pfe tcam-errors tcam-stage ingress app fw-ccc-in shared-usage
clear pfe tcam-errors tcam-stage ingress app fw-ccc-in shared-usage detail
clear pfe tcam-errors tcam-stage ingress app fw-ifl-in
<clear-pfe-tcam-errors-ingress-app-fw-ifl-in>
clear pfe tcam-errors tcam-stage ingress app fw-ifl-in detail
clear pfe tcam-errors tcam-stage ingress app fw-ifl-in list-related-apps
clear pfe tcam-errors tcam-stage ingress app fw-ifl-in list-shared-apps
clear pfe tcam-errors tcam-stage ingress app fw-ifl-in shared-usage
clear pfe tcam-errors tcam-stage ingress app fw-ifl-in shared-usage detail
clear pfe tcam-errors tcam-stage ingress app fw-inet-ftf
<clear-pfe-tcam-errors-ingress-app-fw-inet-ftf>
clear pfe tcam-errors tcam-stage ingress app fw-inet-ftf detail
clear pfe tcam-errors tcam-stage ingress app fw-inet-ftf list-related-apps
clear pfe tcam-errors tcam-stage ingress app fw-inet-ftf list-shared-apps
clear pfe tcam-errors tcam-stage ingress app fw-inet-ftf shared-usage
clear pfe tcam-errors tcam-stage ingress app fw-inet-ftf shared-usage detail
clear pfe tcam-errors tcam-stage ingress app fw-inet-in
<clear-pfe-tcam-errors-ingress-app-fw-inet-in>
clear pfe tcam-errors tcam-stage ingress app fw-inet-in detail
clear pfe tcam-errors tcam-stage ingress app fw-inet-in list-related-apps
clear pfe tcam-errors tcam-stage ingress app fw-inet-in list-shared-apps
clear pfe tcam-errors tcam-stage ingress app fw-inet-in shared-usage
clear pfe tcam-errors tcam-stage ingress app fw-inet-in shared-usage detail
clear pfe tcam-errors tcam-stage ingress app fw-inet-pm
<clear-pfe-tcam-errors-ingress-app-fw-inet-pm>
clear pfe tcam-errors tcam-stage ingress app fw-inet-pm detail
clear pfe tcam-errors tcam-stage ingress app fw-inet-pm list-related-apps
clear pfe tcam-errors tcam-stage ingress app fw-inet-pm list-shared-apps
clear pfe tcam-errors tcam-stage ingress app fw-inet-pm shared-usage
clear pfe tcam-errors tcam-stage ingress app fw-inet-pm shared-usage detail
clear pfe tcam-errors tcam-stage ingress app fw-inet-rpf
<clear-pfe-tcam-errors-ingress-app-fw-inet-rpf>
clear pfe tcam-errors tcam-stage ingress app fw-inet-rpf detail
clear pfe tcam-errors tcam-stage ingress app fw-inet-rpf list-related-apps
clear pfe tcam-errors tcam-stage ingress app fw-inet-rpf list-shared-apps
clear pfe tcam-errors tcam-stage ingress app fw-inet-rpf shared-usage
clear pfe tcam-errors tcam-stage ingress app fw-inet-rpf shared-usage detail

```

```
clear pfe tcam-errors tcam-stage ingress app fw-inet6-ftf
<clear-pfe-tcam-errors-ingress-app-fw-inet6-ftf>
clear pfe tcam-errors tcam-stage ingress app fw-inet6-ftf detail
clear pfe tcam-errors tcam-stage ingress app fw-inet6-ftf list-related-apps
clear pfe tcam-errors tcam-stage ingress app fw-inet6-ftf list-shared-apps
clear pfe tcam-errors tcam-stage ingress app fw-inet6-ftf shared-usage
clear pfe tcam-errors tcam-stage ingress app fw-inet6-ftf shared-usage detail
clear pfe tcam-errors tcam-stage ingress app fw-inet6-in
<clear-pfe-tcam-errors-ingress-app-fw-inet6-in>
clear pfe tcam-errors tcam-stage ingress app fw-inet6-in detail
clear pfe tcam-errors tcam-stage ingress app fw-inet6-in list-related-apps
clear pfe tcam-errors tcam-stage ingress app fw-inet6-in list-shared-apps
clear pfe tcam-errors tcam-stage ingress app fw-inet6-in shared-usage
clear pfe tcam-errors tcam-stage ingress app fw-inet6-in shared-usage detail
clear pfe tcam-errors tcam-stage ingress app fw-inet6-rpf
<clear-pfe-tcam-errors-ingress-app-fw-inet6-rpf>
clear pfe tcam-errors tcam-stage ingress app fw-inet6-rpf detail
clear pfe tcam-errors tcam-stage ingress app fw-inet6-rpf list-related-apps
clear pfe tcam-errors tcam-stage ingress app fw-inet6-rpf list-shared-apps
clear pfe tcam-errors tcam-stage ingress app fw-inet6-rpf shared-usage
clear pfe tcam-errors tcam-stage ingress app fw-inet6-rpf shared-usage detail
clear pfe tcam-errors tcam-stage ingress app fw-l2-in
<clear-pfe-tcam-errors-ingress-app-fw-l2-in>
clear pfe tcam-errors tcam-stage ingress app fw-l2-in detail
clear pfe tcam-errors tcam-stage ingress app fw-l2-in list-related-apps
clear pfe tcam-errors tcam-stage ingress app fw-l2-in list-shared-apps
clear pfe tcam-errors tcam-stage ingress app fw-l2-in shared-usage
clear pfe tcam-errors tcam-stage ingress app fw-l2-in shared-usage detail
clear pfe tcam-errors tcam-stage ingress app fw-mpls-in
<clear-pfe-tcam-errors-ingress-app-fw-mpls-in>
clear pfe tcam-errors tcam-stage ingress app fw-mpls-in detail
clear pfe tcam-errors tcam-stage ingress app fw-mpls-in list-related-apps
clear pfe tcam-errors tcam-stage ingress app fw-mpls-in list-shared-apps
clear pfe tcam-errors tcam-stage ingress app fw-mpls-in shared-usage
clear pfe tcam-errors tcam-stage ingress app fw-mpls-in shared-usage detail
clear pfe tcam-errors tcam-stage ingress app fw-vpls-in
<clear-pfe-tcam-errors-ingress-app-fw-vpls-in>
clear pfe tcam-errors tcam-stage ingress app fw-vpls-in detail
clear pfe tcam-errors tcam-stage ingress app fw-vpls-in list-related-apps
clear pfe tcam-errors tcam-stage ingress app fw-vpls-in list-shared-apps
clear pfe tcam-errors tcam-stage ingress app fw-vpls-in shared-usage
clear pfe tcam-errors tcam-stage ingress app fw-vpls-in shared-usage detail
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-egr
<clear-pfe-tcam-errors-ingress-app-gr-ifl-statistics-egr>
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-egr detail
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-egr list-related-apps
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-egr list-shared-apps
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-egr shared-usage
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-egr shared-usage
detail
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-ing
<clear-pfe-tcam-errors-ingress-app-gr-ifl-statistics-ing>
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-ing detail
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-ing list-related-apps
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-ing list-shared-apps
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-ing shared-usage
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-ing shared-usage
detail
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-preing
<clear-pfe-tcam-errors-ingress-app-gr-ifl-statistics-preing>
```

```

clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-preing detail
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-preing
list-related-apps
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-preing
list-shared-apps
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-preing shared-usage
clear pfe tcam-errors tcam-stage ingress app gr-ifl-stats-preing shared-usage
detail
clear pfe tcam-errors tcam-stage ingress app ifl-statistics-in
<clear-pfe-tcam-errors-ingress-app-ifl-statistics-in>
clear pfe tcam-errors tcam-stage ingress app ifl-statistics-in detail
clear pfe tcam-errors tcam-stage ingress app ifl-statistics-in list-related-apps
clear pfe tcam-errors tcam-stage ingress app ifl-statistics-in list-shared-apps
clear pfe tcam-errors tcam-stage ingress app ifl-statistics-in shared-usage
clear pfe tcam-errors tcam-stage ingress app ifl-statistics-in shared-usage
detail
clear pfe tcam-errors tcam-stage ingress app ipsec-reverse-fil
<clear-pfe-tcam-errors-ingress-app-ipsec-reverse-fil>
clear pfe tcam-errors tcam-stage ingress app ipsec-reverse-fil detail
clear pfe tcam-errors tcam-stage ingress app ipsec-reverse-fil list-related-apps
clear pfe tcam-errors tcam-stage ingress app ipsec-reverse-fil list-shared-apps
clear pfe tcam-errors tcam-stage ingress app ipsec-reverse-fil shared-usage
clear pfe tcam-errors tcam-stage ingress app ipsec-reverse-fil shared-usage
detail
clear pfe tcam-errors tcam-stage ingress app irb-fixed-cos
<clear-pfe-tcam-errors-ingress-app-irb-fixed-cos>
clear pfe tcam-errors tcam-stage ingress app irb-fixed-cos detail
clear pfe tcam-errors tcam-stage ingress app irb-fixed-cos list-related-apps
clear pfe tcam-errors tcam-stage ingress app irb-fixed-cos list-shared-apps
clear pfe tcam-errors tcam-stage ingress app irb-fixed-cos shared-usage
clear pfe tcam-errors tcam-stage ingress app irb-fixed-cos shared-usage detail
clear pfe tcam-errors tcam-stage ingress app irb-inet6-fil
<clear-pfe-tcam-errors-ingress-app-irb-inet6-fil>
clear pfe tcam-errors tcam-stage ingress app irb-inet6-fil detail
clear pfe tcam-errors tcam-stage ingress app irb-inet6-fil list-related-apps
clear pfe tcam-errors tcam-stage ingress app irb-inet6-fil list-shared-apps
clear pfe tcam-errors tcam-stage ingress app irb-inet6-fil shared-usage
clear pfe tcam-errors tcam-stage ingress app irb-inet6-fil shared-usage detail
clear pfe tcam-errors tcam-stage ingress app lfm-802.3ah-in
<clear-pfe-tcam-errors-ingress-app-lfm-802.3ah-in>
clear pfe tcam-errors tcam-stage ingress app lfm-802.3ah-in detail
clear pfe tcam-errors tcam-stage ingress app lfm-802.3ah-in list-related-apps
clear pfe tcam-errors tcam-stage ingress app lfm-802.3ah-in list-shared-apps
clear pfe tcam-errors tcam-stage ingress app lfm-802.3ah-in shared-usage
clear pfe tcam-errors tcam-stage ingress app lfm-802.3ah-in shared-usage detail
clear pfe tcam-errors tcam-stage ingress app lo0-inet-fil
<clear-pfe-tcam-errors-ingress-app-lo0-inet-fil>
clear pfe tcam-errors tcam-stage ingress app lo0-inet-fil detail
clear pfe tcam-errors tcam-stage ingress app lo0-inet-fil list-related-apps
clear pfe tcam-errors tcam-stage ingress app lo0-inet-fil list-shared-apps
clear pfe tcam-errors tcam-stage ingress app lo0-inet-fil shared-usage
clear pfe tcam-errors tcam-stage ingress app lo0-inet-fil shared-usage detail
clear pfe tcam-errors tcam-stage ingress app lo0-inet6-fil
<clear-pfe-tcam-errors-ingress-app-lo0-inet6-fil>
clear pfe tcam-errors tcam-stage ingress app lo0-inet6-fil detail
clear pfe tcam-errors tcam-stage ingress app lo0-inet6-fil list-related-apps
clear pfe tcam-errors tcam-stage ingress app lo0-inet6-fil list-shared-apps
clear pfe tcam-errors tcam-stage ingress app lo0-inet6-fil shared-usage
clear pfe tcam-errors tcam-stage ingress app lo0-inet6-fil shared-usage detail
clear pfe tcam-errors tcam-stage ingress app mac-drop-cnt

```

```
<clear-pfe-tcam-errors-ingress-app-mac-drop-cnt>
clear pfe tcam-errors tcam-stage ingress app mac-drop-cnt detail
clear pfe tcam-errors tcam-stage ingress app mac-drop-cnt list-related-apps
clear pfe tcam-errors tcam-stage ingress app mac-drop-cnt list-shared-apps
clear pfe tcam-errors tcam-stage ingress app mac-drop-cnt shared-usage
clear pfe tcam-errors tcam-stage ingress app mac-drop-cnt shared-usage detail
clear pfe tcam-errors tcam-stage ingress app mrouter-port-in
<clear-pfe-tcam-errors-ingress-app-mrouter-port-in>
clear pfe tcam-errors tcam-stage ingress app mrouter-port-in detail
clear pfe tcam-errors tcam-stage ingress app mrouter-port-in list-related-apps
clear pfe tcam-errors tcam-stage ingress app mrouter-port-in list-shared-apps
clear pfe tcam-errors tcam-stage ingress app mrouter-port-in shared-usage
clear pfe tcam-errors tcam-stage ingress app mrouter-port-in shared-usage
detail
clear pfe tcam-errors tcam-stage ingress app napt-reverse-fil
<clear-pfe-tcam-errors-ingress-app-napt-reverse-fil>
clear pfe tcam-errors tcam-stage ingress app napt-reverse-fil detail
clear pfe tcam-errors tcam-stage ingress app napt-reverse-fil list-related-apps
clear pfe tcam-errors tcam-stage ingress app napt-reverse-fil list-shared-apps
clear pfe tcam-errors tcam-stage ingress app napt-reverse-fil shared-usage
clear pfe tcam-errors tcam-stage ingress app napt-reverse-fil shared-usage
detail
clear pfe tcam-errors tcam-stage ingress app no-local-switching
<clear-pfe-tcam-errors-ingress-app-no-local-switching>
clear pfe tcam-errors tcam-stage ingress app no-local-switching detail
clear pfe tcam-errors tcam-stage ingress app no-local-switching
list-related-apps
clear pfe tcam-errors tcam-stage ingress app no-local-switching list-shared-apps
clear pfe tcam-errors tcam-stage ingress app no-local-switching shared-usage
clear pfe tcam-errors tcam-stage ingress app no-local-switching shared-usage
detail
clear pfe tcam-errors tcam-stage pre-ingress
<clear-pfe-tcam-errors-pre-ingress-tcam-stage>
clear pfe tcam-errors tcam-stage pre-ingress app
<clear-pfe-tcam-errors-pre-ingress-app>
clear pfe tcam-errors tcam-stage pre-ingress app cos-fc
<clear-pfe-tcam-errors-pre-ingress-app-cos-fc>
clear pfe tcam-errors tcam-stage pre-ingress app cos-fc detail
clear pfe tcam-errors tcam-stage pre-ingress app cos-fc list-related-apps
clear pfe tcam-errors tcam-stage pre-ingress app cos-fc list-shared-apps
clear pfe tcam-errors tcam-stage pre-ingress app cos-fc shared-usage
clear pfe tcam-errors tcam-stage pre-ingress app cos-fc shared-usage detail
clear pfe tcam-errors tcam-stage pre-ingress app fw-fbf
<clear-pfe-tcam-errors-pre-ingress-app-fw-fbf>
clear pfe tcam-errors tcam-stage pre-ingress app fw-fbf detail
clear pfe tcam-errors tcam-stage pre-ingress app fw-fbf list-related-apps
clear pfe tcam-errors tcam-stage pre-ingress app fw-fbf list-shared-apps
clear pfe tcam-errors tcam-stage pre-ingress app fw-fbf shared-usage
clear pfe tcam-errors tcam-stage pre-ingress app fw-fbf shared-usage detail
clear pfe tcam-errors tcam-stage pre-ingress app fw-fbf-inet6
<clear-pfe-tcam-errors-pre-ingress-app-fw-fbf-inet6>
clear pfe tcam-errors tcam-stage pre-ingress app fw-fbf-inet6 detail
clear pfe tcam-errors tcam-stage pre-ingress app fw-fbf-inet6 list-related-apps
clear pfe tcam-errors tcam-stage pre-ingress app fw-fbf-inet6 list-shared-apps
clear pfe tcam-errors tcam-stage pre-ingress app fw-fbf-inet6 shared-usage
clear pfe tcam-errors tcam-stage pre-ingress app fw-fbf-inet6 shared-usage
detail
clear pfe tcam-errors tcam-stage pre-ingress app fw-semantics
<clear-pfe-tcam-errors-pre-ingress-app-fw-semantics>
clear pfe tcam-errors tcam-stage pre-ingress app fw-semantics detail
```

```

clear pfe tcam-errors tcam-stage pre-ingress app fw-semantics list-related-apps
clear pfe tcam-errors tcam-stage pre-ingress app fw-semantics list-shared-apps
clear pfe tcam-errors tcam-stage pre-ingress app fw-semantics shared-usage
clear pfe tcam-errors tcam-stage pre-ingress app fw-semantics shared-usage
detail
clear pfe tcam-errors tcam-stage pre-ingress app ifd-src-mac-fil
<clear-pfe-tcam-errors-pre-ingress-app-ifd-src-mac-fil>
clear pfe tcam-errors tcam-stage pre-ingress app ifd-src-mac-fil detail
clear pfe tcam-errors tcam-stage pre-ingress app ifd-src-mac-fil
list-related-apps
clear pfe tcam-errors tcam-stage pre-ingress app ifd-src-mac-fil
list-shared-apps
clear pfe tcam-errors tcam-stage pre-ingress app ifd-src-mac-fil shared-usage
clear pfe tcam-errors tcam-stage pre-ingress app ifd-src-mac-fil shared-usage
detail
clear pfe tcam-errors tcam-stage pre-ingress app ing-out-iff
<clear-pfe-tcam-errors-pre-ingress-app-ing-out-iff>
clear pfe tcam-errors tcam-stage pre-ingress app ing-out-iff detail
clear pfe tcam-errors tcam-stage pre-ingress app ing-out-iff list-related-apps
clear pfe tcam-errors tcam-stage pre-ingress app ing-out-iff list-shared-apps
clear pfe tcam-errors tcam-stage pre-ingress app ing-out-iff shared-usage
clear pfe tcam-errors tcam-stage pre-ingress app ing-out-iff shared-usage
detail
clear pfe tcam-errors tcam-stage pre-ingress app ip-mac-val
<clear-pfe-tcam-errors-pre-ingress-app-ip-mac-val>
clear pfe tcam-errors tcam-stage pre-ingress app ip-mac-val detail
clear pfe tcam-errors tcam-stage pre-ingress app ip-mac-val list-related-apps
clear pfe tcam-errors tcam-stage pre-ingress app ip-mac-val list-shared-apps
clear pfe tcam-errors tcam-stage pre-ingress app ip-mac-val shared-usage
clear pfe tcam-errors tcam-stage pre-ingress app ip-mac-val shared-usage detail
clear pfe tcam-errors tcam-stage pre-ingress app ip-mac-val-bcast
<clear-pfe-tcam-errors-pre-ingress-app-ip-mac-val-bcast>
clear pfe tcam-errors tcam-stage pre-ingress app ip-mac-val-bcast detail
clear pfe tcam-errors tcam-stage pre-ingress app ip-mac-val-bcast
list-related-apps
clear pfe tcam-errors tcam-stage pre-ingress app ip-mac-val-bcast
list-shared-apps
clear pfe tcam-errors tcam-stage pre-ingress app ip-mac-val-bcast shared-usage
clear pfe tcam-errors tcam-stage pre-ingress app ip-mac-val-bcast shared-usage
detail
clear pfe tcam-errors tcam-stage pre-ingress app rfc2544-layer2-in
<clear-pfe-tcam-errors-pre-ingress-app-rfc2544-layer2-in>
clear pfe tcam-errors tcam-stage pre-ingress app rfc2544-layer2-in detail
clear pfe tcam-errors tcam-stage pre-ingress app rfc2544-layer2-in
list-related-apps
clear pfe tcam-errors tcam-stage pre-ingress app rfc2544-layer2-in
list-shared-apps
clear pfe tcam-errors tcam-stage pre-ingress app rfc2544-layer2-in shared-usage
clear pfe tcam-errors tcam-stage pre-ingress app rfc2544-layer2-in shared-usage
detail
clear pfe tcam-errors tcam-stage pre-ingress app vpls-mesh-group-mcast
<get-upper-level-xml-name-vpls-mesh-group-mcast>
clear pfe tcam-errors tcam-stage pre-ingress app vpls-mesh-group-mcast detail
clear pfe tcam-errors tcam-stage pre-ingress app vpls-mesh-group-mcast
list-related-apps
clear pfe tcam-errors tcam-stage pre-ingress app vpls-mesh-group-mcast
list-shared-apps
clear pfe tcam-errors tcam-stage pre-ingress app vpls-mesh-group-mcast
shared-usage
clear pfe tcam-errors tcam-stage pre-ingress app vpls-mesh-group-mcast

```

```
shared-usage detail
clear pfe tcam-errors tcam-stage pre-ingress app vpls-mesh-group-ucast
<get-upper-level-xml-name-vpls-mesh-group-ucast>
clear pfe tcam-errors tcam-stage pre-ingress app vpls-mesh-group-ucast detail
clear pfe tcam-errors tcam-stage pre-ingress app vpls-mesh-group-ucast
list-related-apps
clear pfe tcam-errors tcam-stage pre-ingress app vpls-mesh-group-ucast
list-shared-apps
clear pfe tcam-errors tcam-stage pre-ingress app vpls-mesh-group-ucast
shared-usage
clear pfe tcam-errors tcam-stage pre-ingress app vpls-mesh-group-ucast
shared-usage detail
clear passive-monitoring
<clear-passive-monitoring>
clear passive-monitoring statistics
<clear-passive-monitoring-statistics>
clear pgm
clear pgm negative-acknowledgments
<clear-pgm-negative-acknowledgments>
clear pgm source-path-messages
<clear-pgm-source-path-messages>
clear pgm statistics
<clear-pgm-statistics>
clear pim
clear pim join
<clear-pim-join-state>
clear pim join-distribution
<clear-pim-join-distribution>
clear pim register
<clear-pim-register-state>
clear pim snooping
clear pim snooping join
clear pim snooping statistics
clear pim statistics
<clear-pim-statistics>
clear poe
clear poe telemetries
clear poe telemetries interface
<clear-poe-telemetries-information>
clear ppp
clear ppp statistics
<clear-ppp-statistics-information>
clear pppoe
clear pppoe lockout
<clear-pppoe-lockout-timers>
clear pppoe lockout atm-identifier
<clear-pppoe-lockout-timers-atm>
clear pppoe lockout vlan-identifier
clear pppoe sessions
<clear-pppoe-sessions-information>
clear-pppoe-lockout-timers-vlan
clear pppoe statistics
<clear-pppoe-statistics-information>
clear pppoe statistics interfaces
<clear-pppoe-statistics-interface-information>
clear protection-group
<clear-protection-group>
clear protection-group ethernet-ring
<clear-ethernet-ring-information>
clear protection-group ethernet-ring statistics
```

```

<clear-ethernet-ring-information>
clear r2cp
clear r2cp radio
<clear-r2cp-radio>
clear r2cp session
<clear-r2cp-session>
clear r2cp statistics
<clear-r2cp-statistics>
clear r2cp statistics radio
clear r2cp statistics session
clear rip
clear rip general-statistics
<clear-rip-general-statistics>
clear rip statistics
<clear-rip-statistics>
clear rip statistics peer
<clear-rip-peer-statistics>
clear ripng
clear ripng general-statistics
<clear-ripng-general-statistic>
clear ripng statistics
<clear-ripng-statistics>
clear rsvp
clear rsvp session
<clear-rsvp-session-information>
clear rsvp statistics
< clear-rsvp-counters-information>
clear security group-vpn
clear security group-vpn member
clear security group-vpn member group
<clear-gvpn-group-information>
clear security group-vpn member ike
clear security group-vpn member ike security-associations
<clear-group-vpn-ike-security-associations>
clear security group-vpn member ipsec
clear security group-vpn member ipsec security-associations
<clear-gvpn-ipsec-security-association>
clear security group-vpn member ipsec security-associations statistics
<clear-gvpn-ipsec-security-association-statistics>
clear security group-vpn member ipsec statistics
<clear-gvpn-ipsec-statistics>
clear services
clear services accounting flow inline-jflow
<clear-services-accounting-inline-jflow-flows>
clear services alg
clear services alg statistics
<clear-services-alg-statistics>
clear services application-aware-access-list
clear services application-aware-access-list statistics
<clear-application-aware-access-list-statistics-interface>
clear services application-aware-access-list statistics interface
<clear-application-aware-access-list-statistics-interface>
clear services application-aware-access-list statistics subscriber
<clear-application-aware-access-list-statistics-subscriber>
clear services application-identification
clear services application-identification application-system-cache
<clear-appid-application-system-cache>
clear services application-identification counter
<clear-appid-counter>
clear services application-identification counter ssl-encrypted-sessions

```

```
<clear-appid-counter-encrypted>
clear services application-identification statistics
<clear-appid-application-statistics>
clear services application-identification statistics cumulative
<clear-appid-application-statistics-cumulative>
clear services application-identification statistics interval
<clear-appid-application-statistics-interval>
clear services border-signaling-gateway
clear services border-signaling-gateway denied-messages
  <clear-service-bsg-denied-messages>
clear services border-signaling-gateway name-resolution-cache
clear services border-signaling-gateway name-resolution-cache all
  <clear-service-border-signaling-gateway-name-resolution-cache-all>
clear services border-signaling-gateway name-resolution-cache by-fqdn
  <clear-border-signaling-gateway-name-resolution-cache-by-fqdn>
clear services border-signaling-gateway statistics
  <clear-service-border-signaling-gateway-statistics>
clear services captive-portal-content-delivery
clear services captive-portal-content-delivery statistics
clear services captive-portal-content-delivery statistics interface
<clear-cpcdd-interface-statistics>
clear services cos
clear services cos statistics
<clear-services-cos-statistics>
clear services crtp
clear services crtp statistics
<clear-services-crtp-statistics>
clear services dynamic-flow-capture
clear services dynamic-flow-capture criteria
<clear-services-dynamic-flow-capture-criteria>
clear services dynamic-flow-capture sequence-number
clear services flow-collector
<clear-services-flow-collector-information>
clear services flow-collector statistics
<clear-services-flow-collector-statistics>
clear service-msp-flow-ipaction-table
clear services ha
clear services ha statistics
<clear-service-ha-statistics-information>
clear services hcm
clear services hcm pic-statistics
<clear-services-hcm-pic-statistics>
clear services hcm statistics
<clear-services-hcm-statistics>
clear services ids
<clear-services-ids-tables>
clear services ids destination-table
<clear-services-ids-destination-table>
clear services ids pair-table
<clear-services-ids-pair-table>
clear services ids source-table
<clear-services-ids-source-table>
clear services inline
clear services inline nat
clear services inline nat pool
<clear-inline-nat-pool-information>
clear services inline nat statistics
<clear-inline-nat-statistics>
clear services inline software
clear services inline software statistics
```



```

<clear-inline-software-statistics>
clear services ipsec-vpn
clear services ipsec-vpn ipsec
clear services ipsec-vpn ipsec security-associations
<clear-services-ipsec-vpn-security-associations>
clear services ipsec-vpn ike
clear services ipsec-vpn ike security-associations
<clear-services-ike-security-associations>
clear services ipsec-vpn ike statistics
<clear-services-ike-statistics>
clear services pcp
clear services pcp epoch
clear services pcp statistics
clear services ipsec-vpn ipsec statistics
<clear-ipsec-vpn-statistics>
clear services l2tp
<clear-l2tp-destinations-information>
clear services l2tp disconnect-cause-summary
<clear-l2tp-disconnect-cause-summary>
clear services l2tp multilink
<clear-l2tp-multilink-information>
clear services l2tp session
<clear-l2tp-session-information>
clear services l2tp destination
<clear-l2tp-destinations-information>
clear services l2tp disconnect-cause-summary
<clear-l2tp-disconnect-cause-summary>
clear services l2tp tunnel
<clear-l2tp-tunnel-information>
clear services l2tp user
<clear-l2tp-user-session-information>
clear services local-policy-decision-function
clear services local-policy-decision-function statistics
clear services local-policy-decision-function statistics interface
<clear-local-policy-decision-function-statistics-interface>
clear services local-policy-decision-function statistics subscriber
<clear-local-policy-decision-function-statistics-subscriber>
clear services server-load-balance
clear services server-load-balance external-manager-statistics
<clear-external-manager-statistics>
clear services server-load-balance hash-table
<clear-hash-table-information>
clear services server-load-balance health-monitor-statistics>
<clear-health-monitor-statistics>
clear services server-load-balance real-server-group-statistics
<clear-real-server-group-statistics>
clear services server-load-balance real-server-statistics
<clear-real-server-statistics>
clear services server-load-balance sticky
<clear-sticky-table>
clear services server-load-balance virtual-server-statistics>
<clear-virtual-server-statistics>
clear services service-sets statistics integrity-drops
clear services service-sets statistics syslog
<clear-service-set-syslog-statistics>
clear services service-sets statistics tcp
<clear-service-tcp-tracker-statistics>
clear services stateful-firewall flow-analysis
<clear-service-flow-analysis>
clear services stateful-firewall flows

```

```
<clear-service-sfw-flow-table-information>
clear services stateful-firewall sip-call
<clear-service-sfw-sip-call-information>
clear services stateful-firewall sip-register
<clear-service-sfw-sip-register-information>
clear services stateful-firewall statistics
<clear-stateful-firewall-statistics>
clear services stateful-firewall subscriber-analysis
<clear-service-subs-analysis>
clear services subscriber
clear services subscriber sessions
<get-services-subscriber-sessions>
clear services video-monitoring
<clear-service-video-monitoring-information>
clear services video-monitoring mdi
<clear-service-video-monitoring-mdi-information>
clear services video-monitoring mdi alarm
<clear-service-video-monitoring-mdi-alarm-information>
clear services video-monitoring mdi alarm errors
<clear-services-video-monitoring-mdi-alarm-errors>
clear services video-monitoring mdi alarm stats
<clear-services-video-monitoring-mdi-alarm-statistics>
clear services video-monitoring mdi errors
<clear-service-video-monitoring-mdi-errors>
clear services video-monitoring mdi statistics
<clear-service-video-monitoring-mdi-statistics>
clear services sessions analysis
<clear-service-msp-session-analysis-information>
clear services softwire
clear services softwire statistics
<clear-services-softwire-statistics>
clear services stateful-firewall
clear services stateful-firewall flow-analysis
<clear-service-flow-analysis>
clear services stateful-firewall flows
<clear-service-sfw-flow-table-information>
clear services pgcp
clear services pgcp gates
<clear-service-pgcp-gates>
clear services pgcp gates gateway
<clear-service-pgcp-gates-gateway>
clear services pgcp statistics
<clear-service-pgcp-statistics>
clear services pgcp statistics gateway
<clear-service-pgcp-statistics-gateway>
<clear-rfc2544-information>
<clear-aborted-tests-information>
<clear-active-tests-information>
<clear-completed-tests-information>
clear sflow
clear sflow collector
clear sflow collector statistics
<clear-sflow-collector-statistics>
clear shmlog
clear shmlog all-info
<clear-shmlog-all-information>
clear shmlog entries
<clear-shmlog-entries>
clear shmlog statistics
<clear-shmlog-statistics>
```

```
clear snmp
clear snmp history
<clear-snmp-history>
<clear-health-monitor-routing-engine-history>
clear snmp statistics
<clear-snmp-statistics>
clear spanning-tree
clear spanning-tree protocol-migration
clear spanning-tree protocol-migration interface
<clear-interface-stp-protocol-migration>
clear spanning-tree statistics
<clear-stp-interface-statistics>
clear spanning-tree statistics bridge
clear spanning-tree statistics interface
clear spanning-tree statistics routing-instance
<clear-stp-routing-instance-statistics>
clear spanning-tree stp-buffer
clear spanning-tree topology-change-counter
<clear-stp-topology-change-counter>
clear synchronous-ethernet
clear synchronous-ethernet esmc
clear synchronous-ethernet esmc statistics
clear system
clear system boot-media
<clear-boot-media>
clear system login
  clear system login logout
<clear-system-login-logout>
clear-twamp-information
clear-twamp-server-information
clear-twamp-server-connection-information
clear unified-edge
clear unified-edge ggsn-pgw
clear unified-edge ggsn-pgw aaa
clear unified-edge ggsn-pgw aaa radius
clear unified-edge ggsn-pgw aaa radius statistics
<clear-mobile-gateway-aaa-radius-statistics>
clear unified-edge ggsn-pgw aaa statistics
<clear-mobile-gateway-aaa-statistics>
clear unified-edge ggsn-pgw address-assignment
clear unified-edge ggsn-pgw address-assignment pool
<clear-mobile-gateway-sm-ippool-pool-sessions>
clear unified-edge ggsn-pgw address-assignment statistics
<clear-mobile-gateway-sm-ippool-statistics>
clear unified-edge ggsn-pgw call-admission-control
clear unified-edge ggsn-pgw call-admission-control statistics
<clear-mobile-gateway-cac-statistics>
clear unified-edge ggsn-pgw charging
clear unified-edge ggsn-pgw charging cdr
<clear-mobile-gateway-charging-clear-cdr>
clear unified-edge ggsn-pgw charging cdr wfa
<clear-mobile-gateway-charging-clear-cdr-wfa>
clear unified-edge ggsn-pgw charging local-persistent-storage
clear unified-edge ggsn-pgw charging local-persistent-storage statistics
<clear-mobile-gateway-charging-clear-lps-stats>
clear unified-edge ggsn-pgw charging path
clear unified-edge ggsn-pgw charging path statistics
<clear-mobile-gateway-charging-clear-path-stats>
clear unified-edge ggsn-pgw charging transfer
clear unified-edge ggsn-pgw charging transfer statistics
```

```
<clear-mobile-gateway-charging-clear-xfer-stats>
clear unified-edge ggsn-pgw diameter
clear unified-edge ggsn-pgw diameter dcca-gy
clear unified-edge ggsn-pgw diameter dcca-gy statistics
<clear-mobile-gateway-aaa-diam-stats-gy>
clear unified-edge ggsn-pgw diameter network-element
clear unified-edge ggsn-pgw diameter network-element statistics
<clear-mobile-gateway-aaa-diam-ne-statistics>
clear unified-edge ggsn-pgw diameter pcc-gx
clear unified-edge ggsn-pgw diameter pcc-gx statistics
<clear-mobile-gateway-aaa-diam-stats-gx>
clear unified-edge ggsn-pgw diameter peer
clear unified-edge ggsn-pgw diameter peer statistics
<clear-mobile-gateway-aaa-diam-peer-statistics>
clear unified-edge ggsn-pgw gtp
clear unified-edge ggsn-pgw gtp peer
clear unified-edge ggsn-pgw gtp peer statistics
<clear-mobile-gateway-gtp-peer-statistics>
clear unified-edge ggsn-pgw gtp statistics
<clear-mobile-gateway-gtp-statistics>
clear unified-edge ggsn-pgw ip-reassembly
clear unified-edge ggsn-pgw ip-reassembly statistics
<clear-mobile-gateways-ip-reassembly-statistics>
clear unified-edge ggsn-pgw statistics
<clear-mobile-gateway-statistics>
clear unified-edge ggsn-pgw subscribers
<clear-mobile-gateway-subscribers>
clear unified-edge ggsn-pgw subscribers bearer
clear unified-edge ggsn-pgw subscribers charging
<clear-mobile-gateway-subscribers-charging>
clear unified-edge ggsn-pgw subscribers peer
<clear-mobile-gateway-subscribers-peer>
clear unified-edge sgw
clear unified-edge sgw call-admission-control
clear unified-edge sgw call-admission-control statistics
<clear-mobile-sgw-cac-statistics>
clear unified-edge sgw charging
clear unified-edge sgw charging cdr
<clear-mobile-gateway-sgw-charging-clear-cdr>
clear unified-edge sgw charging cdr wfa
<clear-mobile-gateway-sgw-charging-clear-cdr-wfa>
clear unified-edge sgw charging local-persistent-storage
clear unified-edge sgw charging local-persistent-storage statistics
<clear-mobile-gateway-sgw-charging-clear-lps-stats>
clear unified-edge sgw charging path
clear unified-edge sgw charging path statistics
<clear-mobile-gateway-sgw-charging-clear-path-stats>
clear unified-edge sgw charging transfer
clear unified-edge sgw charging transfer statistics
<clear-mobile-gateway-sgw-charging-clear-xfer-stats>
clear unified-edge sgw gtp
clear unified-edge sgw gtp peer
clear unified-edge sgw gtp peer statistics
<clear-mobile-sgw-gtp-peer-statistics>
clear unified-edge sgw gtp statistics
<clear-mobile-sgw-gtp-statistics>
clear unified-edge sgw idle-mode-buffering
clear unified-edge sgw idle-mode-buffering statistics
<clear-mobile-gw-sgw-idle-mode-buffering-statistics>
clear unified-edge sgw ip-reassembly
```

```
clear unified-edge sgw ip-reassembly statistics
<clear-mobile-gateways-sgw-ip-reassembly-statistics-sgw>
clear unified-edge sgw statistics
<clear-mobile-sgw-statistics>
clear unified-edge sgw subscribers
<clear-mobile-sgw-subscribers>
clear unified-edge sgw subscribers charging
<clear-mobile-sgw-subscribers-charging>
clear unified-edge sgw subscribers peer
<clear-mobile-sgw-subscribers-peer>
clear validation
clear validation database
<clear-validation-database>
clear validation session
<clear-validation-session>
clear validation statistics
<clear-validation-statistics>
clear virtual-chassis
clear virtual-chassis heartbeat
<clear-virtual-chassis-heartbeat-statistics>
<clear-virtual-chassis-protocol>
clear virtual-chassis protocol statistics
<clear-virtual-chassis-statistics>
<clear-virtual-chassis-port-statistics>
clear vpls
clear vpls mac-address
<clear-vpls-mac-address>
clear vpls mac-table
<clear-vpls-mac-table>
clear vpls mac-table interface
<clear-vpls-interface-mac-table>
request interface rebalance
request pppoe
request pppoe connect
request pppoe disconnect
request security ike debug-disable
<get-disable-ike-debug>
request security ike debug-enable
<get-enable-ike-debug>
request services rpm twamp start
request services rpm twamp start client
<twamp-test-start>
request services rpm twamp stop
request services rpm twamp stop client
<twamp-test-stop>
request snmp
<request-snmp-utility-mib-clear>
<request-snmp-utility-mib-set>
clear vpls statistics
<clear-vpls-statistics>
clear vrrp
<clear-vrrp-information>
clear vrrp interface
<clear-vrrp-interface-statistics>
request mpls
request mpls lsp
request mpls lsp adjust-autobandwidth
<request-mpls-lsp-autobandwidth-adjust>
clear services inline stateful-firewall
clear services inline stateful-firewall flows
```

```
<clear-service-inline-sfw-flow-table-information>
clear services inline stateful-firewall statistics
<clear-inline-stateful-firewall-statistics>
clear services service-sets statistics drop-flow-limit>
<clear-service-set-drop-flow-statistics>
clear services service-sets statistics jflow-log
<clear-service-set-jflow-log-statistics>
request services ipsec-vpn ipsec
request services ipsec-vpn ipsec switch
request services ipsec-vpn ipsec switch tunnel
request unified-edge
request unified-edge ggsn-pgw
request unified-edge ggsn-pgw call-trace
<monitor-mobile-gateways-call-trace-start>
request unified-edge ggsn-pgw call-trace clear
<get-mobile-gateways-call-trace-clear>
request unified-edge ggsn-pgw call-trace show
<get-mobile-gateways-call-trace-information>
request unified-edge ggsn-pgw call-trace start
<get-mobile-gateways-call-trace-start-information>
request unified-edge ggsn-pgw call-trace stop
<get-mobile-gateways-call-trace-stop-information>
request unified-edge sgw
request unified-edge sgw call-trace
request unified-edge sgw call-trace clear
<get-mobile-gateways-sgw-call-trace-clear>
request unified-edge sgw call-trace show
<get-mobile-gateways-sgw-call-trace-information>
request unified-edge sgw call-trace start
<get-mobile-gateways-sgw-call-trace-start-information>
request unified-edge sgw call-trace stop
<get-mobile-gateways-sgw-call-trace-stop-information>
```

Configuration Hierarchy Levels No associated CLI configuration hierarchy levels and statements.

- Related Documentation**
- [Understanding Junos OS Access Privilege Levels on page 107](#)
 - [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
 - [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
 - [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

configure

Can enter configuration mode.

Commands

```
configure
request snmp
```

```
request-snmp-utility-mib-clear
request-snmp-utility-mib-set
```

Configuration Hierarchy Levels No associated CLI configuration hierarchy levels and statements.

- Related Documentation**
- [Understanding Junos OS Access Privilege Levels on page 107](#)
 - [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
 - [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
 - [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

control

Can perform all control-level operations; can modify any configuration.

Commands

```
request jnu
request jnu role
request jnu schema
request jnu schema add
request jnu schema delete
```

Configuration Hierarchy Levels No associated CLI configuration hierarchy levels and statements.

- Related Documentation**
- [Understanding Junos OS Access Privilege Levels on page 107](#)
 - [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
 - [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
 - [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

field

Can view field debug commands.

Commands No associated CLI commands.

Configuration Hierarchy Levels No associated CLI configuration hierarchy levels and statements.

- Related Documentation**
- [Understanding Junos OS Access Privilege Levels on page 107](#)
 - [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
 - [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
 - [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

firewall

Can view the firewall filter configuration in configuration mode.

Commands

```
clear unified-edge
clear unified-edge ggsn-pgw
clear unified-edge ggsn-pgw aaa
clear unified-edge ggsn-pgw aaa radius
clear unified-edge ggsn-pgw aaa radius statistics
<clear-mobile-gateway-aaa-radius-statistics>
clear unified-edge ggsn-pgw aaa statistics
<clear-mobile-gateway-aaa-statistics>
clear unified-edge ggsn-pgw address-assignment
clear unified-edge ggsn-pgw address-assignment pool
<clear-mobile-gateway-sm-ippool-pool-sessions>
clear unified-edge ggsn-pgw address-assignment statistics
<clear-mobile-gateway-sm-ippool-statistics>
clear unified-edge ggsn-pgw call-admission-control
clear unified-edge ggsn-pgw call-admission-control statistics
<clear-mobile-gateway-cac-statistics>
clear unified-edge ggsn-pgw charging
clear unified-edge ggsn-pgw charging cdr
<clear-mobile-gateway-charging-clear-cdr>
clear unified-edge ggsn-pgw charging cdr wfa
<clear-mobile-gateway-charging-clear-cdr-wfa>
clear unified-edge ggsn-pgw charging local-persistent-storage
clear unified-edge ggsn-pgw charging local-persistent-storage statistics
<clear-mobile-gateway-charging-clear-lps-stats>
clear unified-edge ggsn-pgw charging path
clear unified-edge ggsn-pgw charging path statistics
<clear-mobile-gateway-charging-clear-path-stats>
clear unified-edge ggsn-pgw charging transfer
clear unified-edge ggsn-pgw charging transfer statistics
<clear-mobile-gateway-charging-clear-xfer-stats>
clear unified-edge ggsn-pgw diameter
clear unified-edge ggsn-pgw diameter dcca-gy
clear unified-edge ggsn-pgw diameter dcca-gy statistics
<clear-mobile-gateway-aaa-diam-stats-gy>
clear unified-edge ggsn-pgw diameter network-element
clear unified-edge ggsn-pgw diameter network-element statistics
<clear-mobile-gateway-aaa-diam-ne-statistics>
clear unified-edge ggsn-pgw diameter pcc-gx
clear unified-edge ggsn-pgw diameter pcc-gx statistics
```



```

<clear-mobile-gateway-aaa-diam-stats-gx>
clear unified-edge ggsn-pgw diameter peer
clear unified-edge ggsn-pgw diameter peer statistics
<clear-mobile-gateway-aaa-diam-peer-statistics>
clear unified-edge ggsn-pgw gtp
clear unified-edge ggsn-pgw gtp peer
clear unified-edge ggsn-pgw gtp peer statistics
<clear-mobile-gateway-gtp-peer-statistics>
clear unified-edge ggsn-pgw gtp statistics
<clear-mobile-gateway-gtp-statistics>
clear unified-edge ggsn-pgw ip-reassembly
clear unified-edge ggsn-pgw ip-reassembly statistics
<clear-mobile-gateways-ip-reassembly-statistics>
clear unified-edge ggsn-pgw statistics
<clear-mobile-gateway-statistics>
clear unified-edge ggsn-pgw subscribers
<clear-mobile-gateway-subscribers>
clear unified-edge ggsn-pgw subscribers bearer
clear unified-edge ggsn-pgw subscribers charging
<clear-mobile-gateway-subscribers-charging>
clear unified-edge ggsn-pgw subscribers peer
<clear-mobile-gateway-subscribers-peer>
clear unified-edge sgw
clear unified-edge sgw call-admission-control
clear unified-edge sgw call-admission-control statistics
<clear-mobile-sgw-cac-statistics>
clear unified-edge sgw charging
clear unified-edge sgw charging cdr
<clear-mobile-gateway-sgw-charging-clear-cdr>
clear unified-edge sgw charging cdr wfa
<clear-mobile-gateway-sgw-charging-clear-cdr-wfa>
clear unified-edge sgw charging local-persistent-storage
clear unified-edge sgw charging local-persistent-storage statistics
<clear-mobile-gateway-sgw-charging-clear-lps-stats>
clear unified-edge sgw charging path
clear unified-edge sgw charging path statistics
<clear-mobile-gateway-sgw-charging-clear-path-stats>
clear unified-edge sgw charging transfer
clear unified-edge sgw charging transfer statistics
<clear-mobile-gateway-sgw-charging-clear-xfer-stats>
clear unified-edge sgw gtp
clear unified-edge sgw gtp peer
clear unified-edge sgw gtp peer statistics
<clear-mobile-sgw-gtp-peer-statistics>
clear unified-edge sgw gtp statistics
<clear-mobile-sgw-gtp-statistics>
clear unified-edge sgw idle-mode-buffering
clear unified-edge sgw idle-mode-buffering statistics
<clear-mobile-gw-sgw-idle-mode-buffering-statistics>
clear unified-edge sgw ip-reassembly
clear unified-edge sgw ip-reassembly statistics
<clear-mobile-gateways-sgw-ip-reassembly-statistics-sgw>
clear unified-edge sgw statistics
<clear-mobile-sgw-statistics>
clear unified-edge sgw subscribers
<clear-mobile-sgw-subscribers>
clear unified-edge sgw subscribers charging
<clear-mobile-sgw-subscribers-charging>
clear unified-edge sgw subscribers peer
<clear-mobile-sgw-subscribers-peer>

```

```
clear unified-edge tdf
clear unified-edge tdf aaa
clear unified-edge tdf aaa radius
clear unified-edge tdf aaa radius client
clear unified-edge tdf aaa radius client statistics
<clear-radius-client-statistics>
clear unified-edge tdf aaa radius network-element
clear unified-edge tdf aaa radius network-element statistics
<clear-radius-network-element-statistics>
clear unified-edge tdf aaa radius server
clear unified-edge tdf aaa radius server statistics
<clear-radius-server-statistics>
clear unified-edge tdf aaa radius snoop-segment
clear unified-edge tdf aaa radius snoop-segment statistics
<clear-radius-snoop-segment-statistics>
clear unified-edge tdf aaa statistics
<clear-tdf-gateway-aaa-statistics>
clear unified-edge tdf address-assignment
clear unified-edge tdf address-assignment pool
<clear-mobile-gateway-tdf-sm-ippool-pool-sessions>
clear unified-edge tdf address-assignment statistics
<clear-mobile-gateway-tdf-sm-ippool-statistics>
clear unified-edge tdf call-admission-control
clear unified-edge tdf call-admission-control statistics
<clear-tdf-cac-statistics>
clear unified-edge tdf diameter
clear unified-edge tdf diameter network-element
clear unified-edge tdf diameter network-element statistics
<clear-diameter-network-element-statistics>
clear unified-edge tdf diameter pcc-gx
clear unified-edge tdf diameter pcc-gx statistics
<clear-diameter-statistics-gx>
clear unified-edge tdf diameter peer
clear unified-edge tdf diameter peer statistics
<clear-diameter-peer-statistics>
clear unified-edge tdf statistics
<clear-tdf-statistics>
clear unified-edge tdf subscribers
<clear-mobile-tdf-subscribers>
clear unified-edge tdf subscribers peer
<clear-mobile-gateway-tdf-subscribers-peer>
request unified-edge
request unified-edge ggsn-pgw
request unified-edge ggsn-pgw call-trace
<monitor-mobile-gateways-call-trace-start>
request unified-edge ggsn-pgw call-trace clear
<get-mobile-gateways-call-trace-clear>
request unified-edge ggsn-pgw call-trace show
<get-mobile-gateways-call-trace-information>
request unified-edge ggsn-pgw call-trace start
<get-mobile-gateways-call-trace-start-information>
request unified-edge ggsn-pgw call-trace stop
<get-mobile-gateways-call-trace-stop-information>
request unified-edge sgw
request unified-edge sgw call-trace
request unified-edge sgw call-trace clear
<get-mobile-gateways-sgw-call-trace-clear>
request unified-edge sgw call-trace show
<get-mobile-gateways-sgw-call-trace-information>
request unified-edge sgw call-trace start
```

```

<get-mobile-gateways-sgw-call-trace-start-information>
request unified-edge sgw call-trace stop
<get-mobile-gateways-sgw-call-trace-stop-information>
request unified-edge tdf
request unified-edge tdf call-trace
request unified-edge tdf call-trace clear
<get-mobile-gateways-tdf-call-trace-clear>
request unified-edge tdf call-trace show
<get-mobile-gateways-tdf-call-trace-information>
request unified-edge tdf call-trace start
<get-mobile-gateways-tdf-call-trace-start-information>
request unified-edge tdf call-trace stop
<get-mobile-gateways-tdf-call-trace-stop-information>
show firewall
    <get-firewall-information>

show firewall counter
    <get-firewall-counter-information>

show firewall filter
    <get-firewall-filter-information>

show firewall filter version
    <get-filter-version>

show firewall log
    <get-firewall-log-information>

show firewall prefix-action-stats
    <get-firewall-prefix-action-information>

show policer
    <get-policer-information>

```

Configuration Hierarchy Levels

```

[edit chassis satellite-management]
[edit firewall]
[edit dynamic-profiles firewall]
[edit firewall]
[edit logical-systems firewall]
[edit unified-edge]

```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [firewall-control on page 928](#)

firewall-control

Can view and configure firewall filter information at the **[edit dynamic-profiles firewall]**, **[edit firewall]**, and **[edit logical-systems firewall]** hierarchy levels.

Commands

```
show firewall
  <get-firewall-information>

show firewall counter
  <get-firewall-counter-information>

show firewall filter
  <get-firewall-filter-information>

show firewall filter version
  <get-filter-version>

show firewall log
  <get-firewall-log-information>

show firewall prefix-action-stats
  <get-firewall-prefix-action-information>

show policer
```

Configuration Hierarchy Levels

```
[edit dynamic-profiles firewall]
[edit firewall]
[edit logical-systems firewall]
```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [firewall on page 924](#)

floppy

Can read from and write to the removable media.

Commands

No associated CLI commands.

Configuration Hierarchy Levels

No associated CLI configuration hierarchy levels and statements.

- Related Documentation**
- [Understanding Junos OS Access Privilege Levels on page 107](#)
 - [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
 - [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
 - [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

flow-tap

Can view the flow-tap configuration in configuration mode.

Commands

```
clear unified-edge
clear unified-edge ggsn-pgw
clear unified-edge ggsn-pgw aaa
clear unified-edge ggsn-pgw aaa radius
clear unified-edge ggsn-pgw aaa radius statistics
<clear-mobile-gateway-aaa-radius-statistics>
clear unified-edge ggsn-pgw aaa statistics
<clear-mobile-gateway-aaa-statistics>
clear unified-edge ggsn-pgw address-assignment
clear unified-edge ggsn-pgw address-assignment pool
<clear-mobile-gateway-sm-ippool-pool-sessions>
clear unified-edge ggsn-pgw address-assignment statistics
<clear-mobile-gateway-sm-ippool-statistics>
clear unified-edge ggsn-pgw call-admission-control
clear unified-edge ggsn-pgw call-admission-control statistics
<clear-mobile-gateway-cac-statistics>
clear unified-edge ggsn-pgw charging
clear unified-edge ggsn-pgw charging cdr
<clear-mobile-gateway-charging-clear-cdr-wfa>
clear unified-edge ggsn-pgw charging local-persistent-storage
clear unified-edge ggsn-pgw charging local-persistent-storage statistics
<clear-mobile-gateway-charging-clear-lps-stats>
clear unified-edge ggsn-pgw charging path
clear unified-edge ggsn-pgw charging path statistics
<clear-mobile-gateway-charging-clear-path-stats>
clear unified-edge ggsn-pgw charging transfer
clear unified-edge ggsn-pgw charging transfer statistics
<clear-mobile-gateway-charging-clear-xfer-stats>
clear unified-edge ggsn-pgw diameter
clear unified-edge ggsn-pgw diameter dcca-gy
clear unified-edge ggsn-pgw diameter dcca-gy statistics
<clear-mobile-gateway-aaa-diam-stats-gy>
clear unified-edge ggsn-pgw diameter network-element
clear unified-edge ggsn-pgw diameter network-element statistics
<clear-mobile-gateway-aaa-diam-ne-statistics>
clear unified-edge ggsn-pgw diameter pcc-gx
clear unified-edge ggsn-pgw diameter pcc-gx statistics
<clear-mobile-gateway-aaa-diam-stats-gx>
clear unified-edge ggsn-pgw diameter peer
clear unified-edge ggsn-pgw diameter peer statistics
<clear-mobile-gateway-aaa-diam-peer-statistics>
clear unified-edge ggsn-pgw gtp
clear unified-edge ggsn-pgw gtp peer
```

```
clear unified-edge ggsn-pgw gtp peer statistics
<clear-mobile-gateway-gtp-peer-statistics>
clear unified-edge ggsn-pgw gtp statistics
<clear-mobile-gateway-gtp-statistics>
clear unified-edge ggsn-pgw ip-reassembly
clear unified-edge ggsn-pgw ip-reassembly statistics
<clear-mobile-gateways-ip-reassembly-statistics>
clear unified-edge ggsn-pgw statistics
<clear-mobile-gateway-statistics>
clear unified-edge ggsn-pgw subscribers
<clear-mobile-gateway-subscribers>
clear unified-edge ggsn-pgw subscribers bearer
clear unified-edge ggsn-pgw subscribers charging
<clear-mobile-gateway-subscribers-charging>
clear unified-edge ggsn-pgw subscribers peer
<clear-mobile-gateway-subscribers-peer>
clear unified-edge sgw
clear unified-edge sgw call-admission-control
clear unified-edge sgw call-admission-control statistics
<clear-mobile-sgw-cac-statistics>
clear unified-edge sgw charging
clear unified-edge sgw charging cdr
<clear-mobile-gateway-sgw-charging-clear-cdr>
clear unified-edge sgw charging cdr wfa
<clear-mobile-gateway-sgw-charging-clear-cdr-wfa>
clear unified-edge sgw charging local-persistent-storage
clear unified-edge sgw charging local-persistent-storage statistics
<clear-mobile-gateway-sgw-charging-clear-lps-stats>
clear unified-edge sgw charging path
clear unified-edge sgw charging path statistics
<clear-mobile-gateway-sgw-charging-clear-path-stats>
clear unified-edge sgw charging transfer
clear unified-edge sgw charging transfer statistics
<clear-mobile-gateway-sgw-charging-clear-xfer-stats>
clear unified-edge sgw gtp
clear unified-edge sgw gtp peer
clear unified-edge sgw gtp peer statistics
<clear-mobile-sgw-gtp-peer-statistics>
clear unified-edge sgw gtp statistics
<clear-mobile-sgw-gtp-statistics>
clear unified-edge sgw idle-mode-buffering
clear unified-edge sgw idle-mode-buffering statistics
<clear-mobile-gw-sgw-idle-mode-buffering-statistics>
clear unified-edge sgw ip-reassembly
clear unified-edge sgw ip-reassembly statistics
<clear-mobile-gateways-sgw-ip-reassembly-statistics-sgw>
clear unified-edge sgw statistics
<clear-mobile-sgw-statistics>
clear unified-edge sgw subscribers
<clear-mobile-sgw-subscribers>
clear unified-edge sgw subscribers charging
<clear-mobile-sgw-subscribers-charging>
clear unified-edge sgw subscribers peer
<clear-mobile-sgw-subscribers-peer>
clear unified-edge tdf
clear unified-edge tdf aaa
clear unified-edge tdf aaa radius
clear unified-edge tdf aaa radius client
clear unified-edge tdf aaa radius client statistics
<clear-radius-client-statistics>
```

```

clear unified-edge tdf aaa radius network-element
clear unified-edge tdf aaa radius network-element statistics
<clear-radius-network-element-statistics>
clear unified-edge tdf aaa radius server
clear unified-edge tdf aaa radius server statistics
<clear-radius-server-statistics>
clear unified-edge tdf aaa radius snoop-segment
clear unified-edge tdf aaa radius snoop-segment statistics
<clear-radius-snoop-segment-statistics>
clear unified-edge tdf aaa statistics
<clear-tdf-gateway-aaa-statistics>
clear unified-edge tdf address-assignment
clear unified-edge tdf address-assignment pool
<clear-mobile-gateway-tdf-sm-ippool-pool-sessions>
clear unified-edge tdf address-assignment statistics
<clear-mobile-gateway-tdf-sm-ippool-statistics>
clear unified-edge tdf call-admission-control
clear unified-edge tdf call-admission-control statistics
<clear-tdf-cac-statistics>
clear unified-edge tdf diameter
clear unified-edge tdf diameter network-element
clear unified-edge tdf diameter network-element statistics
<clear-diameter-network-element-statistics>
clear unified-edge tdf diameter pcc-gx
clear unified-edge tdf diameter pcc-gx statistics
<clear-diameter-statistics-gx>
clear unified-edge tdf diameter peer
clear unified-edge tdf diameter peer statistics
<clear-diameter-peer-statistics>
clear unified-edge tdf statistics
<clear-tdf-statistics>
clear unified-edge tdf subscribers
<clear-mobile-tdf-subscribers>
clear unified-edge tdf subscribers peer
<clear-mobile-gateway-tdf-subscribers-peer>
request unified-edge
request unified-edge ggsn-pgw
request unified-edge ggsn-pgw call-trace
<monitor-mobile-gateways-call-trace-start>
request unified-edge ggsn-pgw call-trace clear
<get-mobile-gateways-call-trace-clear>
request unified-edge ggsn-pgw call-trace show
<get-mobile-gateways-call-trace-information>
request unified-edge ggsn-pgw call-trace start
<get-mobile-gateways-call-trace-start-information>
request unified-edge ggsn-pgw call-trace stop
<get-mobile-gateways-call-trace-stop-information>
request unified-edge sgw
request unified-edge sgw call-trace
request unified-edge sgw call-trace clear
<get-mobile-gateways-sgw-call-trace-clear>
request unified-edge sgw call-trace show
<get-mobile-gateways-sgw-call-trace-information>
request unified-edge sgw call-trace start
<get-mobile-gateways-sgw-call-trace-start-information>
request unified-edge sgw call-trace stop
<get-mobile-gateways-sgw-call-trace-stop-information>
request unified-edge tdf
request unified-edge tdf call-trace
request unified-edge tdf call-trace clear

```

```
<get-mobile-gateways-tdf-call-trace-clear>
request unified-edge tdf call-trace show
<get-mobile-gateways-tdf-call-trace-information>
request unified-edge tdf call-trace start
<get-mobile-gateways-tdf-call-trace-start-information>
request unified-edge tdf call-trace stop
<get-mobile-gateways-tdf-call-trace-stop-information>
```

**Configuration
Hierarchy Levels**

```
[edit services flow-tap]
[edit services radius-flow-tap]
[edit system services flow-tap-dtcp]
[edit unified-edge]
```

**Related
Documentation**

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [flow-tap-control on page 932](#)

flow-tap-control

Can view the flow-tap configuration in configuration mode and can configure flow-tap configuration information at the **[edit services flow-tap]**, **[edit services radius-flow-tap]**, and **[edit system services flow-tap-dtcp]** hierarchy levels.

Commands

No associated CLI commands.

**Configuration
Hierarchy Levels**

```
[edit services flow-tap]
[edit services radius-flow-tap]
[edit system services flow-tap-dtcp]
```

**Related
Documentation**

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [flow-tap on page 929](#)

flow-tap-operation

Can make flow-tap requests to the router.

Commands No associated CLI commands.

Configuration Hierarchy Levels No associated CLI configuration hierarchy levels and statements.

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

idp-profiler-operation

Can view profiler data.

Commands No associated CLI commands.

CLI Configuration Hierarchy Levels No associated CLI configuration hierarchy levels and statements.

interface

Can view the interface configuration in configuration mode.

Commands

```
clear unified-edge
clear unified-edge ggsn-pgw
clear unified-edge ggsn-pgw aaa
clear unified-edge ggsn-pgw aaa radius
clear unified-edge ggsn-pgw aaa radius statistics
<clear-mobile-gateway-aaa-radius-statistics>
clear unified-edge ggsn-pgw aaa statistics
<clear-mobile-gateway-aaa-statistics>
clear unified-edge ggsn-pgw address-assignment
clear unified-edge ggsn-pgw address-assignment pool
<clear-mobile-gateway-sm-ippool-pool-sessions>
clear unified-edge ggsn-pgw address-assignment statistics
<clear-mobile-gateway-sm-ippool-statistics>
```

```
clear unified-edge ggsn-pgw call-admission-control
clear unified-edge ggsn-pgw call-admission-control statistics
<clear-mobile-gateway-cac-statistics>
clear unified-edge ggsn-pgw charging
clear unified-edge ggsn-pgw charging cdr
<clear-mobile-gateway-charging-clear-cdr>
clear unified-edge ggsn-pgw charging cdr wfa
<clear-mobile-gateway-charging-clear-cdr-wfa>
clear unified-edge ggsn-pgw charging local-persistent-storage
clear unified-edge ggsn-pgw charging local-persistent-storage statistics
<clear-mobile-gateway-charging-clear-lps-stats>
clear unified-edge ggsn-pgw charging path
clear unified-edge ggsn-pgw charging path statistics
<clear-mobile-gateway-charging-clear-path-stats>
clear unified-edge ggsn-pgw charging transfer
clear unified-edge ggsn-pgw charging transfer statistics
<clear-mobile-gateway-charging-clear-xfer-stats>
clear unified-edge ggsn-pgw diameter
clear unified-edge ggsn-pgw diameter dcca-gy
clear unified-edge ggsn-pgw diameter dcca-gy statistics
<clear-mobile-gateway-aaa-diam-stats-gy>
clear unified-edge ggsn-pgw diameter network-element
clear unified-edge ggsn-pgw diameter network-element statistics
<clear-mobile-gateway-aaa-diam-ne-statistics>
clear unified-edge ggsn-pgw diameter pcc-gx
clear unified-edge ggsn-pgw diameter pcc-gx statistics
<clear-mobile-gateway-aaa-diam-stats-gx>
clear unified-edge ggsn-pgw diameter peer
clear unified-edge ggsn-pgw diameter peer statistics
<clear-mobile-gateway-aaa-diam-peer-statistics>
clear unified-edge ggsn-pgw gtp
clear unified-edge ggsn-pgw gtp peer
clear unified-edge ggsn-pgw gtp peer statistics
<clear-mobile-gateway-gtp-peer-statistics>
clear unified-edge ggsn-pgw gtp statistics
<clear-mobile-gateway-gtp-statistics>
clear unified-edge ggsn-pgw ip-reassembly
clear unified-edge ggsn-pgw ip-reassembly statistics
<clear-mobile-gateways-ip-reassembly-statistics>
clear unified-edge ggsn-pgw statistics
<clear-mobile-gateway-statistics>
clear unified-edge ggsn-pgw subscribers
<clear-mobile-gateway-subscribers>
clear unified-edge ggsn-pgw subscribers bearer
clear unified-edge ggsn-pgw subscribers charging
<clear-mobile-gateway-subscribers-charging>
clear unified-edge ggsn-pgw subscribers peer
<clear-mobile-gateway-subscribers-peer>
clear unified-edge sgw
clear unified-edge sgw call-admission-control
clear unified-edge sgw call-admission-control statistics
<clear-mobile-sgw-cac-statistics>
clear unified-edge sgw charging
clear unified-edge sgw charging cdr
<clear-mobile-gateway-sgw-charging-clear-cdr>
clear unified-edge sgw charging cdr wfa
<clear-mobile-gateway-sgw-charging-clear-cdr-wfa>
clear unified-edge sgw charging local-persistent-storage
clear unified-edge sgw charging local-persistent-storage statistics
<clear-mobile-gateway-sgw-charging-clear-lps-stats>
```

```
clear unified-edge sgw charging path
clear unified-edge sgw charging path statistics
<clear-mobile-gateway-sgw-charging-clear-path-stats>
clear unified-edge sgw charging transfer
clear unified-edge sgw charging transfer statistics
<clear-mobile-gateway-sgw-charging-clear-xfer-stats>
clear unified-edge sgw gtp
clear unified-edge sgw gtp peer
clear unified-edge sgw gtp peer statistics
<clear-mobile-sgw-gtp-peer-statistics>
clear unified-edge sgw gtp statistics
<clear-mobile-sgw-gtp-statistics>
clear unified-edge sgw idle-mode-buffering
clear unified-edge sgw idle-mode-buffering statistics
<clear-mobile-gw-sgw-idle-mode-buffering-statistics>
clear unified-edge sgw ip-reassembly
clear unified-edge sgw ip-reassembly statistics
<clear-mobile-gateways-sgw-ip-reassembly-statistics-sgw>
clear unified-edge sgw statistics
<clear-mobile-sgw-statistics>
clear unified-edge sgw subscribers
<clear-mobile-sgw-subscribers>
clear unified-edge sgw subscribers charging
<clear-mobile-sgw-subscribers-charging>
clear unified-edge sgw subscribers peer
<clear-mobile-sgw-subscribers-peer>
clear unified-edge tdf
clear unified-edge tdf aaa
clear unified-edge tdf aaa radius
clear unified-edge tdf aaa radius client
clear unified-edge tdf aaa radius client statistics
<clear-radius-client-statistics>
clear unified-edge tdf aaa radius network-element
clear unified-edge tdf aaa radius network-element statistics
<clear-radius-network-element-statistics>
clear unified-edge tdf aaa radius server
clear unified-edge tdf aaa radius server statistics
<clear-radius-server-statistics>
clear unified-edge tdf aaa radius snoop-segment
clear unified-edge tdf aaa radius snoop-segment statistics
<clear-radius-snoop-segment-statistics>
clear unified-edge tdf aaa statistics
<clear-tdf-gateway-aaa-statistics>
clear unified-edge tdf address-assignment
clear unified-edge tdf address-assignment pool
<clear-mobile-gateway-tdf-sm-ippool-pool-sessions>
clear unified-edge tdf address-assignment statistics
<clear-mobile-gateway-tdf-sm-ippool-statistics>
clear unified-edge tdf call-admission-control
clear unified-edge tdf call-admission-control statistics
<clear-tdf-cac-statistics>
clear unified-edge tdf diameter
clear unified-edge tdf diameter network-element
clear unified-edge tdf diameter network-element statistics
<clear-diameter-network-element-statistics>
clear unified-edge tdf diameter pcc-gx
clear unified-edge tdf diameter pcc-gx statistics
<clear-diameter-statistics-gx>
clear unified-edge tdf diameter peer
clear unified-edge tdf diameter peer statistics
```

```

<clear-diameter-peer-statistics>
clear unified-edge tdf statistics
<clear-tdf-statistics>
clear unified-edge tdf subscribers
<clear-mobile-tdf-subscribers>
clear unified-edge tdf subscribers peer
<clear-mobile-gateway-tdf-subscribers-peer>
request unified-edge
request unified-edge ggsn-pgw
request unified-edge ggsn-pgw call-trace
<monitor-mobile-gateways-call-trace-start>
request unified-edge ggsn-pgw call-trace clear
<get-mobile-gateways-call-trace-clear>
request unified-edge ggsn-pgw call-trace show
<get-mobile-gateways-call-trace-information>
request unified-edge ggsn-pgw call-trace start
<get-mobile-gateways-call-trace-start-information>
request unified-edge ggsn-pgw call-trace stop
<get-mobile-gateways-call-trace-stop-information>
request unified-edge sgw
request unified-edge sgw call-trace
request unified-edge sgw call-trace clear
<get-mobile-gateways-sgw-call-trace-clear>
request unified-edge sgw call-trace show
<get-mobile-gateways-sgw-call-trace-information>
request unified-edge sgw call-trace start
<get-mobile-gateways-sgw-call-trace-start-information>
request unified-edge sgw call-trace stop
<get-mobile-gateways-sgw-call-trace-stop-information>
request unified-edge tdf
request unified-edge tdf call-trace
request unified-edge tdf call-trace clear
<get-mobile-gateways-tdf-call-trace-clear>
request unified-edge tdf call-trace show
<get-mobile-gateways-tdf-call-trace-information>
request unified-edge tdf call-trace start
<get-mobile-gateways-tdf-call-trace-start-information>
request unified-edge tdf call-trace stop
<get-mobile-gateways-tdf-call-trace-stop-information>

```

Configuration Hierarchy Levels

```

[edit accounting-options]
[edit chassis]
[edit class-of-service]
[edit class-of-service interfaces]
[edit dynamic-profiles class-of-service]
[edit dynamic-profiles class-of-service interfaces]
[edit dynamic-profiles interfaces]
[edit dynamic-profiles routing-instances instance system services
dhcp-local-server]
[edit dynamic-profiles routing-instances instance system services
static-subscribers group]
[edit forwarding-options]
[edit interfaces]
[edit jnx-example]
[edit logical-systems forwarding-options]
[edit logical-systems interfaces]
[edit logical-systems routing-instances instance system services
dhcp-local-server]
[edit logical-systems routing-instances instance system services

```

```
static-subscribers group]
[edit logical-systems system services dhcp-local-server]
[edit logical-systems system services static-subscribers group]
[edit routing-instances instance system services dhcp-local-server]
[edit routing-instances instance system services static-subscribers group]
[edit services logging]
[edit services radius-flow-tap]
[edit services radius-flow-tap interfaces]
[edit system services dhcp-local-server]
[edit system services static-subscribers group]
[edit unified-edge]
```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [interface-control on page 937](#)

interface-control

Can view chassis, class of service (CoS), groups, forwarding options, and interfaces configuration information. Can edit configuration at the **[edit chassis]**, **[edit class-of-service]**, **[edit groups]**, **[edit forwarding-options]**, and **[edit interfaces]** hierarchy levels.

Commands No associated CLI commands.

Configuration Hierarchy Levels

```
[edit accounting-options]
[edit chassis]
[edit class-of-service]
[edit class-of-service interfaces]
[edit dynamic-profiles class-of-service]
[edit dynamic-profiles class-of-service interfaces]
[edit dynamic-profiles interfaces]
[edit dynamic-profiles routing-instances instance system services
dhcp-local-server]
[edit dynamic-profiles routing-instances instance system services
static-subscribers group]
[edit forwarding-options]
[edit interfaces]
[edit jnx-example]
[edit logical-systems forwarding-options]
[edit logical-systems interfaces]
[edit logical-systems routing-instances instance system services
dhcp-local-server]
[edit logical-systems routing-instances instance system services
```

```
static-subscribers group]
[edit logical-systems system services dhcp-local-server]
[edit logical-systems system services static-subscribers group]
[edit routing-instances instance system services dhcp-local-server]
[edit routing-instances instance system services static-subscribers group]
[edit services logging]
[edit services radius-flow-tap]
[edit services radius-flow-tap interfaces]
[edit system services dhcp-local-server]
[edit system services static-subscribers group]
```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [interface on page 933](#)

maintenance

Can perform system maintenance, including starting a local shell on the router and becoming the superuser in the shell, and can halt and reboot the router.

Commands

```
clear system commit synchronize-server pending-jobs
<clear-pending-commit-sync-jobs>
clear system reboot
<clear-reboot>

clear-system-services-reverse-information
file archive
<file-archive>
file change-owner
<file-change-owner>
<extract-file>
monitor traffic
request chassis afeb
request chassis beacon
<request-chassis-beacon>
request chassis cb
<request-chassis-cb>
request chassis ccg
<request-chassis-ccg>

request chassis cfeb
request chassis cfeb master
request chassis cip
request chassis fabric
request chassis fabric device
request chassis fabric guided-cabling
request chassis fabric plane
```

```

request chassis fabric upgrade-bandwidth
request chassis fabric upgrade-bandwidth fpc
request chassis fabric upgrade-bandwidth info
request chassis fan-tray
request chassis feb
  <request-feb>

request chassis fpc
  <request-chassis-fpc>
request chassis fpc optical-module
  <request-fpc-optical-module>
request chassis fpc optical-module amplifier-chain
  <request-fpc-optical-module-amplifier-chain>
request chassis fpc optical-module amplifier-chain ila
  <request-fpc-optical-module-ila>
request chassis fpc optical-module amplifier-chain ila firmware-upgrade
  <request-fpc-optical-module-ila-firmware-upgrade>
request chassis fpc optical-module amplifier-chain ila hard-reset
  <request-fpc-optical-module-ila-hard-reset>
request chassis fpc optical-module amplifier-chain ila soft-reset
  <request-fpc-optical-module-ila-soft-reset>
request chassis fpc optical-module firmware-upgrade
  <request-fpc-optical-module-firmware-upgrade>
request chassis fpm
request chassis mcs
request chassis mic
request chassis optics
request chassis pcg
request chassis pic
  <request-chassis-pic>
request chassis port-led
request chassis port-led start
  <request-chassis-port-led-switch-on>
request chassis port-led stop
  <request-chassis-port-led-switch-off>

request chassis redundancy
request chassis redundancy feb
  <request-redundancy-feb>
request chassis routing-engine
  <request-chassis-routing-engine>
request chassis routing-engine hard-disk-test
request chassis routing-engine master
request chassis satellite device-mode
request chassis satellite disable
  <request-chassis-satellite-disable>
request chassis satellite enable
  <request-chassis-satellite-enable>
request chassis satellite file-copy
  <request-chassis-satellite-file-copy>
request chassis satellite install
  <request-chassis-satellite-install>
request chassis satellite interface
request chassis satellite login
  <request-chassis-satellite-login>
request chassis satellite reboot
  <request-chassis-satellite-reboot>
request chassis satellite restart
  <request-chassis-satellite-restart>
request chassis satellite restart process

```

```
request chassis satellite shell-command
<request-chassis-satellite-shell-command>

request chassis scg
request chassis sfb
request chassis sfm
request chassis sfm master
request chassis sib
<request-chassis-sib>
request chassis sib f13

request chassis sib f2s
request chassis sib optics
request chassis spmb
<request-chassis-spmb>
request chassis ssb
request chassis ssb master
request chassis synchronization
request chassis synchronization force
request chassis synchronization force automatic-switching
request chassis synchronization force mark-failed
request chassis synchronization force unmark-failed
request chassis synchronization switch
request chassis tfcb
request chassis vcpu
request chassis vnpu
request diagnostics
request diagnostics tdr
request diagnostics tdr abort
request diagnostics tdr abort interface
<abort-tdr-interface-diagnostics>
request diagnostics tdr start
request diagnostics tdr start interface
<request-tdr-interface-diagnostics>
request extension-service
request extension-service start
<extension-service-start>
request extension-service stop
<extension-service-stop>
request l2circuit-switchover
request mpls
request mpls lsp
request mpls lsp adjust-autobandwidth
<request-mpls-lsp-autobandwidth-adjust>
request security
request security certificate
request security certificate enroll
request security datapath-debug
request security datapath-debug action-profile
request security datapath-debug action-profile reload-all
    <reload-eedebg-action-profile>

request security idp
    <request-idp-security-policy-load>

request security idp security-package
request security idp security-package download
    <request-idp-security-package-download>

request security idp security-package download version
```



```

<request-idp-security-package-download-version>

request security idp security-package install
  <request-idp-security-package-install>
request security idp security-package offline-download
<request-idp-security-package-offline-download>
request security idp ssl-inspection
request security idp ssl-inspection key
request security idp ssl-inspection key add
  <request-idp-ssl-key-add>

request security idp ssl-inspection key delete
  <request-idp-ssl-key-delete>
request security idp storage-cleanup
  <request-idp-storage-cleanup>
request security ike
request security key-pair
request security pki
request security pki ca-certificate
request security pki ca-certificate ca-profile-group
request security pki ca-certificate ca-profile-group load
request security pki ca-certificate enroll
request security pki local-certificate export
request security pki ca-certificate load
  <load-pki-ca-certificate>
request security pki ca-certificate verify
  <verify-pki-ca-certificate>
request security pki crl
request security pki crl load
  <load-pki-crl>
request security pki generate-certificate-request
  <generate-pki-certificate-request>
request security pki generate-key-pair
  <generate-pki-key-pair>
request security pki local-certificate
request security pki local-certificate enroll
request security pki local-certificate generate-self-signed
  <generate-pki-self-signed-local-certificate>
request security pki local-certificate load
  <load-pki-local-certificate>
request security pki local-certificate verify
  <verify-pki-local-certificate>
request security pki verify-integrity-status
<verify-integrity-status>
request services fips
request services fips authorize
request services fips authorize pic
request services fips zeroize
request services fips zeroize pic
request services flow-collector
request services flow-collector change-destination
  <request-services-flow-collector-destination>

request services ggsn
request services ggsn pdp
request services ggsn pdp terminate
request services ggsn pdp terminate apn
  <request-ggsn-terminate-contexts-apn>

request services ggsn pdp terminate context

```

```
<request-ggsn-terminate-context>

request services ggsn pdp terminate context msisdn
  <request-ggsn-terminate-msisdn-context>

request services ggsn restart
request services ggsn restart interface
  <request-ggsn-restart-interface>

request services ggsn restart node
  <request-ggsn-restart-node>

request services ggsn start
request services ggsn start interface
request services ggsn stop
request services ggsn stop interface
  <request-ggsn-stop-interface>

request services ggsn stop node
  <request-ggsn-stop-node>

request services ggsn trace
request services ggsn trace software
request services ggsn trace software update
  <request-ggsn-software-update>

request services ggsn trace start
request services ggsn trace start imsi
  <request-ggsn-start-imsi-trace>

request services ggsn trace start msisdn
  <request-ggsn-start-msisdn-trace>

request services ggsn trace stop
request services ggsn trace stop all
  <request-ggsn-stop-trace-activity>

request services ggsn trace stop imsi
  <request-ggsn-stop-imsi-trace>

request services ggsn trace stop msisdn
  <request-ggsn-stop-msisdn-trace>

request support
request support information
request system
request system boot-media
  <request-boot-media>
request system certificate
request system certificate add
request system commit
request system commit server
request system commit server pause
  <request-commit-server-pause>
request system commit server queue
request system commit server queue cleanup
  <request-commit-server-cleanup>
request system commit server start
  <request-commit-server-start>
request system configuration
```

```

request system configuration rescue
request system configuration rescue delete
    <request-delete-rescue-configuration>

request system configuration rescue save
    <request-save-rescue-configuration>
request system decrypt
<security-decrypt-password>
request system diagnostics
request system diagnostics log-archive
<request-log>
request system diagnostics transfer-control
<transfer-control>
request system firmware
request system firmware downgrade
request system firmware downgrade cb
<request-fpc-fpga-upgrade>
request system firmware downgrade cb i2c
<request-i2c-fpga-upgrade>
request system firmware downgrade feb
request system firmware downgrade fpc
request system firmware downgrade pic
request system firmware downgrade poe
request system firmware downgrade re
request system firmware downgrade scb
request system firmware downgrade sfm
request system firmware downgrade spmb
request system firmware downgrade ssb
request system firmware downgrade vcpu
request system firmware upgrade
request system firmware upgrade cb i2c
<request-i2c-fpga-upgrade>
request system firmware upgrade feb
request system firmware upgrade fpc
request system firmware upgrade fpga
request system firmware upgrade fpga cb
<request-cb-fpga-upgrade>
request system firmware upgrade fpga fpc
request system firmware upgrade fpga fpd
<request-fpd-fpga-upgrade>
request system firmware upgrade fpga ftc
<request-ftc-fpga-upgrade>
request system firmware upgrade fpga re
<request-re-fpga-upgrade>

request system firmware upgrade fpga scb
<request-scb-fpga-upgrade>
request system firmware upgrade fpga sib
<request-sib-fpga-upgrade>
request system firmware upgrade pic
request system firmware upgrade poe
request system firmware upgrade re
request system firmware upgrade re bios
request system firmware upgrade scb
request system firmware upgrade sfm
request system firmware upgrade spmb
request system firmware upgrade ssb
request system firmware upgrade vcpu
request system halt
    <request-halt>

```

```
request system keep-alive
request system license
request system license add
request system license delete
    <request-license-delete>
request system license revoke-licenses
<license-revoke-licenses>

request system license save
request system license update
    <request-license-update>
request system logout
request system logs
<request-system-logs-copy>

request system partition
request system partition abort
request system partition compact-flash
request system partition hard-disk
request system power-off
    <request-power-off>

request system power-on
<request-power-on-other-re>
request system process
request system process terminate
<request-process-terminate>
request system reboot
    <request-reboot>
request system recover

request system scripts
request system scripts add
    <request-scripts-package-add>

request system scripts convert
request system scripts convert slax-to-xslt
request system scripts convert xslt-to-slax
request system scripts delete
    <request-scripts-package-delete>

request system scripts event-scripts
request system scripts event-scripts reload
    <reload-event-scripts>

request system scripts refresh-from
    <request-script-refresh-from>

request system scripts rollback
    <request-scripts-package-rollback>

request system scripts synchronize
<request-scripts-synchronize>

request system snapshot
    <request-snapshot>

request system software
request system software abort
```

```

request system software abort in-service-upgrade
    <abort-in-service-upgrade>

request system software add
    <request-package-add>

request system software delete
    <request-package-delete>

request system software delete-backup
    <request-package-delete-backup>

request system software in-service-upgrade
    <request-package-in-service-upgrade>

request system software nonstop-upgrade
    <request-package-nonstop-upgrade>
request system software recovery-package
request system software recovery-package add
request system software recovery-package delete
request system software recovery-package extract
request system software recovery-package extract ex-8200-package
request system software recovery-package extract ex-xre200-package
request system software rollback
    <request-package-rollback>

request system software validate
    <request-package-validate>
request system software validate in-service-upgrade
    <check-in-service-upgrade>

request system storage
request system storage cleanup
    <request-system-storage-cleanup>
request system storage cleanup qfabric
    <remove-qfabric-repository-contents>
request system storage mount
<request-mount>
request system storage unified-edge
request system storage unified-edge charging
request system storage unified-edge charging media
request system storage unified-edge media
request system storage unified-edge media eject
request system storage unified-edge media prepare
request system storage unmount
<request-unmount>
request system subscriber-management
request system subscriber-management new-sessions-disable
<request-sm-new-sessions-disable>
request system subscriber-management new-sessions-enable
<request-sm-new-sessions-enable>
request system yang enable
<request-yang-enable>
request system yang update
<request-yang-update>
request system yang validate
<request-yang-validate>
request system zeroize
request vmhost
request vmhost cleanup

```

```
<request-vmhost-file-cleanup>
request vmhost file-copy
<request-vmhost-file-copy>
request vmhost halt
<request-vmhost-halt>
request vmhost hard-disk-test
<request-vmhost-hard-disk-test>
request vmhost power-off
<request-vmhost-poweroff>
request vmhost power-on
<request-power-on-other-re>
request vmhost reboot
<request-vmhost-reboot>
request vmhost snapshot
<request-vmhost-snapshot>
request vmhost snapshot partition
<request-vmhost-snapshot-partition>
request vmhost snapshot recovery
<request-vmhost-snapshot-recovery>
request vmhost snapshot recovery partition
<request-vmhost-snapshot-recovery-partition>
request vmhost software
request vmhost software abort
request vmhost software abort in-service-upgrade
<abort-in-service-upgrade>
request vmhost software add
<request-vmhost-package-add>
request vmhost software in-service-upgrade
<request-vmhost-package-in-service-upgrade>
request vmhost software rollback
<request-package-rollback>
request vmhost zeroize
<request-vmhost-zeroize>
request vpls-switchover
set date
set date ntp
show chassis usb
show chassis usb storage
<get-usb-storage-status>
show services fips
show system configuration database
show system configuration database usage
<get-database-usage>
start shell
start shell user
test access
test access profile
    <get-radius-profile-access-test-result>

test access radius-server
    <get-radius-server-access-test-result>
get-test-services-l2tp-tunnel-result
```

Configuration Hierarchy Levels

```
[edit event-options]
[edit security ipsec internal]
[edit security ipsec trusted-channel]
[edit services dynamic-flow-capture traceoptions]
[edit services ggsn]
```

```
[edit system fips]
[edit services ggsn rule-space]
[edit system processes daemon-process command]
[edit system scripts]
[edit system scripts commit]
[edit system scripts op]
[edit system scripts snmp]
```

- Related Documentation**
- [Understanding Junos OS Access Privilege Levels on page 107](#)
 - [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
 - [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
 - [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

network

Can access the network by using the **ping**, **ssh**, **telnet**, and **traceroute** commands.

Commands

```
mtrace
mtrace from-source
mtrace monitor
mtrace to-gateway
ping
  <ping>

ping atm
ping clns
ping ethernet
  <request-ping-ethernet>
ping fibre-channel
ping mpls
ping mpls bgp
  <request-ping-bgp-lsp>
ping mpls l2circuit
ping mpls l2circuit interface
  <request-ping-l2circuit-interface>

ping mpls l2circuit virtual-circuit
  <request-ping-l2circuit-virtual-circuit>

ping mpls l2vpn
ping mpls l2vpn fec129
ping mpls l2vpn fec129 interface
  <request-ping-l2vpn-fec129-interface>
ping mpls l2vpn instance
  <request-ping-l2vpn-instance>

ping mpls l2vpn interface
  <request-ping-l2vpn-interface>

ping mpls l3vpn
```

```

    <request-ping-l3vpn>

ping mpls ldp
    <request-ping-ldp-lsp>

ping mpls ldp p2mp
    <request-ping-ldp-p2mp-lsp>

ping mpls lsp-end-point
    <request-ping-lsp-end-point>

ping mpls rsvp
    <request-ping-rsvp-lsp>

ping overlay
    <request-ping-overlay>
ping vpls
ping vpls instance
    <request-ping-vpls-instance>

request routing-engine
request routing-engine login
    <request-routing-engine-login>
request routing-engine login other-routing-engine
    <request-login-to-other-routing-engine>
request services flow-collector
request services flow-collector test-file-transfer
    <request-services-flow-collector-test-file-transfer>

show host
show interfaces level-extra descriptions
show multicast mrimfo
ssh
telnet
traceroute
    <traceroute>

traceroute clns
traceroute ethernet
    <request-traceroute-ethernet>

traceroute monitor
traceroute mpls
traceroute mpls l2vpn
    <traceroute-mpls-l2vpn>
traceroute mpls l2vpn fec129
    <traceroute-mpls-mspw>
traceroute mpls ldp
    <traceroute-mpls-ldp>
traceroute mpls rsvp
    <traceroute-mpls-rsvp>
traceroute overlay
    <request-traceroute-overlay>

```

Configuration Hierarchy Levels

No associated CLI configuration hierarchy levels and statements.

- Related Documentation**
- [Understanding Junos OS Access Privilege Levels on page 107](#)
 - [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
 - [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
 - [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

pgcp-session-mirroring

Can view session mirroring configuration by using the **pgcp** command.

Commands

```
clear unified-edge
clear unified-edge ggsn-pgw
clear unified-edge ggsn-pgw aaa
clear unified-edge ggsn-pgw aaa radius
clear unified-edge ggsn-pgw aaa radius statistics
<clear-mobile-gateway-aaa-radius-statistics>
clear unified-edge ggsn-pgw aaa statistics
<clear-mobile-gateway-aaa-statistics>
clear unified-edge ggsn-pgw address-assignment
clear unified-edge ggsn-pgw address-assignment pool
<clear-mobile-gateway-sm-ippool-pool-sessions>
clear unified-edge ggsn-pgw address-assignment statistics
<clear-mobile-gateway-sm-ippool-statistics>
clear unified-edge ggsn-pgw call-admission-control
clear unified-edge ggsn-pgw call-admission-control statistics
<clear-mobile-gateway-cac-statistics>
clear unified-edge ggsn-pgw charging
clear unified-edge ggsn-pgw charging cdr
<clear-mobile-gateway-charging-clear-cdr>
clear unified-edge ggsn-pgw charging cdr wfa
<clear-mobile-gateway-charging-clear-cdr-wfa>
clear unified-edge ggsn-pgw charging local-persistent-storage
clear unified-edge ggsn-pgw charging local-persistent-storage statistics
<clear-mobile-gateway-charging-clear-lps-stats>
clear unified-edge ggsn-pgw charging path
clear unified-edge ggsn-pgw charging path statistics
<clear-mobile-gateway-charging-clear-path-stats>
clear unified-edge ggsn-pgw charging transfer
clear unified-edge ggsn-pgw charging transfer statistics
<clear-mobile-gateway-charging-clear-xfer-stats>
clear unified-edge ggsn-pgw diameter
clear unified-edge ggsn-pgw diameter dcca-gy
clear unified-edge ggsn-pgw diameter dcca-gy statistics
<clear-mobile-gateway-aaa-diam-stats-gy>
clear unified-edge ggsn-pgw diameter network-element
clear unified-edge ggsn-pgw diameter network-element statistics
<clear-mobile-gateway-aaa-diam-ne-statistics>
clear unified-edge ggsn-pgw diameter pcc-gx
clear unified-edge ggsn-pgw diameter pcc-gx statistics
<clear-mobile-gateway-aaa-diam-stats-gx>
clear unified-edge ggsn-pgw diameter peer
clear unified-edge ggsn-pgw diameter peer statistics
<clear-mobile-gateway-aaa-diam-peer-statistics>
```

```
clear unified-edge ggsn-pgw gtp
clear unified-edge ggsn-pgw gtp peer
clear unified-edge ggsn-pgw gtp peer statistics
<clear-mobile-gateway-gtp-peer-statistics>
clear unified-edge ggsn-pgw gtp statistics
<clear-mobile-gateway-gtp-statistics>
clear unified-edge ggsn-pgw ip-reassembly
clear unified-edge ggsn-pgw ip-reassembly statistics
<clear-mobile-gateways-ip-reassembly-statistics>
clear unified-edge ggsn-pgw statistics
<clear-mobile-gateway-statistics>
clear unified-edge ggsn-pgw subscribers
<clear-mobile-gateway-subscribers>
clear unified-edge ggsn-pgw subscribers bearer
clear unified-edge ggsn-pgw subscribers charging
<clear-mobile-gateway-subscribers-charging>
clear unified-edge ggsn-pgw subscribers peer
<clear-mobile-gateway-subscribers-peer>
clear unified-edge sgw
clear unified-edge sgw call-admission-control
clear unified-edge sgw call-admission-control statistics
<clear-mobile-sgw-cac-statistics>
clear unified-edge sgw charging
clear unified-edge sgw charging cdr
<clear-mobile-gateway-sgw-charging-clear-cdr>
clear unified-edge sgw charging cdr wfa
<clear-mobile-gateway-sgw-charging-clear-cdr-wfa>
clear unified-edge sgw charging local-persistent-storage
clear unified-edge sgw charging local-persistent-storage statistics
<clear-mobile-gateway-sgw-charging-clear-lps-stats>
clear unified-edge sgw charging path
clear unified-edge sgw charging path statistics
<clear-mobile-gateway-sgw-charging-clear-path-stats>
clear unified-edge sgw charging transfer
clear unified-edge sgw charging transfer statistics
<clear-mobile-gateway-sgw-charging-clear-xfer-stats>
clear unified-edge sgw gtp
clear unified-edge sgw gtp peer
clear unified-edge sgw gtp peer statistics
<clear-mobile-sgw-gtp-peer-statistics>
clear unified-edge sgw gtp statistics
<clear-mobile-sgw-gtp-statistics>
clear unified-edge sgw idle-mode-buffering
clear unified-edge sgw idle-mode-buffering statistics
<clear-mobile-gw-sgw-idle-mode-buffering-statistics>
clear unified-edge sgw ip-reassembly
clear unified-edge sgw ip-reassembly statistics
<clear-mobile-gateways-sgw-ip-reassembly-statistics-sgw>
clear unified-edge sgw statistics
<clear-mobile-sgw-statistics>
clear unified-edge sgw subscribers
<clear-mobile-sgw-subscribers>
clear unified-edge sgw subscribers charging
<clear-mobile-sgw-subscribers-charging>
clear unified-edge sgw subscribers peer
<clear-mobile-sgw-subscribers-peer>
clear unified-edge tdf
clear unified-edge tdf aaa
clear unified-edge tdf aaa radius
clear unified-edge tdf aaa radius client
```

```

clear unified-edge tdf aaa radius client statistics
<clear-radius-client-statistics>
clear unified-edge tdf aaa radius network-element
clear unified-edge tdf aaa radius network-element statistics
<clear-radius-network-element-statistics>
clear unified-edge tdf aaa radius server
clear unified-edge tdf aaa radius server statistics
<clear-radius-server-statistics>
clear unified-edge tdf aaa radius snoop-segment
clear unified-edge tdf aaa radius snoop-segment statistics
<clear-radius-snoop-segment-statistics>
clear unified-edge tdf aaa statistics
<clear-tdf-gateway-aaa-statistics>
clear unified-edge tdf address-assignment
clear unified-edge tdf address-assignment pool
<clear-mobile-gateway-tdf-sm-ippool-pool-sessions>
clear unified-edge tdf address-assignment statistics
<clear-mobile-gateway-tdf-sm-ippool-statistics>
clear unified-edge tdf call-admission-control
clear unified-edge tdf call-admission-control statistics
<clear-tdf-cac-statistics>
clear unified-edge tdf diameter
clear unified-edge tdf diameter network-element
clear unified-edge tdf diameter network-element statistics
<clear-diameter-network-element-statistics>
clear unified-edge tdf diameter pcc-gx
clear unified-edge tdf diameter pcc-gx statistics
<clear-diameter-statistics-gx>
clear unified-edge tdf diameter peer
clear unified-edge tdf diameter peer statistics
<clear-diameter-peer-statistics>
clear unified-edge tdf statistics
<clear-tdf-statistics>
clear unified-edge tdf subscribers
<clear-mobile-tdf-subscribers>
clear unified-edge tdf subscribers peer
<clear-mobile-gateway-tdf-subscribers-peer>
request unified-edge
request unified-edge ggsn-pgw
request unified-edge ggsn-pgw call-trace
<monitor-mobile-gateways-call-trace-start>
request unified-edge ggsn-pgw call-trace clear
<get-mobile-gateways-call-trace-clear>
request unified-edge ggsn-pgw call-trace show
<get-mobile-gateways-call-trace-information>
request unified-edge ggsn-pgw call-trace start
<get-mobile-gateways-call-trace-start-information>
request unified-edge ggsn-pgw call-trace stop
<get-mobile-gateways-call-trace-stop-information>
request unified-edge sgw
request unified-edge sgw call-trace
request unified-edge sgw call-trace clear
<get-mobile-gateways-sgw-call-trace-clear>
request unified-edge sgw call-trace show
<get-mobile-gateways-sgw-call-trace-information>
request unified-edge sgw call-trace start
<get-mobile-gateways-sgw-call-trace-start-information>
request unified-edge sgw call-trace stop
<get-mobile-gateways-sgw-call-trace-stop-information>
request unified-edge tdf

```

```
request unified-edge tdf call-trace
request unified-edge tdf call-trace clear
<get-mobile-gateways-tdf-call-trace-clear>
request unified-edge tdf call-trace show
<get-mobile-gateways-tdf-call-trace-information>
request unified-edge tdf call-trace start
<get-mobile-gateways-tdf-call-trace-start-information>
request unified-edge tdf call-trace stop
<get-mobile-gateways-tdf-call-trace-stop-information>
show services pgcp gates gate-way display session-mirroring
```

**Configuration
Hierarchy Levels**

```
[edit services pgcp gateway session-mirroring]
[edit services pgcp session-mirroring]
[edit unified-edge]
```

**Related
Documentation**

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [pgcp-session-mirroring-control on page 952](#)

pgcp-session-mirroring-control

Can modify PGCP session mirroring configuration

Commands

```
show services pgcp gates gate-way display session-mirroring
```

**Configuration
Hierarchy Levels**

```
[edit services pgcp gateway session-mirroring]
[edit services pgcp session-mirroring]
```

**Related
Documentation**

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [pgcp-session-mirroring on page 949](#)

reset

Can restart software processes by using the **restart** command and can configure whether software processes configured at the **[edit system processes]** hierarchy level are enabled or disabled.

Commands

```
request chassis cfeb master switch
request chassis cfeb master switch no-confirm
request chassis routing-engine master acquire
request chassis routing-engine master acquire force
request chassis routing-engine master acquire force no-confirm
request chassis routing-engine master acquire no-confirm
request chassis routing-engine master release
request chassis routing-engine master release no-confirm
request chassis routing-engine master switch
request chassis routing-engine master switch no-confirm
request chassis satellite install no-confirm
request chassis sfm master switch
request chassis sfm master switch no-confirm
request chassis ssb master switch
request chassis ssb master switch no-confirm
restart
restart kernel-replication
  <restart-kernel-replication>
restart-named-service
restart routing
<routing-restart>
restart services
restart services border-signaling-gateway
<restart-border-signaling-gateway-service>
restart services pgcp
<restart-pgcp-service>
restart web-management
<restart-web-management>
```

Configuration Hierarchy Levels

No associated CLI configuration hierarchy levels and statements.

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

rollback

Can roll back to previous configurations.

Commands rollback**Configuration
Hierarchy Levels**

[edit]

**Related
Documentation**

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

routing

Can view general routing, routing protocol, and routing policy configuration information.

Commands

```
clear unified-edge
clear unified-edge ggsn-pgw
clear unified-edge ggsn-pgw aaa
clear unified-edge ggsn-pgw aaa radius
clear unified-edge ggsn-pgw aaa radius statistics
<clear-mobile-gateway-aaa-radius-statistics>
clear unified-edge ggsn-pgw aaa statistics
<clear-mobile-gateway-aaa-statistics>
clear unified-edge ggsn-pgw address-assignment
clear unified-edge ggsn-pgw address-assignment pool
<clear-mobile-gateway-sm-ippool-pool-sessions>
clear unified-edge ggsn-pgw address-assignment statistics
<clear-mobile-gateway-sm-ippool-statistics>
clear unified-edge ggsn-pgw call-admission-control
clear unified-edge ggsn-pgw call-admission-control statistics
<clear-mobile-gateway-cac-statistics>
clear unified-edge ggsn-pgw charging
clear unified-edge ggsn-pgw charging cdr
<clear-mobile-gateway-charging-clear-cdr>
clear unified-edge ggsn-pgw charging cdr wfa
<clear-mobile-gateway-charging-clear-cdr-wfa>
clear unified-edge ggsn-pgw charging local-persistent-storage
clear unified-edge ggsn-pgw charging local-persistent-storage statistics
<clear-mobile-gateway-charging-clear-lps-stats>
clear unified-edge ggsn-pgw charging path
clear unified-edge ggsn-pgw charging path statistics
<clear-mobile-gateway-charging-clear-path-stats>
clear unified-edge ggsn-pgw charging transfer
clear unified-edge ggsn-pgw charging transfer statistics
<clear-mobile-gateway-charging-clear-xfer-stats>
clear unified-edge ggsn-pgw diameter
clear unified-edge ggsn-pgw diameter dcca-gy
clear unified-edge ggsn-pgw diameter dcca-gy statistics
<clear-mobile-gateway-aaa-diam-stats-gy>
```

```

clear unified-edge ggsn-pgw diameter network-element
clear unified-edge ggsn-pgw diameter network-element statistics
<clear-mobile-gateway-aaa-diam-ne-statistics>
clear unified-edge ggsn-pgw diameter pcc-gx
clear unified-edge ggsn-pgw diameter pcc-gx statistics
<clear-mobile-gateway-aaa-diam-stats-gx>
clear unified-edge ggsn-pgw diameter peer
clear unified-edge ggsn-pgw diameter peer statistics
<clear-mobile-gateway-aaa-diam-peer-statistics>
clear unified-edge ggsn-pgw gtp
clear unified-edge ggsn-pgw gtp peer
clear unified-edge ggsn-pgw gtp peer statistics
<clear-mobile-gateway-gtp-peer-statistics>
clear unified-edge ggsn-pgw gtp statistics
<clear-mobile-gateway-gtp-statistics>
clear unified-edge ggsn-pgw ip-reassembly
clear unified-edge ggsn-pgw ip-reassembly statistics
<clear-mobile-gateways-ip-reassembly-statistics>
clear unified-edge ggsn-pgw statistics
<clear-mobile-gateway-statistics>
clear unified-edge ggsn-pgw subscribers
<clear-mobile-gateway-subscribers>
clear unified-edge ggsn-pgw subscribers bearer
clear unified-edge ggsn-pgw subscribers charging
<clear-mobile-gateway-subscribers-charging>
clear unified-edge ggsn-pgw subscribers peer
<clear-mobile-gateway-subscribers-peer>
clear unified-edge sgw
clear unified-edge sgw call-admission-control
clear unified-edge sgw call-admission-control statistics
<clear-mobile-sgw-cac-statistics>
clear unified-edge sgw charging
clear unified-edge sgw charging cdr
<clear-mobile-gateway-sgw-charging-clear-cdr>
clear unified-edge sgw charging cdr wfa
<clear-mobile-gateway-sgw-charging-clear-cdr-wfa>
clear unified-edge sgw charging local-persistent-storage
clear unified-edge sgw charging local-persistent-storage statistics
<clear-mobile-gateway-sgw-charging-clear-lps-stats>
clear unified-edge sgw charging path
clear unified-edge sgw charging path statistics
<clear-mobile-gateway-sgw-charging-clear-path-stats>
clear unified-edge sgw charging transfer
clear unified-edge sgw charging transfer statistics
<clear-mobile-gateway-sgw-charging-clear-xfer-stats>
clear unified-edge sgw gtp
clear unified-edge sgw gtp peer
clear unified-edge sgw gtp peer statistics
<clear-mobile-sgw-gtp-peer-statistics>
clear unified-edge sgw gtp statistics
<clear-mobile-sgw-gtp-statistics>
clear unified-edge sgw idle-mode-buffering
clear unified-edge sgw idle-mode-buffering statistics
<clear-mobile-gw-sgw-idle-mode-buffering-statistics>
clear unified-edge sgw ip-reassembly
clear unified-edge sgw ip-reassembly statistics
<clear-mobile-gateways-sgw-ip-reassembly-statistics-sgw>
clear unified-edge sgw statistics
<clear-mobile-sgw-statistics>
clear unified-edge sgw subscribers

```

```
<clear-mobile-sgw-subscribers>
clear unified-edge sgw subscribers charging
<clear-mobile-sgw-subscribers-charging>
clear unified-edge sgw subscribers peer
<clear-mobile-sgw-subscribers-peer>
clear unified-edge tdf
clear unified-edge tdf aaa
clear unified-edge tdf aaa radius
clear unified-edge tdf aaa radius client
clear unified-edge tdf aaa radius client statistics
<clear-radius-client-statistics>
clear unified-edge tdf aaa radius network-element
clear unified-edge tdf aaa radius network-element statistics
<clear-radius-network-element-statistics>
clear unified-edge tdf aaa radius server
clear unified-edge tdf aaa radius server statistics
<clear-radius-server-statistics>
clear unified-edge tdf aaa radius snoop-segment
clear unified-edge tdf aaa radius snoop-segment statistics
<clear-radius-snoop-segment-statistics>
clear unified-edge tdf aaa statistics
<clear-tdf-gateway-aaa-statistics>
clear unified-edge tdf address-assignment
clear unified-edge tdf address-assignment pool
<clear-mobile-gateway-tdf-sm-ippool-pool-sessions>
clear unified-edge tdf address-assignment statistics
<clear-mobile-gateway-tdf-sm-ippool-statistics>
clear unified-edge tdf call-admission-control
clear unified-edge tdf call-admission-control statistics
<clear-tdf-cac-statistics>
clear unified-edge tdf diameter
clear unified-edge tdf diameter network-element
clear unified-edge tdf diameter network-element statistics
<clear-diameter-network-element-statistics>
clear unified-edge tdf diameter pcc-gx
clear unified-edge tdf diameter pcc-gx statistics
<clear-diameter-statistics-gx>
clear unified-edge tdf diameter peer
clear unified-edge tdf diameter peer statistics
<clear-diameter-peer-statistics>
clear unified-edge tdf statistics
<clear-tdf-statistics>
clear unified-edge tdf subscribers
<clear-mobile-tdf-subscribers>
clear unified-edge tdf subscribers peer
<clear-mobile-gateway-tdf-subscribers-peer>
request mpls
request mpls lsp
request mpls lsp adjust-autobandwidth
<request-mpls-lsp-autobandwidth-adjust>
request unified-edge
request unified-edge ggsn-pgw
request unified-edge ggsn-pgw call-trace
<monitor-mobile-gateways-call-trace-start>
request unified-edge ggsn-pgw call-trace clear
<get-mobile-gateways-call-trace-clear>
request unified-edge ggsn-pgw call-trace show
<get-mobile-gateways-call-trace-information>
request unified-edge ggsn-pgw call-trace start
<get-mobile-gateways-call-trace-start-information>
```



```

request unified-edge ggsn-pgw call-trace stop
<get-mobile-gateways-call-trace-stop-information>
request unified-edge sgw
request unified-edge sgw call-trace
request unified-edge sgw call-trace clear
<get-mobile-gateways-sgw-call-trace-clear>
request unified-edge sgw call-trace show
<get-mobile-gateways-sgw-call-trace-information>
request unified-edge sgw call-trace start
<get-mobile-gateways-sgw-call-trace-start-information>
request unified-edge sgw call-trace stop
<get-mobile-gateways-sgw-call-trace-stop-information>
request unified-edge tdf
request unified-edge tdf call-trace
request unified-edge tdf call-trace clear
<get-mobile-gateways-tdf-call-trace-clear>
request unified-edge tdf call-trace show
<get-mobile-gateways-tdf-call-trace-information>
request unified-edge tdf call-trace start
<get-mobile-gateways-tdf-call-trace-start-information>
request unified-edge tdf call-trace stop
<get-mobile-gateways-tdf-call-trace-stop-information>

```

Configuration Hierarchy Levels

```

[edit bridge-domains]
[edit bridge-domains domain multicast-snooping-options]
[edit bridge-domains domain multicast-snooping-options traceoptions]
[edit dynamic-profiles protocols igmp traceoptions]
[edit dynamic-profiles protocols mld traceoptions]
[edit dynamic-profiles protocols router-advertisement traceoptions]
[edit dynamic-profiles routing-instances]
[edit dynamic-profiles routing-instances instance bridge-domains]
[edit dynamic-profiles routing-instances instance bridge-domains domain
multicast-snooping-options]
[edit dynamic-profiles routing-instances instance bridge-domains domain
multicast-snooping-options traceoptions]
[edit dynamic-profiles routing-instances instance multicast-snooping-options]
[edit dynamic-profiles routing-instances instance multicast-snooping-options
traceoptions]
[edit dynamic-profiles routing-instances instance pbb-options]
[edit dynamic-profiles routing-instances instance protocols]
[edit dynamic-profiles routing-instances instance protocols bgp group neighbor
traceoptions]
[edit dynamic-profiles routing-instances instance protocols bgp group
traceoptions]
[edit dynamic-profiles routing-instances instance protocols bgp traceoptions]
[edit dynamic-profiles routing-instances instance protocols isis traceoptions]
[edit dynamic-profiles routing-instances instance protocols l2vpn traceoptions]
[edit dynamic-profiles routing-instances instance protocols ldp traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp group peer
traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp group
traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp peer
traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp traceoptions]
[edit dynamic-profiles routing-instances instance protocols mvpn traceoptions]
[edit dynamic-profiles routing-instances instance protocols ospf traceoptions]
[edit dynamic-profiles routing-instances instance protocols pim traceoptions]

```

```
[edit dynamic-profiles routing-instances instance protocols rip traceoptions]
[edit dynamic-profiles routing-instances instance protocols ripng traceoptions]
[edit dynamic-profiles routing-instances instance protocols router-discovery
  traceoptions]
[edit dynamic-profiles routing-instances instance protocols vpls traceoptions]
[[edit dynamic-profiles routing-instances instance routing-options]
[edit dynamic-profiles routing-instances instance routing-options multicast
  traceoptions]
[edit dynamic-profiles routing-instances instance routing-options traceoptions]
[edit dynamic-profiles routing-instances instance service-groups]
[edit dynamic-profiles routing-instances instance switch-options]
[edit dynamic-profiles routing-options multicast traceoptions]
[edit jnx-example]
[edit fabric protocols]
[edit fabric protocols bgp group neighbor traceoptions]
[edit fabric protocols bgp group traceoptions]
[edit fabric protocols bgp traceoptions]
[edit fabric routing-instances]
[edit fabric routing-instances instance routing-options]
[edit fabric routing-instances instance routing-options traceoptions]
[edit fabric routing-options]
[edit fabric routing-options traceoptions]
[edit logical-systems bridge-domains]
[edit logical-systems bridge-domains domain multicast-snooping-options]
[edit logical-systems bridge-domains domain multicast-snooping-options
  traceoptions]
[edit logical-systems policy-options]
[edit logical-systems protocols]
[edit logical-systems protocols bgp group neighbor traceoptions]
[edit logical-systems protocols bgp group traceoptions]
[edit logical-systems protocols bgp traceoptions]
[edit logical-systems protocols dvmrp traceoptions]
[edit logical-systems protocols esis traceoptions]
[edit logical-systems protocols igmp traceoptions]
[edit logical-systems protocols igmp-host traceoptions]
[edit logical-systems protocols isis traceoptions]
[edit logical-systems protocols l2circuit traceoptions]
[edit logical-systems protocols l2iw traceoptions]
[edit logical-systems protocols ldp traceoptions]
[edit logical-systems protocols mld traceoptions]
[edit logical-systems protocols mld-host traceoptions]
[edit logical-systems protocols msdp group peer traceoptions]
[edit logical-systems protocols msdp group traceoptions]
[edit logical-systems protocols msdp peer traceoptions]
[edit logical-systems protocols msdp traceoptions]
[edit logical-systems protocols mvpn traceoptions]
[edit logical-systems protocols ospf traceoptions]
[edit logical-systems protocols pim traceoptions]
[edit logical-systems protocols rip traceoptions]
[edit logical-systems protocols ripng traceoptions]
[edit logical-systems protocols router-advertisement traceoptions]
[edit logical-systems protocols router-discovery traceoptions]
[edit logical-systems protocols rsvp lsp-set]
[edit logical-systems protocols rsvp traceoptions]
[edit logical-systems routing-instances]
[edit logical-systems routing-instances instance bridge-domains]
[edit logical-systems routing-instances instance bridge-domains domain
  multicast-snooping-options]
[edit logical-systems routing-instances instance bridge-domains domain
  multicast-snooping-options traceoptions]
```

```

[edit logical-systems routing-instances instance igmp-snooping-options]
[edit logical-systems routing-instances instance multicast-snooping-options]
[edit logical-systems routing-instances instance multicast-snooping-options
traceoptions]
[edit logical-systems routing-instances instance pbb-options]
[edit logical-systems routing-instances instance protocols]
[edit logical-systems routing-instances instance protocols bgp group neighbor
traceoptions]
[edit logical-systems routing-instances instance protocols bgp group
traceoptions]
[edit logical-systems routing-instances instance protocols bgp traceoptions]
[edit logical-systems routing-instances instance protocols esis traceoptions]
[edit logical-systems routing-instances instance protocols evpn traceoptions]
[edit logical-systems routing-instances instance protocols isis traceoptions]
[edit logical-systems routing-instances instance protocols l2vpn traceoptions]
[edit logical-systems routing-instances instance protocols ldp traceoptions]
[edit logical-systems routing-instances instance protocols msdp group peer
traceoptions]
[edit logical-systems routing-instances instance protocols msdp group
traceoptions]
[edit logical-systems routing-instances instance protocols msdp peer
traceoptions]
[edit logical-systems routing-instances instance protocols msdp traceoptions]
[edit logical-systems routing-instances instance protocols mvpn traceoptions]
[edit logical-systems routing-instances instance protocols ospf traceoptions]
[edit logical-systems routing-instances instance protocols pim traceoptions]
[edit logical-systems routing-instances instance protocols rip traceoptions]
[edit logical-systems routing-instances instance protocols ripng traceoptions]
[edit logical-systems routing-instances instance protocols router-discovery
traceoptions]
[edit logical-systems routing-instances instance protocols rsvp]
[edit logical-systems routing-instances instance protocols rsvp lsp-set
traceoptions]
[edit logical-systems routing-instances instance protocols vpls traceoptions]
[edit logical-systems routing-instances instance routing-options]
[edit logical-systems routing-instances instance routing-options multicast
traceoptions]
[edit logical-systems routing-instances instance routing-options validation
group session traceoptions]
[edit logical-systems routing-instances instance routing-options validation
traceoptions]
[edit logical-systems routing-instances instance routing-options traceoptions]
[edit logical-systems routing-options validation group session traceoptions]
sho[edit logical-systems routing-instances instance service-groups]
[edit logical-systems routing-instances instance switch-options]
[edit logical-systems routing-instances instance vlans]
[edit logical-systems routing-instances instance vlans vlan
multicast-snooping-options]
[edit logical-systems routing-instances instance vlans vlan
multicast-snooping-options traceoptions]
[edit logical-systems routing-options]
[edit logical-systems routing-options validation group session traceoptions]
[edit logical-systems routing-options validation traceoptions]
[edit logical-systems routing-options multicast traceoptions]
[edit logical-systems routing-options traceoptions]
[edit logical-systems switch-options]
[edit logical-systems vlans]
[edit logical-systems vlans vlan multicast-snooping-options]
[edit logical-systems vlans vlan multicast-snooping-options traceoptions]
[edit multicast-snooping-options]

```

```
[edit multicast-snooping-options traceoptions]
[edit policy-options]
[edit protocols]
[edit protocols amt traceoptions]
[edit protocols bgp group neighbor traceoptions]
[edit protocols bgp group traceoptions]
[edit protocols bgp traceoptions]
[edit protocols connections]
[edit protocols dot1x]
[edit protocols dvmrp traceoptions]
[edit protocols esis traceoptions]
[edit protocols igmp traceoptions]
[edit protocols igmp-host traceoptions]
[edit protocols igmp-snooping]
[edit protocols isis traceoptions]
[edit protocols l2circuit traceoptions]
[edit protocols l2iw traceoptions]
[edit protocols ldp traceoptions]
[edit protocols lldp]
[edit protocols lldp-med]
[edit protocols mld traceoptions]
[edit protocols mld-host traceoptions]
[edit protocols msdp group peer traceoptions]
[edit protocols msdp group traceoptions]
[edit protocols msdp peer traceoptions]
[edit protocols msdp traceoptions]
[edit protocols mstp]
[edit protocols mvrp]
[edit protocols oam]
[edit protocols ospf traceoptions]
[edit protocols pim traceoptions]
[edit protocols rip traceoptions]
[edit protocols ripng traceoptions]
[edit protocols router-advertisement traceoptions]
[edit protocols router-discovery traceoptions]
[edit protocols rsvp traceoptions]
[edit protocols sflow]
[edit protocols stp]
[edit protocols uplink-failure-detection]
[edit protocols vstp]
[edit routing-instances]
[edit routing-instances instance bridge-domains]
[edit routing-instances instance bridge-domains domain
multicast-snooping-options]
[edit routing-instances instance bridge-domains domain
multicast-snooping-options traceoptions]
[edit routing-instances instance multicast-snooping-options]
[edit routing-instances instance multicast-snooping-options traceoptions]
[edit routing-instances instance pbb-options]
[edit routing-instances instance protocols]
[edit routing-instances instance protocols bgp group neighbor traceoptions]
[edit routing-instances instance protocols bgp group traceoptions]
[edit routing-instances instance protocols bgp traceoptions]
[edit routing-instances instance protocols esis traceoptions]
[edit routing-instances instance protocols evpn traceoptions]
[edit routing-instances instance protocols isis traceoptions]
[edit routing-instances instance protocols l2vpn traceoptions]
[edit routing-instances instance protocols ldp traceoptions]
[edit routing-instances instance protocols mld-snooping traceoptions]
[edit routing-instances instance protocols mld-snooping vlan traceoptions]
```

```
[edit routing-instances instance protocols msdp group peer traceoptions]
[edit routing-instances instance protocols msdp group traceoptions]
[edit routing-instances instance protocols msdp peer traceoptions]
[edit routing-instances instance protocols msdp traceoptions]
[edit routing-instances instance protocols mvpn traceoptions]
[edit routing-instances instance protocols ospf traceoptions]
[edit routing-instances instance protocols pim traceoptions]
[edit routing-instances instance protocols rip traceoptions]
[edit routing-instances instance protocols ripng traceoptions]
[edit routing-instances instance protocols router-discovery traceoptions]
[edit routing-instances instance protocols vpls traceoptions]
[edit routing-instances instance routing-options]
[edit routing-instances instance routing-options validation group session
traceoptions]
[edit routing-instances instance routing-options validation traceoptions]
[edit routing-instances instance routing-options multicast traceoptions]
[edit routing-instances instance routing-options traceoptions]
[edit routing-instances instance service-groups]
[edit routing-instances instance switch-options]
[edit routing-instances instance vlans]
[edit routing-instances instance vlans vlan multicast-snooping-options]
[edit routing-instances instance vlans vlan multicast-snooping-options
traceoptions]
[edit routing-options]
[edit routing-options validation group session]
[edit routing-options multicast traceoptions]
[edit routing-options validation]
[edit routing-options traceoptions]
[edit switch-options]
[edit unified-edge]
[edit vlans]
[edit vlans vlan multicast-snooping-options]
[edit vlans vlan multicast-snooping-options traceoptions]
```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [routing-control on page 961](#)

routing-control

Can view general routing, routing protocol, and routing policy configuration information and can configure general routing at the **[edit routing-options]** hierarchy level, routing protocols at the **[edit protocols]** hierarchy level, and routing policy at the **[edit policy-options]** hierarchy level.

Commands No associated CLI commands.

Configuration Hierarchy Levels

```
[edit bridge-domains]
[edit bridge-domains domain multicast-snooping-options]
[edit bridge-domains domain multicast-snooping-options traceoptions]
[edit dynamic-profiles protocols igmp traceoptions]
[edit dynamic-profiles protocols mld traceoptions]
[edit dynamic-profiles protocols router-advertisement traceoptions]
[edit dynamic-profiles routing-instances]
[edit dynamic-profiles routing-instances instance bridge-domains]
[edit dynamic-profiles routing-instances instance bridge-domains domain
multicast-snooping-options]
[edit dynamic-profiles routing-instances instance bridge-domains domain
multicast-snooping-options traceoptions]
[edit dynamic-profiles routing-instances instance multicast-snooping-options
traceoptions]
[edit dynamic-profiles routing-instances instance pbb-options]
[edit dynamic-profiles routing-instances instance protocols]
[edit dynamic-profiles routing-instances instance protocols bgp group neighbor
traceoptions]
[edit dynamic-profiles routing-instances instance protocols bgp group
traceoptions]
[edit dynamic-profiles routing-instances instance protocols bgp traceoptions]
[edit dynamic-profiles routing-instances instance protocols esis traceoptions]
[edit dynamic-profiles routing-instances instance protocols isis traceoptions]
[edit dynamic-profiles routing-instances instance protocols l2vpn traceoptions]
[edit dynamic-profiles routing-instances instance protocols ldp traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp group peer
traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp group
traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp peer
traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp traceoptions]
[edit dynamic-profiles routing-instances instance protocols mvpn traceoptions]
[edit dynamic-profiles routing-instances instance protocols ospf traceoptions]
[edit dynamic-profiles routing-instances instance protocols pim traceoptions]
[edit dynamic-profiles routing-instances instance protocols rip traceoptions]
[edit dynamic-profiles routing-instances instance protocols ripng traceoptions]
[edit dynamic-profiles routing-instances instance protocols router-discovery
traceoptions]
[edit dynamic-profiles routing-instances instance protocols vpls traceoptions]
[edit dynamic-profiles routing-instances instance routing-options]
[edit dynamic-profiles routing-instances instance routing-options multicast
traceoptions]
[edit dynamic-profiles routing-instances instance routing-options traceoptions]
[edit dynamic-profiles routing-instances instance service-groups]
[edit dynamic-profiles routing-instances instance switch-options]
[edit dynamic-profiles routing-options multicast traceoptions]
[edit jnx-example]
[edit fabric protocols]
[edit fabric protocols bgp group neighbor traceoptions]
[edit fabric protocols bgp group traceoptions]
[edit fabric protocols bgp traceoptions]
[edit fabric routing-instances]
[edit fabric routing-instances instance routing-options]
[edit fabric routing-instances instance routing-options traceoptions]
[edit fabric routing-options]
[edit fabric routing-options traceoptions]
[edit logical-systems bridge-domains]
[edit logical-systems bridge-domains domain multicast-snooping-options]
```

```

[edit logical-systems bridge-domains domain multicast-snooping-options
traceoptions]
[edit logical-systems policy-options]
[edit logical-systems protocols]
[edit logical-systems protocols bgp group neighbor traceoptions]
[edit logical-systems protocols bgp group traceoptions]
[edit logical-systems protocols bgp traceoptions]
[edit logical-systems protocols dvmrp traceoptions]
[edit logical-systems protocols esis traceoptions]
[edit logical-systems protocols igmp traceoptions]
[edit logical-systems protocols igmp-host traceoptions]
[edit logical-systems protocols isis traceoptions]
[edit logical-systems protocols l2circuit traceoptions]
[edit logical-systems protocols l2iw traceoptions]
[edit logical-systems protocols ldp traceoptions]
[edit logical-systems protocols mld traceoptions]
[edit logical-systems protocols mld-host traceoptions]
[edit logical-systems protocols msdp group peer traceoptions]
[edit logical-systems protocols msdp group traceoptions]
[edit logical-systems protocols msdp peer traceoptions]
[edit logical-systems protocols msdp traceoptions]
[edit logical-systems protocols ospf traceoptions]
[edit logical-systems protocols pim traceoptions]
[edit logical-systems protocols rip traceoptions]
[edit logical-systems protocols ripng traceoptions]
[edit logical-systems protocols router-advertisement traceoptions]
[edit logical-systems protocols router-discovery traceoptions]
[edit logical-systems protocols rsvp traceoptions]
[edit logical-systems routing-instances]
[edit logical-systems routing-instances instance bridge-domains]
[edit logical-systems routing-instances instance bridge-domains domain
multicast-snooping-options]
[edit logical-systems routing-instances instance bridge-domains domain
multicast-snooping-options traceoptions]
[edit logical-systems routing-instances instance forwarding-options satellite]
[edit logical-systems routing-instances instance multicast-snooping-options]
[edit logical-systems routing-instances instance multicast-snooping-options
traceoptions]
[edit logical-systems routing-instances instance pbb-options]
[edit logical-systems routing-instances instance protocols]
[edit logical-systems routing-instances instance protocols bgp group neighbor
traceoptions]
[edit logical-systems routing-instances instance protocols bgp group
traceoptions]
[edit logical-systems routing-instances instance protocols bgp traceoptions]
[edit logical-systems routing-instances instance protocols esis traceoptions]
[edit logical-systems routing-instances instance protocols isis traceoptions]
[edit logical-systems routing-instances instance protocols l2vpn traceoptions]
[edit logical-systems routing-instances instance protocols ldp traceoptions]
[edit logical-systems routing-instances instance protocols msdp group peer
traceoptions]
[edit logical-systems routing-instances instance protocols msdp group
traceoptions]
[edit logical-systems routing-instances instance protocols msdp peer
traceoptions]
[edit logical-systems routing-instances instance protocols msdp traceoptions]
[edit logical-systems routing-instances instance protocols mvpn traceoptions]
[edit logical-systems routing-instances instance protocols ospf traceoptions]
[edit logical-systems routing-instances instance protocols pim traceoptions]
[edit logical-systems routing-instances instance protocols rip traceoptions]

```

```
[edit logical-systems routing-instances instance protocols ripng traceoptions]
[edit logical-systems routing-instances instance protocols router-discovery
traceoptions]
[edit logical-systems routing-instances instance protocols vpls traceoptions]
[edit logical-systems routing-instances instance routing-options]
[edit logical-systems routing-instances instance routing-options multicast
traceoptions]
[edit logical-systems routing-instances instance routing-options traceoptions]
[edit logical-systems routing-instances instance service-groups]
[edit logical-systems routing-instances instance switch-options]
[edit logical-systems routing-options]
[edit logical-systems routing-options multicast traceoptions]
[edit logical-systems routing-options traceoptions]
[edit logical-systems switch-options]
[edit multicast-snooping-options]
[edit multicast-snooping-options traceoptions]
[edit policy-options]
[edit protocols]
[edit protocols amt traceoptions]
[edit protocols bgp group neighbor traceoptions]
[edit protocols bgp group traceoptions]
[edit protocols bgp traceoptions]
[edit protocols connections][edit protocols dot1x]
[edit protocols dvmrp traceoptions]
[edit protocols esis traceoptions]
[edit protocols igmp traceoptions]
[edit protocols igmp-host traceoptions]
[edit protocols igmp-snooping]
[edit protocols isis traceoptions]
[edit protocols l2circuit traceoptions]
[edit protocols l2iw traceoptions]
[edit protocols ldp traceoptions]
[edit protocols lldp]
[edit protocols lldp-med]
[edit protocols mld traceoptions]
[edit protocols mld-host traceoptions]
[edit protocols msdp group peer traceoptions]
[edit protocols msdp group traceoptions]
[edit protocols msdp peer traceoptions]
[edit protocols msdp traceoptions]
[edit protocols mstp]
[edit protocols mvrp]
[edit protocols oam]
[edit protocols ospf traceoptions]
[edit protocols pim traceoptions]
[edit protocols rip traceoptions]
[edit protocols ripng traceoptions]
[edit protocols router-advertisement traceoptions]
[edit protocols router-discovery traceoptions]
[edit protocols rsvp traceoptions]
[edit protocols sflow]
[edit protocols stp]
[edit protocols uplink-failure-detection]
[edit protocols vstp]
[edit routing-instances]
[edit routing-instances instance bridge-domains]
[edit routing-instances instance bridge-domains domain
multicast-snooping-options]
[edit routing-instances instance bridge-domains domain
multicast-snooping-options traceoptions]
```



```
[edit routing-instances instance multicast-snooping-options]
[edit routing-instances instance multicast-snooping-options traceoptions]
[edit routing-instances instance pbb-options]
[edit routing-instances instance protocols]
[edit routing-instances instance protocols bgp group neighbor traceoptions]
[edit routing-instances instance protocols bgp group traceoptions]
[edit routing-instances instance protocols bgp traceoptions]
[edit routing-instances instance protocols esis traceoptions]
[edit routing-instances instance protocols isis traceoptions]
[edit routing-instances instance protocols l2vpn traceoptions]
[edit routing-instances instance protocols ldp traceoptions]
[edit routing-instances instance protocols msdp group peer traceoptions]
[edit routing-instances instance protocols msdp group traceoptions]
[edit routing-instances instance protocols msdp peer traceoptions]
[edit routing-instances instance protocols msdp traceoptions]
[edit routing-instances instance protocols mvpn traceoptions]
[edit routing-instances instance protocols ospf traceoptions]
[edit routing-instances instance protocols pim traceoptions]
[edit routing-instances instance protocols rip traceoptions]
[edit routing-instances instance protocols ripng traceoptions]
[edit routing-instances instance protocols router-discovery traceoptions]
[edit routing-instances instance protocols vpls traceoptions]
[edit routing-instances instance routing-options]
[edit routing-instances instance routing-options multicast traceoptions]
[edit routing-instances instance routing-options traceoptions]
[edit routing-instances instance service-groups]
[edit routing-instances instance switch-options]
[edit routing-options]
[edit routing-options multicast traceoptions]
[edit routing-options traceoptions]
[edit switch-options]
```

- Related Documentation**
- [Understanding Junos OS Access Privilege Levels on page 107](#)
 - [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
 - [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
 - [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
 - [routing on page 954](#)

secret

Can view passwords and other authentication keys in the configuration.

Commands No associated CLI commands.

```
clear unified-edge
clear unified-edge ggsn-pgw
clear unified-edge ggsn-pgw aaa
clear unified-edge ggsn-pgw aaa radius
clear unified-edge ggsn-pgw aaa radius statistics
```

```
<clear-mobile-gateway-aaa-radius-statistics>
clear unified-edge ggsn-pgw aaa statistics
<clear-mobile-gateway-aaa-statistics>
clear unified-edge ggsn-pgw address-assignment
clear unified-edge ggsn-pgw address-assignment pool
<clear-mobile-gateway-sm-ippool-pool-sessions>
clear unified-edge ggsn-pgw address-assignment statistics
<clear-mobile-gateway-sm-ippool-statistics>
clear unified-edge ggsn-pgw call-admission-control
clear unified-edge ggsn-pgw call-admission-control statistics
<clear-mobile-gateway-cac-statistics>
clear unified-edge ggsn-pgw charging
clear unified-edge ggsn-pgw charging cdr
<clear-mobile-gateway-charging-clear-cdr>
clear unified-edge ggsn-pgw charging cdr wfa
<clear-mobile-gateway-charging-clear-cdr-wfa>
clear unified-edge ggsn-pgw charging local-persistent-storage
clear unified-edge ggsn-pgw charging local-persistent-storage statistics
<clear-mobile-gateway-charging-clear-lps-stats>
clear unified-edge ggsn-pgw charging path
clear unified-edge ggsn-pgw charging path statistics
<clear-mobile-gateway-charging-clear-path-stats>
clear unified-edge ggsn-pgw charging transfer
clear unified-edge ggsn-pgw charging transfer statistics
<clear-mobile-gateway-charging-clear-xfer-stats>
clear unified-edge ggsn-pgw diameter
clear unified-edge ggsn-pgw diameter dcca-gy
clear unified-edge ggsn-pgw diameter dcca-gy statistics
<clear-mobile-gateway-aaa-diam-stats-gy>
clear unified-edge ggsn-pgw diameter network-element
clear unified-edge ggsn-pgw diameter network-element statistics
<clear-mobile-gateway-aaa-diam-ne-statistics>
clear unified-edge ggsn-pgw diameter pcc-gx
clear unified-edge ggsn-pgw diameter pcc-gx statistics
<clear-mobile-gateway-aaa-diam-stats-gx>
clear unified-edge ggsn-pgw diameter peer
clear unified-edge ggsn-pgw diameter peer statistics
<clear-mobile-gateway-aaa-diam-peer-statistics>
clear unified-edge ggsn-pgw gtp
clear unified-edge ggsn-pgw gtp peer
clear unified-edge ggsn-pgw gtp peer statistics
<clear-mobile-gateway-gtp-peer-statistics>
clear unified-edge ggsn-pgw gtp statistics
<clear-mobile-gateway-gtp-statistics>
clear unified-edge ggsn-pgw ip-reassembly
clear unified-edge ggsn-pgw ip-reassembly statistics
<clear-mobile-gateways-ip-reassembly-statistics>
clear unified-edge ggsn-pgw statistics
<clear-mobile-gateway-statistics>
clear unified-edge ggsn-pgw subscribers
<clear-mobile-gateway-subscribers>
clear unified-edge ggsn-pgw subscribers bearer
clear unified-edge ggsn-pgw subscribers charging
<clear-mobile-gateway-subscribers-charging>
clear unified-edge ggsn-pgw subscribers peer
<clear-mobile-gateway-subscribers-peer>
clear unified-edge sgw
clear unified-edge sgw call-admission-control
clear unified-edge sgw call-admission-control statistics
<clear-mobile-sgw-cac-statistics>
```

```
clear unified-edge sgw charging
clear unified-edge sgw charging cdr
<clear-mobile-gateway-sgw-charging-clear-cdr>
clear unified-edge sgw charging cdr wfa
<clear-mobile-gateway-sgw-charging-clear-cdr-wfa>
clear unified-edge sgw charging local-persistent-storage
clear unified-edge sgw charging local-persistent-storage statistics
<clear-mobile-gateway-sgw-charging-clear-lps-stats>
clear unified-edge sgw charging path
clear unified-edge sgw charging path statistics
<clear-mobile-gateway-sgw-charging-clear-path-stats>
clear unified-edge sgw charging transfer
clear unified-edge sgw charging transfer statistics
<clear-mobile-gateway-sgw-charging-clear-xfer-stats>
clear unified-edge sgw gtp
clear unified-edge sgw gtp peer
clear unified-edge sgw gtp peer statistics
<clear-mobile-sgw-gtp-peer-statistics>
clear unified-edge sgw gtp statistics
<clear-mobile-sgw-gtp-statistics>
clear unified-edge sgw idle-mode-buffering
clear unified-edge sgw idle-mode-buffering statistics
<clear-mobile-gw-sgw-idle-mode-buffering-statistics>
clear unified-edge sgw ip-reassembly
clear unified-edge sgw ip-reassembly statistics
<clear-mobile-gateways-sgw-ip-reassembly-statistics-sgw>
clear unified-edge sgw statistics
<clear-mobile-sgw-statistics>
clear unified-edge sgw subscribers
<clear-mobile-sgw-subscribers>
clear unified-edge sgw subscribers charging
<clear-mobile-sgw-subscribers-charging>
clear unified-edge sgw subscribers peer
<clear-mobile-sgw-subscribers-peer>
clear unified-edge tdf
clear unified-edge tdf aaa
clear unified-edge tdf aaa radius
clear unified-edge tdf aaa radius client
clear unified-edge tdf aaa radius client statistics
<clear-radius-client-statistics>
clear unified-edge tdf aaa radius network-element
clear unified-edge tdf aaa radius network-element statistics
<clear-radius-network-element-statistics>
clear unified-edge tdf aaa radius server
clear unified-edge tdf aaa radius server statistics
<clear-radius-server-statistics>
clear unified-edge tdf aaa radius snoop-segment
clear unified-edge tdf aaa radius snoop-segment statistics
<clear-radius-snoop-segment-statistics>
clear unified-edge tdf aaa statistics
<clear-tdf-gateway-aaa-statistics>
clear unified-edge tdf address-assignment
clear unified-edge tdf address-assignment pool
<clear-mobile-gateway-tdf-sm-ippool-pool-sessions>
clear unified-edge tdf address-assignment statistics
<clear-mobile-gateway-tdf-sm-ippool-statistics>
clear unified-edge tdf call-admission-control
clear unified-edge tdf call-admission-control statistics
<clear-tdf-cac-statistics>
clear unified-edge tdf diameter
```

```
clear unified-edge tdf diameter network-element
clear unified-edge tdf diameter network-element statistics
<clear-diameter-network-element-statistics>
clear unified-edge tdf diameter pcc-gx
clear unified-edge tdf diameter pcc-gx statistics
<clear-diameter-statistics-gx>
clear unified-edge tdf diameter peer
clear unified-edge tdf diameter peer statistics
<clear-diameter-peer-statistics>
clear unified-edge tdf statistics
<clear-tdf-statistics>
clear unified-edge tdf subscribers
<clear-mobile-tdf-subscribers>
clear unified-edge tdf subscribers peer
<clear-mobile-gateway-tdf-subscribers-peer>
request unified-edge
request unified-edge ggsn-pgw
request unified-edge ggsn-pgw call-trace
<monitor-mobile-gateways-call-trace-start>
request unified-edge ggsn-pgw call-trace clear
<get-mobile-gateways-call-trace-clear>
request unified-edge ggsn-pgw call-trace show
<get-mobile-gateways-call-trace-information>
request unified-edge ggsn-pgw call-trace start
<get-mobile-gateways-call-trace-start-information>
request unified-edge ggsn-pgw call-trace stop
<get-mobile-gateways-call-trace-stop-information>
request unified-edge sgw
request unified-edge sgw call-trace
request unified-edge sgw call-trace clear
<get-mobile-gateways-sgw-call-trace-clear>
request unified-edge sgw call-trace show
<get-mobile-gateways-sgw-call-trace-information>
request unified-edge sgw call-trace start
<get-mobile-gateways-sgw-call-trace-start-information>
request unified-edge sgw call-trace stop
<get-mobile-gateways-sgw-call-trace-stop-information>
request unified-edge tdf
request unified-edge tdf call-trace
request unified-edge tdf call-trace clear
<get-mobile-gateways-tdf-call-trace-clear>
request unified-edge tdf call-trace show
<get-mobile-gateways-tdf-call-trace-information>
request unified-edge tdf call-trace start
<get-mobile-gateways-tdf-call-trace-start-information>
request unified-edge tdf call-trace stop
<get-mobile-gateways-tdf-call-trace-stop-information>
```

Configuration Hierarchy Levels

```
[edit access profile client chap-secret]
[edit access profile client firewall-user password]
[edit access profile client l2tp shared-secret]
[edit access profile client pap-password]
[edit access profile radius-server secret]
[edit access radius clients accounting secret]
[edit access radius snoop-segments shared-secret]
[edit access radius-disconnect preauthentication-secret]
[edit access radius-disconnect secret]
[edit access radius-server preauthentication-secret]
```

```

[edit access radius-server secret]
[edit dynamic-profiles interfaces interface ppp-options chap
default-chap-secret]
[edit dynamic-profiles interfaces interface ppp-options pap default-password]
[edit dynamic-profiles interfaces interface ppp-options pap local-password]
[edit dynamic-profiles interfaces interface unit ppp-options chap
default-chap-secret]
[edit dynamic-profiles interfaces interface unit ppp-options pap
default-password]
[edit dynamic-profiles interfaces interface unit ppp-options pap local-password]
[edit interfaces interface ppp-options chap default-chap-secret]
[edit interfaces interface ppp-options pap default-password]
[edit interfaces interface ppp-options pap local-password]
[edit interfaces interface unit ppp-options chap default-chap-secret]
[edit interfaces interface unit ppp-options pap default-password]
[edit interfaces interface unit ppp-options pap local-password]
[edit logical-systems interfaces interface unit ppp-options chap]
[edit logical-systems interfaces interface unit ppp-options pap
default-password]
[edit logical-systems interfaces interface unit ppp-options pap local-password]
[edit logical-systems routing-instances instance system services
static-subscribers authentication password]
[edit logical-systems routing-instances instance system services
static-subscribers group authentication password]
[edit logical-systems system services static-subscribers authentication
password]
[edit logical-systems system services static-subscribers group authentication
password]
[edit routing-instances instance system services static-subscribers
authentication password]
[edit routing-instances instance system services static-subscribers group
authentication password]
[edit services ggsn apn radius accounting server secret]
[edit services ggsn apn radius authentication server secret]
[edit services ggsn radius server secret]
[edit system accounting destination radius server preauthentication-secret]
[edit system accounting destination radius server secret]
[edit system accounting destination radius server secret]
[edit system accounting destination tacplus server secret]
[edit system radius-server preauthentication-secret]
[edit system radius-server secret]
[edit system services outbound-ssh client secret]
[edit system services packet-triggered-subscribers partition-radius
accounting-shared-secret]
[edit system services static-subscribers authentication password]
[edit system services static-subscribers group authentication password]
[edit system tacplus-server secret]
[edit unified-edge]

```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

- [secret-control on page 970](#)

secret-control

Can view passwords and other authentication keys in the configuration and can modify them in configuration mode.

Commands No associated CLI commands.

Configuration Hierarchy Levels

```
[edit access profile client chap-secret]
[edit access profile client firewall-user password]
[edit access profile client l2tp shared-secret]
[edit access profile client pap-password]
[edit access profile radius-server secret]
[edit access radius-disconnect secret]
[edit dynamic-profiles interfaces interface ppp-options chap
default-chap-secret]
[edit dynamic-profiles interfaces interface ppp-options pap default-password]
[edit dynamic-profiles interfaces interface ppp-options pap local-password]
[edit dynamic-profiles interfaces interface unit ppp-options chap
default-chap-secret]
[edit dynamic-profiles interfaces interface unit ppp-options pap
default-password]
[edit dynamic-profiles interfaces interface unit ppp-options pap local-password]
[edit interfaces interface ppp-options chap default-chap-secret]
[edit interfaces interface ppp-options pap default-password]
[edit interfaces interface ppp-options pap local-password]
[edit interfaces interface unit ppp-options chap default-chap-secret]
[edit interfaces interface unit ppp-options pap default-password]
[edit interfaces interface unit ppp-options pap local-password]
[edit logical-systems interfaces interface unit ppp-options chap
default-password]
[edit logical-systems interfaces interface unit ppp-options pap local-password]
[edit logical-systems routing-instances instance system services
static-subscribers authentication password]
[edit logical-systems routing-instances instance system services
static-subscribers group authentication password]
[edit logical-systems system services static-subscribers authentication
password]
[edit logical-systems system services static-subscribers group authentication
password]
[edit routing-instances instance system services static-subscribers
authentication password]
[edit routing-instances instance system services static-subscribers group
authentication password]
[edit services ggsn apn radius accounting server secret]
[edit services ggsn apn radius authentication server secret]
[edit services ggsn radius server secret]
[edit system accounting destination radius server secret]
[edit system accounting destination tacplus server secret]
[edit system radius-server secret]
[edit system services outbound-ssh client secret]
[edit system services packet-triggered-subscribers partition-radius
accounting-shared-secret]
```

```
[edit system services static-subscribers authentication password]
[edit system services static-subscribers group authentication password]
[edit system tacplus-server secret]
```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [secret on page 965](#)

security

Can view security configuration.

Commands

```
clear security
clear security alarms
  <clear-security-alarm-information>
clear security idp
clear security idp application-ddos
clear security idp application-ddos cache
  <clear-idp-appddos-cache>

clear security idp application-identification
clear security idp application-identification application-system-cache
  <clear-idp-application-system-cache>

clear security idp application-statistics
  <clear-idp-applications-information>

clear security idp attack
clear security idp attack table
  <clear-idp-attack-table>

clear security idp counters
  <clear-idp-counters-by-counter-class>
clear security idp counters action
clear security idp counters application-ddos
clear security idp counters application-identification
clear security idp counters dfa
clear security idp counters flow
clear security idp counters http-decoder
clear security idp counters ips
clear security idp counters log
clear security idp counters memory
clear security idp counters packet
clear security idp counters packet-log
clear security idp counters pdf-decoder
clear security idp counters policy-manager
clear security idp counters ssl-inspection
```

```
clear security idp counters tcp-reassembler

clear security idp ssl-inspection
clear security idp ssl-inspection session-id-cache
    <clear-idp-ssl-session-cache-information>
clear security idp status
    <clear-idp-status-information>
clear security log
    <clear-security-log-information>
clear security pki
clear security pki ca-certificate
    <clear-pki-ca-certificate>
clear security pki certificate-request
    <clear-pki-certificate-request>
clear security pki crl
    <clear-pki-crl>
clear security pki key-pair
    <clear-pki-key-pair>
clear security pki local-certificate
    <clear-pki-local-certificate>
clear unified-edge
clear unified-edge ggsn-pgw
clear unified-edge ggsn-pgw aaa
clear unified-edge ggsn-pgw aaa radius
clear unified-edge ggsn-pgw aaa radius statistics
<clear-mobile-gateway-aaa-radius-statistics>
clear unified-edge ggsn-pgw aaa statistics
<clear-mobile-gateway-aaa-statistics>
clear unified-edge ggsn-pgw address-assignment
clear unified-edge ggsn-pgw address-assignment pool
<clear-mobile-gateway-sm-ippool-pool-sessions>
clear unified-edge ggsn-pgw address-assignment statistics
<clear-mobile-gateway-sm-ippool-statistics>
clear unified-edge ggsn-pgw call-admission-control
clear unified-edge ggsn-pgw call-admission-control statistics
<clear-mobile-gateway-cac-statistics>
clear unified-edge ggsn-pgw charging
clear unified-edge ggsn-pgw charging cdr
<clear-mobile-gateway-charging-clear-cdr>
clear unified-edge ggsn-pgw charging cdr wfa
<clear-mobile-gateway-charging-clear-cdr-wfa>
clear unified-edge ggsn-pgw charging local-persistent-storage
clear unified-edge ggsn-pgw charging local-persistent-storage statistics
<clear-mobile-gateway-charging-clear-lps-stats>
clear unified-edge ggsn-pgw charging path
clear unified-edge ggsn-pgw charging path statistics
<clear-mobile-gateway-charging-clear-path-stats>
clear unified-edge ggsn-pgw charging transfer
clear unified-edge ggsn-pgw charging transfer statistics
<clear-mobile-gateway-charging-clear-xfer-stats>
clear unified-edge ggsn-pgw diameter
clear unified-edge ggsn-pgw diameter dcca-gy
clear unified-edge ggsn-pgw diameter dcca-gy statistics
<clear-mobile-gateway-aaa-diam-stats-gy>
clear unified-edge ggsn-pgw diameter network-element
clear unified-edge ggsn-pgw diameter network-element statistics
<clear-mobile-gateway-aaa-diam-ne-statistics>
clear unified-edge ggsn-pgw diameter pcc-gx
clear unified-edge ggsn-pgw diameter pcc-gx statistics
```



```

<clear-mobile-gateway-aaa-diam-stats-gx>
clear unified-edge ggsn-pgw diameter peer
clear unified-edge ggsn-pgw diameter peer statistics
<clear-mobile-gateway-aaa-diam-peer-statistics>
clear unified-edge ggsn-pgw gtp
clear unified-edge ggsn-pgw gtp peer
clear unified-edge ggsn-pgw gtp peer statistics
<clear-mobile-gateway-gtp-peer-statistics>
clear unified-edge ggsn-pgw gtp statistics
<clear-mobile-gateway-gtp-statistics>
clear unified-edge ggsn-pgw ip-reassembly
clear unified-edge ggsn-pgw ip-reassembly statistics
<clear-mobile-gateways-ip-reassembly-statistics>
clear unified-edge ggsn-pgw statistics
<clear-mobile-gateway-statistics>
clear unified-edge ggsn-pgw subscribers
<clear-mobile-gateway-subscribers>
clear unified-edge ggsn-pgw subscribers bearer
clear unified-edge ggsn-pgw subscribers charging
<clear-mobile-gateway-subscribers-charging>
clear unified-edge ggsn-pgw subscribers peer
<clear-mobile-gateway-subscribers-peer>
clear unified-edge sgw
clear unified-edge sgw call-admission-control
clear unified-edge sgw call-admission-control statistics
<clear-mobile-sgw-cac-statistics>
clear unified-edge sgw charging
clear unified-edge sgw charging cdr
<clear-mobile-gateway-sgw-charging-clear-cdr>
clear unified-edge sgw charging cdr wfa
<clear-mobile-gateway-sgw-charging-clear-cdr-wfa>
clear unified-edge sgw charging local-persistent-storage
clear unified-edge sgw charging local-persistent-storage statistics
<clear-mobile-gateway-sgw-charging-clear-lps-stats>
clear unified-edge sgw charging path
clear unified-edge sgw charging path statistics
<clear-mobile-gateway-sgw-charging-clear-path-stats>
clear unified-edge sgw charging transfer
clear unified-edge sgw charging transfer statistics
<clear-mobile-gateway-sgw-charging-clear-xfer-stats>
clear unified-edge sgw gtp
clear unified-edge sgw gtp peer
clear unified-edge sgw gtp peer statistics
<clear-mobile-sgw-gtp-peer-statistics>
clear unified-edge sgw gtp statistics
<clear-mobile-sgw-gtp-statistics>
clear unified-edge sgw idle-mode-buffering
clear unified-edge sgw idle-mode-buffering statistics
<clear-mobile-gw-sgw-idle-mode-buffering-statistics>
clear unified-edge sgw ip-reassembly
clear unified-edge sgw ip-reassembly statistics
<clear-mobile-gateways-sgw-ip-reassembly-statistics-sgw>
clear unified-edge sgw statistics
<clear-mobile-sgw-statistics>
clear unified-edge sgw subscribers
<clear-mobile-sgw-subscribers>
clear unified-edge sgw subscribers charging
<clear-mobile-sgw-subscribers-charging>
clear unified-edge sgw subscribers peer
<clear-mobile-sgw-subscribers-peer>

```

```
clear unified-edge tdf
clear unified-edge tdf aaa
clear unified-edge tdf aaa radius
clear unified-edge tdf aaa radius client
clear unified-edge tdf aaa radius client statistics
<clear-radius-client-statistics>
clear unified-edge tdf aaa radius network-element
clear unified-edge tdf aaa radius network-element statistics
<clear-radius-network-element-statistics>
clear unified-edge tdf aaa radius server
clear unified-edge tdf aaa radius server statistics
<clear-radius-server-statistics>
clear unified-edge tdf aaa radius snoop-segment
clear unified-edge tdf aaa radius snoop-segment statistics
<clear-radius-snoop-segment-statistics>
clear unified-edge tdf aaa statistics
<clear-tdf-gateway-aaa-statistics>
clear unified-edge tdf address-assignment
clear unified-edge tdf address-assignment pool
<clear-mobile-gateway-tdf-sm-ippool-pool-sessions>
clear unified-edge tdf address-assignment statistics
<clear-mobile-gateway-tdf-sm-ippool-statistics>
clear unified-edge tdf call-admission-control
clear unified-edge tdf call-admission-control statistics
<clear-tdf-cac-statistics>
clear unified-edge tdf diameter
clear unified-edge tdf diameter network-element
clear unified-edge tdf diameter network-element statistics
<clear-diameter-network-element-statistics>
clear unified-edge tdf diameter pcc-gx
clear unified-edge tdf diameter pcc-gx statistics
<clear-diameter-statistics-gx>
clear unified-edge tdf diameter peer
clear unified-edge tdf diameter peer statistics
<clear-diameter-peer-statistics>
clear unified-edge tdf statistics
<clear-tdf-statistics>
clear unified-edge tdf subscribers
<clear-mobile-tdf-subscribers>
clear unified-edge tdf subscribers peer
<clear-mobile-gateway-tdf-subscribers-peer>
request security
request security certificate
request security certificate enroll
request security datapath-debug
request security datapath-debug action-profile
request security datapath-debug action-profile reload-all
request security idp
  <request-idp-policy-load>
request security idp security-package
request security idp security-package download
  <request-idp-security-package-download>

request security idp security-package download version
  <request-idp-security-package-download-version>

request security idp security-package install
  <request-idp-security-package-install>

request security idp ssl-inspection
```

```

request security idp ssl-inspection key
request security idp ssl-inspection key add
  <request-idp-ssl-key-add>

request security idp ssl-inspection key delete
  <request-idp-ssl-key-delete>
request security idp storage-cleanup
  <request-idp-storage-cleanup>
request security key-pair
request security pki
request security pki ca-certificate
request security pki ca-certificate verify
  <verify-pki-ca-certificate>
request security pki ca-certificate enroll
request security pki ca-certificate load
  <load-pki-ca-certificate>
request security pki crl
request security pki crl load
  <request security pki crl load>
request security pki generate-certificate-request
  <generate-pki-certificate-request>
request security pki generate-key-pair
  <generate-pki-key-pair>
request security pki local-certificate
request security pki local-certificate verify
  <verify-pki-local-certificate>
request security pki verify-integrity-status
<verify-integrity-status>
request security pki local-certificate enroll
request security pki local-certificate generate-self-signed
  <generate-pki-self-signed-local-certificate>
request security pki local-certificate load
  <load-pki-local-certificate>
request system set-encryption-key
request unified-edge
request unified-edge ggsn-pgw
request unified-edge ggsn-pgw call-trace
<monitor-mobile-gateways-call-trace-start>
request unified-edge ggsn-pgw call-trace clear
<get-mobile-gateways-call-trace-clear>
request unified-edge ggsn-pgw call-trace show
<get-mobile-gateways-call-trace-information>
request unified-edge ggsn-pgw call-trace start
<get-mobile-gateways-call-trace-start-information>
request unified-edge ggsn-pgw call-trace stop
<get-mobile-gateways-call-trace-stop-information>
request unified-edge sgw
request unified-edge sgw call-trace
request unified-edge sgw call-trace clear
<get-mobile-gateways-sgw-call-trace-clear>
request unified-edge sgw call-trace show
<get-mobile-gateways-sgw-call-trace-information>
request unified-edge sgw call-trace start
<get-mobile-gateways-sgw-call-trace-start-information>
request unified-edge sgw call-trace stop
<get-mobile-gateways-sgw-call-trace-stop-information>
request unified-edge tdf
request unified-edge tdf call-trace
request unified-edge tdf call-trace clear
<get-mobile-gateways-tdf-call-trace-clear>

```

```
request unified-edge tdf call-trace show
<get-mobile-gateways-tdf-call-trace-information>
request unified-edge tdf call-trace start
<get-mobile-gateways-tdf-call-trace-start-information>
request unified-edge tdf call-trace stop
<get-mobile-gateways-tdf-call-trace-stop-information>
show security
show security alarms
    <get-security-alarm-information>
show security idp
show security idp application-ddos
show security idp application-ddos application
    <get-idp-addos-application-information>

show security idp application-identification
show security idp application-identification application-system-cache
    <get-idp-application-system-cache>

show security idp application-statistics
    <get-idp-applications-information>

show security idp attack
show security idp attack description
    <get-idp-attack-description-information>
show security idp attack detail
    <get-idp-attack-detail-information>
show security idp attack table
    <get-idp-attack-table-information>

show security idp counters
    <get-idp-counter-information>
show security idp counters action
show security idp counters application-ddos
show security idp counters application-identification
show security idp counters dfa
show security idp counters flow
show security idp counters http-decoder
show security idp counters ips
show security idp counters log
show security idp counters memory
show security idp counters packet
show security idp counters packet-log
show security idp counters pdf-decoder
show security idp counters policy-manager
show security idp counters ssl-inspection
show security idp counters tcp-reassembler

show security idp logical-system
show security idp logical-system policy-association
show security idp memory
    <get-idp-memory-information>

show security idp policies
    <get-idp-subscriber-policy-list>

show security idp policy-templates-list
    <get-idp-policy-template-information>
    <get-idp-predefined-attack-groups>
    <get-idp-predefined-attack-group-filters>
    <get-idp-predefined-attacks>
```

```

    <get-idp-predefined-attack-filters>
    <get-idp-recent-security-package-information>
show security idp policy-commit-status
    <get-idp-policy-commit-status>

    <get-idp-recent-security-package-information>

show security idp security-package-version
    <get-idp-security-package-information>

show security idp ssl-inspection
show security idp ssl-inspection key
    <get-idp-ssl-key-information>

show security idp ssl-inspection session-id-cache
    <get-idp-ssl-session-cache-information>

show security idp status
    <get-idp-status-information>

show security idp status detail
    <get-idp-detail-status-information>
show security keychain
    <get-hakr-keychain-information>
show security log
    <get-security-log-information>

show security pki
show security pki ca-certificate
    <get-pki-ca-certificate>
show security pki certificate-request
    <get-pki-certificate-request>
show security pki crl
    <get-pki-crl>
show security pki local-certificate
    <get-pki-local-certificate>

```

Configuration Hierarchy Levels

```

[edit security]
[edit security alarms]
[edit security log]
[edit unified-edge]

```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [security-control on page 978](#)

security-control

Can view and configure security information at the **[edit security]** hierarchy level.

Commands

```
clear security
clear security alarms
  <clear-security-alarm-information>
clear security idp
clear security idp application-ddos
clear security idp application-ddos cache
  <clear-idp-appddos-cache>

clear security idp application-identification
clear security idp application-identification application-system-cache
  <clear-idp-application-system-cache>

clear security idp application-statistics
  <clear-idp-applications-information>

clear security idp attack
clear security idp attack table
  <clear-idp-attack-table>

clear security idp counters
  <clear-idp-counters-by-counter-class>

clear security idp ssl-inspection
clear security idp ssl-inspection session-id-cache
  <clear-idp-ssl-session-cache-information>
clear security idp status
  <clear-idp-status-information>
clear security log
  <clear-security-log-information>
clear security pki
clear security pki ca-certificate
  <clear-pki-ca-certificate>
clear security pki certificate-request
  <clear-pki-certificate-request>
clear security pki crl
  <clear-pki-crl>
clear security pki key-pair
  <clear-pki-key-pair>
clear security pki local-certificate
  <clear-pki-local-certificate>
request security
request security certificate
request security certificate enroll
request security datapath-debug
request security datapath-debug action-profile
request security datapath-debug action-profile reload-all
request security idp
  <request-idp-policy-load>
request security idp security-package
request security idp security-package download
  <request-idp-security-package-download>

request security idp security-package download version
```

```

<request-idp-security-package-download-version>

request security idp security-package install
  <request-idp-security-package-install>
request security idp security-package offline-download
<request-idp-security-package-offline-download>
request security idp ssl-inspection
request security idp ssl-inspection key
request security idp ssl-inspection key add
  <request-idp-ssl-key-add>

request security idp ssl-inspection key delete
  <request-idp-ssl-key-delete>
request security idp storage-cleanup
  <request-idp-storage-cleanup>
request security key-pair
request security pki
request security pki ca-certificate
request security pki ca-certificate verify
  <verify-pki-ca-certificate>
request security pki ca-certificate enroll
request security pki ca-certificate load
  <load-pki-ca-certificate>
request security pki crl
request security pki crl load
  <request security pki crl load>
request security pki generate-certificate-request
  <generate-pki-certificate-request>
request security pki generate-key-pair
  <generate-pki-key-pair>
request security pki local-certificate
request security pki local-certificate verify
  <verify-pki-local-certificate>
request security pki local-certificate enroll
request security pki local-certificate generate-self-signed
  <generate-pki-self-signed-local-certificate>
request security pki local-certificate load
  <load-pki-local-certificate>
request system set-encryption-key
show security
show security alarms
  <get-security-alarm-information>
show security idp
show security idp application-ddos
show security idp application-ddos application
  <get-idp-addos-application-information>

show security idp application-identification
show security idp application-identification application-system-cache
  <get-idp-application-system-cache>

show security idp application-statistics
  <get-idp-applications-information>

show security idp attack
show security idp attack description
  <get-idp-attack-description-information>
show security idp attack detail
  <get-idp-attack-detail-information>
show security idp attack table

```

```
<get-idp-attack-table-information>

show security idp counters
  <get-idp-counter-information>
show security idp counters action
show security idp counters application-ddos
show security idp counters application-identification
show security idp counters dfa
show security idp counters flow
show security idp counters http-decoder
show security idp counters ips
show security idp counters log
show security idp counters memory
show security idp counters packet
show security idp counters packet-log
show security idp counters pdf-decoder
show security idp counters policy-manager
show security idp counters ssl-inspection
show security idp counters tcp-reassembler

show security idp logical-system
show security idp logical-system policy-association
show security idp memory
  <get-idp-memory-information>

show security idp policies
  <get-idp-subscriber-policy-list>

show security idp policy-templates-list
  <get-idp-policy-template-information>
  <get-idp-predefined-attack-groups>
  <get-idp-predefined-attack-group-filters>
  <get-idp-predefined-attacks>
  <get-idp-predefined-attack-filters>
  <get-idp-recent-security-package-information>
show security idp policy-commit-status
  <get-idp-policy-commit-status>

<get-idp-recent-security-package-information>

show security idp security-package-version
  <get-idp-security-package-information>

show security idp ssl-inspection
show security idp ssl-inspection key
  <get-idp-ssl-key-information>

show security idp ssl-inspection session-id-cache
  <get-idp-ssl-session-cache-information>

show security idp status
  <get-idp-status-information>

show security idp status detail
  <get-idp-detail-status-information>
show security keychain
  <get-hakr-keychain-information>
show security log
  <get-security-log-information>
```



```
show security pki
show security pki ca-certificate
  <get-pki-ca-certificate>
show security pki certificate-request
  <get-pki-certificate-request>
show security pki crl
  <get-pki-crl>
show security pki local-certificate
  <get-pki-local-certificate>
```

Configuration Hierarchy Levels

```
[edit security]
[edit security alarms]
[edit security log]
```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [security on page 971](#)

shell

Can start a local shell on the router.

Commands

```
start shell
start shell user
```

Configuration Hierarchy Levels

No associated CLI configuration hierarchy levels and statements.

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

snmp

Can view Simple Network Management Protocol (SNMP) configuration.

Commands

```

clear unified-edge
clear unified-edge ggsn-pgw
clear unified-edge ggsn-pgw aaa
clear unified-edge ggsn-pgw aaa radius
clear unified-edge ggsn-pgw aaa radius statistics
<clear-mobile-gateway-aaa-radius-statistics>
clear unified-edge ggsn-pgw aaa statistics
<clear-mobile-gateway-aaa-statistics>
clear unified-edge ggsn-pgw address-assignment
clear unified-edge ggsn-pgw address-assignment pool
<clear-mobile-gateway-sm-ippool-pool-sessions>
clear unified-edge ggsn-pgw address-assignment statistics
<clear-mobile-gateway-sm-ippool-statistics>
clear unified-edge ggsn-pgw call-admission-control
clear unified-edge ggsn-pgw call-admission-control statistics
<clear-mobile-gateway-cac-statistics>
clear unified-edge ggsn-pgw charging
clear unified-edge ggsn-pgw charging cdr
<clear-mobile-gateway-charging-clear-cdr>
clear unified-edge ggsn-pgw charging cdr wfa
<clear-mobile-gateway-charging-clear-cdr-wfa>
clear unified-edge ggsn-pgw charging local-persistent-storage
clear unified-edge ggsn-pgw charging local-persistent-storage statistics
<clear-mobile-gateway-charging-clear-lps-stats>
clear unified-edge ggsn-pgw charging path
clear unified-edge ggsn-pgw charging path statistics
<clear-mobile-gateway-charging-clear-path-stats>
clear unified-edge ggsn-pgw charging transfer
clear unified-edge ggsn-pgw charging transfer statistics
<clear-mobile-gateway-charging-clear-xfer-stats>
clear unified-edge ggsn-pgw diameter
clear unified-edge ggsn-pgw diameter dcca-gy
clear unified-edge ggsn-pgw diameter dcca-gy statistics
<clear-mobile-gateway-aaa-diam-stats-gy>
clear unified-edge ggsn-pgw diameter network-element
clear unified-edge ggsn-pgw diameter network-element statistics
<clear-mobile-gateway-aaa-diam-ne-statistics>
clear unified-edge ggsn-pgw diameter pcc-gx
clear unified-edge ggsn-pgw diameter pcc-gx statistics
<clear-mobile-gateway-aaa-diam-stats-gx>
clear unified-edge ggsn-pgw diameter peer
clear unified-edge ggsn-pgw diameter peer statistics
<clear-mobile-gateway-aaa-diam-peer-statistics>
clear unified-edge ggsn-pgw gtp
clear unified-edge ggsn-pgw gtp peer
clear unified-edge ggsn-pgw gtp peer statistics
<clear-mobile-gateway-gtp-peer-statistics>
clear unified-edge ggsn-pgw gtp statistics
<clear-mobile-gateway-gtp-statistics>
clear unified-edge ggsn-pgw ip-reassembly
clear unified-edge ggsn-pgw ip-reassembly statistics
<clear-mobile-gateways-ip-reassembly-statistics>
clear unified-edge ggsn-pgw statistics
<clear-mobile-gateway-statistics>
clear unified-edge ggsn-pgw subscribers
<clear-mobile-gateway-subscribers>
clear unified-edge ggsn-pgw subscribers bearer
clear unified-edge ggsn-pgw subscribers charging
<clear-mobile-gateway-subscribers-charging>
clear unified-edge ggsn-pgw subscribers peer

```

```

<clear-mobile-gateway-subscribers-peer>
clear unified-edge sgw
clear unified-edge sgw call-admission-control
clear unified-edge sgw call-admission-control statistics
<clear-mobile-sgw-cac-statistics>
clear unified-edge sgw charging
clear unified-edge sgw charging cdr
<clear-mobile-gateway-sgw-charging-clear-cdr>
clear unified-edge sgw charging cdr wfa
<clear-mobile-gateway-sgw-charging-clear-cdr-wfa>
clear unified-edge sgw charging local-persistent-storage
clear unified-edge sgw charging local-persistent-storage statistics
<clear-mobile-gateway-sgw-charging-clear-lps-stats>
clear unified-edge sgw charging path
clear unified-edge sgw charging path statistics
<clear-mobile-gateway-sgw-charging-clear-path-stats>
clear unified-edge sgw charging transfer
clear unified-edge sgw charging transfer statistics
<clear-mobile-gateway-sgw-charging-clear-xfer-stats>
clear unified-edge sgw gtp
clear unified-edge sgw gtp peer
clear unified-edge sgw gtp peer statistics
<clear-mobile-sgw-gtp-peer-statistics>
clear unified-edge sgw gtp statistics
<clear-mobile-sgw-gtp-statistics>
clear unified-edge sgw idle-mode-buffering
clear unified-edge sgw idle-mode-buffering statistics
<clear-mobile-gw-sgw-idle-mode-buffering-statistics>
clear unified-edge sgw ip-reassembly
clear unified-edge sgw ip-reassembly statistics
<clear-mobile-gateways-sgw-ip-reassembly-statistics-sgw>
clear unified-edge sgw statistics
<clear-mobile-sgw-statistics>
clear unified-edge sgw subscribers
<clear-mobile-sgw-subscribers>
clear unified-edge sgw subscribers charging
<clear-mobile-sgw-subscribers-charging>
clear unified-edge sgw subscribers peer
<clear-mobile-sgw-subscribers-peer>
clear unified-edge tdf
clear unified-edge tdf aaa
clear unified-edge tdf aaa radius
clear unified-edge tdf aaa radius client
clear unified-edge tdf aaa radius client statistics
<clear-radius-client-statistics>
clear unified-edge tdf aaa radius network-element
clear unified-edge tdf aaa radius network-element statistics
<clear-radius-network-element-statistics>
clear unified-edge tdf aaa radius server
clear unified-edge tdf aaa radius server statistics
<clear-radius-server-statistics>
clear unified-edge tdf aaa radius snoop-segment
clear unified-edge tdf aaa radius snoop-segment statistics
<clear-radius-snoop-segment-statistics>
clear unified-edge tdf aaa statistics
<clear-tdf-gateway-aaa-statistics>
clear unified-edge tdf address-assignment
clear unified-edge tdf address-assignment pool
<clear-mobile-gateway-tdf-sm-ippool-pool-sessions>
clear unified-edge tdf address-assignment statistics

```

```

<clear-mobile-gateway-tdf-sm-ippool-statistics>
clear unified-edge tdf call-admission-control
clear unified-edge tdf call-admission-control statistics
<clear-tdf-cac-statistics>
clear unified-edge tdf diameter
clear unified-edge tdf diameter network-element
clear unified-edge tdf diameter network-element statistics
<clear-diameter-network-element-statistics>
clear unified-edge tdf diameter pcc-gx
clear unified-edge tdf diameter pcc-gx statistics
<clear-diameter-statistics-gx>
clear unified-edge tdf diameter peer
clear unified-edge tdf diameter peer statistics
<clear-diameter-peer-statistics>
clear unified-edge tdf statistics
<clear-tdf-statistics>
clear unified-edge tdf subscribers
<clear-mobile-tdf-subscribers>
clear unified-edge tdf subscribers peer
<clear-mobile-gateway-tdf-subscribers-peer>
request unified-edge
request unified-edge ggsn-pgw
request unified-edge ggsn-pgw call-trace
<monitor-mobile-gateways-call-trace-start>
request unified-edge ggsn-pgw call-trace clear
<get-mobile-gateways-call-trace-clear>
request unified-edge ggsn-pgw call-trace show
<get-mobile-gateways-call-trace-information>
request unified-edge ggsn-pgw call-trace start
<get-mobile-gateways-call-trace-start-information>
request unified-edge ggsn-pgw call-trace stop
<get-mobile-gateways-call-trace-stop-information>
request unified-edge sgw
request unified-edge sgw call-trace
request unified-edge sgw call-trace clear
<get-mobile-gateways-sgw-call-trace-clear>
request unified-edge sgw call-trace show
<get-mobile-gateways-sgw-call-trace-information>
request unified-edge sgw call-trace start
<get-mobile-gateways-sgw-call-trace-start-information>
request unified-edge sgw call-trace stop
<get-mobile-gateways-sgw-call-trace-stop-information>
request unified-edge tdf
request unified-edge tdf call-trace
request unified-edge tdf call-trace clear
<get-mobile-gateways-tdf-call-trace-clear>
request unified-edge tdf call-trace show
<get-mobile-gateways-tdf-call-trace-information>
request unified-edge tdf call-trace start
<get-mobile-gateways-tdf-call-trace-start-information>
request unified-edge tdf call-trace stop
<get-mobile-gateways-tdf-call-trace-stop-information>

```

Configuration
Hierarchy Levels

[edit snmp]
[edit unified-edge]

- Related Documentation**
- [Understanding Junos OS Access Privilege Levels on page 107](#)
 - [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
 - [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
 - [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

snmp-control

Can view SNMP configuration information and can modify SNMP configuration at the **[edit snmp]** hierarchy level.

Commands No associated CLI commands.

Configuration Hierarchy Levels

[edit snmp]

- Related Documentation**
- [Understanding Junos OS Access Privilege Levels on page 107](#)
 - [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
 - [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
 - [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
 - [snmp on page 981](#)

system

Can view system-level configuration information.

Commands

```
clear unified-edge
clear unified-edge ggsn-pgw
clear unified-edge ggsn-pgw aaa
clear unified-edge ggsn-pgw aaa radius
clear unified-edge ggsn-pgw aaa radius statistics
<clear-mobile-gateway-aaa-radius-statistics>
clear unified-edge ggsn-pgw aaa statistics
<clear-mobile-gateway-aaa-statistics>
clear unified-edge ggsn-pgw address-assignment
clear unified-edge ggsn-pgw address-assignment pool
<clear-mobile-gateway-sm-ippool-pool-sessions>
clear unified-edge ggsn-pgw address-assignment statistics
<clear-mobile-gateway-sm-ippool-statistics>
clear unified-edge ggsn-pgw call-admission-control
clear unified-edge ggsn-pgw call-admission-control statistics
```

```
<clear-mobile-gateway-cac-statistics>
clear unified-edge ggsn-pgw charging
clear unified-edge ggsn-pgw charging cdr
<clear-mobile-gateway-charging-clear-cdr>
clear unified-edge ggsn-pgw charging cdr wfa
<clear-mobile-gateway-charging-clear-cdr-wfa>
clear unified-edge ggsn-pgw charging local-persistent-storage
clear unified-edge ggsn-pgw charging local-persistent-storage statistics
<clear-mobile-gateway-charging-clear-lps-stats>
clear unified-edge ggsn-pgw charging path
clear unified-edge ggsn-pgw charging path statistics
<clear-mobile-gateway-charging-clear-path-stats>
clear unified-edge ggsn-pgw charging transfer
clear unified-edge ggsn-pgw charging transfer statistics
<clear-mobile-gateway-charging-clear-xfer-stats>
clear unified-edge ggsn-pgw diameter
clear unified-edge ggsn-pgw diameter dcca-gy
clear unified-edge ggsn-pgw diameter dcca-gy statistics
<clear-mobile-gateway-aaa-diam-stats-gy>
clear unified-edge ggsn-pgw diameter network-element
clear unified-edge ggsn-pgw diameter network-element statistics
<clear-mobile-gateway-aaa-diam-ne-statistics>
clear unified-edge ggsn-pgw diameter pcc-gx
clear unified-edge ggsn-pgw diameter pcc-gx statistics
<clear-mobile-gateway-aaa-diam-stats-gx>
clear unified-edge ggsn-pgw diameter peer
clear unified-edge ggsn-pgw diameter peer statistics
<clear-mobile-gateway-aaa-diam-peer-statistics>
clear unified-edge ggsn-pgw gtp
clear unified-edge ggsn-pgw gtp peer
clear unified-edge ggsn-pgw gtp peer statistics
<clear-mobile-gateway-gtp-peer-statistics>
clear unified-edge ggsn-pgw gtp statistics
<clear-mobile-gateway-gtp-statistics>
clear unified-edge ggsn-pgw ip-reassembly
clear unified-edge ggsn-pgw ip-reassembly statistics
<clear-mobile-gateways-ip-reassembly-statistics>
clear unified-edge ggsn-pgw statistics
<clear-mobile-gateway-statistics>
clear unified-edge ggsn-pgw subscribers
<clear-mobile-gateway-subscribers>
clear unified-edge ggsn-pgw subscribers bearer
clear unified-edge ggsn-pgw subscribers charging
<clear-mobile-gateway-subscribers-charging>
clear unified-edge ggsn-pgw subscribers peer
<clear-mobile-gateway-subscribers-peer>
clear unified-edge sgw
clear unified-edge sgw call-admission-control
clear unified-edge sgw call-admission-control statistics
<clear-mobile-sgw-cac-statistics>
clear unified-edge sgw charging
clear unified-edge sgw charging cdr
<clear-mobile-gateway-sgw-charging-clear-cdr>
clear unified-edge sgw charging cdr wfa
<clear-mobile-gateway-sgw-charging-clear-cdr-wfa>
clear unified-edge sgw charging local-persistent-storage
clear unified-edge sgw charging local-persistent-storage statistics
<clear-mobile-gateway-sgw-charging-clear-lps-stats>
clear unified-edge sgw charging path
clear unified-edge sgw charging path statistics
```

```

<clear-mobile-gateway-sgw-charging-clear-path-stats>
clear unified-edge sgw charging transfer
clear unified-edge sgw charging transfer statistics
<clear-mobile-gateway-sgw-charging-clear-xfer-stats>
clear unified-edge sgw gtp
clear unified-edge sgw gtp peer
clear unified-edge sgw gtp peer statistics
<clear-mobile-sgw-gtp-peer-statistics>
clear unified-edge sgw gtp statistics
<clear-mobile-sgw-gtp-statistics>
clear unified-edge sgw idle-mode-buffering
clear unified-edge sgw idle-mode-buffering statistics
<clear-mobile-gw-sgw-idle-mode-buffering-statistics>
clear unified-edge sgw ip-reassembly
clear unified-edge sgw ip-reassembly statistics
<clear-mobile-gateways-sgw-ip-reassembly-statistics-sgw>
clear unified-edge sgw statistics
<clear-mobile-sgw-statistics>
clear unified-edge sgw subscribers
<clear-mobile-sgw-subscribers>
clear unified-edge sgw subscribers charging
<clear-mobile-sgw-subscribers-charging>
clear unified-edge sgw subscribers peer
<clear-mobile-sgw-subscribers-peer>
clear unified-edge tdf
clear unified-edge tdf aaa
clear unified-edge tdf aaa radius
clear unified-edge tdf aaa radius client
clear unified-edge tdf aaa radius client statistics
<clear-radius-client-statistics>
clear unified-edge tdf aaa radius network-element
clear unified-edge tdf aaa radius network-element statistics
<clear-radius-network-element-statistics>
clear unified-edge tdf aaa radius server
clear unified-edge tdf aaa radius server statistics
<clear-radius-server-statistics>
clear unified-edge tdf aaa radius snoop-segment
clear unified-edge tdf aaa radius snoop-segment statistics
<clear-radius-snoop-segment-statistics>
clear unified-edge tdf aaa statistics
<clear-tdf-gateway-aaa-statistics>
clear unified-edge tdf address-assignment
clear unified-edge tdf address-assignment pool
<clear-mobile-gateway-tdf-sm-ippool-pool-sessions>
clear unified-edge tdf address-assignment statistics
<clear-mobile-gateway-tdf-sm-ippool-statistics>
clear unified-edge tdf call-admission-control
clear unified-edge tdf call-admission-control statistics
<clear-tdf-cac-statistics>
clear unified-edge tdf diameter
clear unified-edge tdf diameter network-element
clear unified-edge tdf diameter network-element statistics
<clear-diameter-network-element-statistics>
clear unified-edge tdf diameter pcc-gx
clear unified-edge tdf diameter pcc-gx statistics
<clear-diameter-statistics-gx>
clear unified-edge tdf diameter peer
clear unified-edge tdf diameter peer statistics
<clear-diameter-peer-statistics>
clear unified-edge tdf statistics

```

```
<clear-tdf-statistics>
clear unified-edge tdf subscribers
<clear-mobile-tdf-subscribers>
clear unified-edge tdf subscribers peer
<clear-mobile-gateway-tdf-subscribers-peer>
request chassis synchronization
request chassis synchronization force
request chassis synchronization force automatic-switching
request chassis synchronization force mark-failed
request chassis synchronization force unmark-failed
request chassis synchronization switch
request path-computation-client retry-delegation
<request-path-computation-retry-delegation>
request unified-edge
request unified-edge ggsn-pgw
request unified-edge ggsn-pgw call-trace
<monitor-mobile-gateways-call-trace-start>
request unified-edge ggsn-pgw call-trace clear
<get-mobile-gateways-call-trace-clear>
request unified-edge ggsn-pgw call-trace show
<get-mobile-gateways-call-trace-information>
request unified-edge ggsn-pgw call-trace start
<get-mobile-gateways-call-trace-start-information>
request unified-edge ggsn-pgw call-trace stop
<get-mobile-gateways-call-trace-stop-information>
request unified-edge sgw
request unified-edge sgw call-trace
request unified-edge sgw call-trace clear
<get-mobile-gateways-sgw-call-trace-clear>
request unified-edge sgw call-trace show
<get-mobile-gateways-sgw-call-trace-information>
request unified-edge sgw call-trace start
<get-mobile-gateways-sgw-call-trace-start-information>
request unified-edge sgw call-trace stop
<get-mobile-gateways-sgw-call-trace-stop-information>
request unified-edge tdf
request unified-edge tdf call-trace
request unified-edge tdf call-trace clear
<get-mobile-gateways-tdf-call-trace-clear>
request unified-edge tdf call-trace show
<get-mobile-gateways-tdf-call-trace-information>
request unified-edge tdf call-trace start
<get-mobile-gateways-tdf-call-trace-start-information>
request unified-edge tdf call-trace stop
<get-mobile-gateways-tdf-call-trace-stop-information>
request virtual-chassis
request virtual-chassis device-reachability
<get-virtual-chassis-diagnostic-information>
request virtual-chassis member-id
request virtual-chassis member-id delete
delete-virtual-chassis-member-id
request virtual-chassis member-id set
<set-virtual-chassis-member-id>
request virtual-chassis mode
request virtual-chassis mode mixed
<request-virtual-chassis-mode-mixed>
request virtual-chassis reactivate
<request-virtual-chassis-reactivate>
request virtual-chassis recycle
<request-virtual-chassis-recycle>
```



```

request virtual-chassis renumber
<request-virtual-chassis-renumber>
request virtual-chassis routing-engine
request virtual-chassis routing-engine master
request virtual-chassis routing-engine master switch
<switch-vc-routing-engine-protocol-master>
request virtual-chassis vc-port
request virtual-chassis vc-port delete
request virtual-chassis vc-port delete fpc-slot
<request-virtual-chassis-vc-port-delete-fpc-slot>
request virtual-chassis vc-port delete pic-slot
<request-virtual-chassis-vc-port-delete-pic-slot>
request virtual-chassis vc-port set
request virtual-chassis vc-port set fpc-slot
<request-virtual-chassis-vc-port-set-fpc-slot>
request virtual-chassis vc-port set interface
<request-virtual-chassis-vc-port-set-interface>
request virtual-chassis vc-port set pic-slot
<request-virtual-chassis-vc-port-set-pic-slot>
<set-virtual-chassis-mode>

```

Configuration Hierarchy Levels

```

[edit applications]
[edit chassis network-slices]
[edit chassis system-domains]
[edit dynamic-profiles routing-instances instance forwarding-options helpers
tftp]
[edit dynamic-profiles routing-instances instance routing-options fate-sharing]
[edit ethernet-switching-options]
[edit fabric virtual-chassis]
[edit forwarding-options helpers bootp]
[edit forwarding-options helpers domain]
[edit forwarding-options helpers port]
[edit forwarding-options helpers tftp]
[edit logical-systems]
[edit logical-systems protocols uplink-failure-detection]
[edit logical-systems routing-instances instance forwarding-options helpers
bootp]
[edit logical-systems routing-instances instance forwarding-options helpers
domain]
[edit logical-systems routing-instances instance forwarding-options helpers
port]
[edit logical-systems routing-instances instance forwarding-options helpers
tftp]
[edit logical-systems routing-instances instance routing-options fate-sharing]
[edit logical-systems routing-options fate-sharing]
[edit logical-systems system]
[edit logical-systems system syslog]
[edit poe]
[edit protocols uplink-failure-detection]
[edit routing-instances instance forwarding-options helpers bootp]
[edit routing-instances instance forwarding-options helpers domain]
[edit routing-instances instance forwarding-options helpers port]
[edit routing-instances instance forwarding-options helpers tftp]
[edit routing-instances instance routing-options fate-sharing]
[edit routing-options fate-sharing]
[edit services]
[edit services ggsn charging charging-log traceoptions]
[edit system]

```

```
[edit system archival]
[edit system backup-router]
[edit system boot loader authentication]
[edit system compress-configuration-files]
[edit system default-address-selection]
[edit system domain-name]
[edit system domain-search]
[edit system encrypt-configuration-files]
[edit system host-name]
[edit system inet6-backup-router]
[edit system internet-options gre-path-mtu-discovery]
[edit system internet-options ipip-path-mtu-discovery]
[edit system internet-options ipv6-path-mtu-discovery]
[edit system internet-options ipv6-path-mtu-discovery-timeout]
[edit system internet-options ipv6-reject-zero-hop-limit]
[edit system internet-options no-tcp-reset]
[edit system internet-options no-tcp-rfc1323]
[edit system internet-options no-tcp-rfc1323-paws]
[edit system internet-options path-mtu-discovery]
[edit system internet-options source-port upper-limit]
[edit system internet-options source-quench]
[edit system internet-options tcp-drop-synfin-set]
[edit system internet-options tcp-mss]
[edit system license]
[edit system max-configuration-rolls-backs]
[edit system max-configurations-on-flash]
[edit system mirror-flash-on-disk]
[edit system no-debugger-on-alt-break]
[edit system no-redirects-ipv6]
[edit system name-server]
[edit no-hidden-commands system]
[edit system no-multicast-echo]
[edit system no-neighbor-learn]
[edit system no-redirects]
[edit system ports auxiliary log-out-on-disconnect]
[edit system ports auxiliary port-type]
[edit system ports auxiliary silent-with-modem]
[edit system ports console log-out-on-disconnect]
[edit system ports console port-type]
[edit system ports console silent-with-modem]
[edit system processes]
[edit system proxy]
[edit system saved-core-context]
[edit system saved-core-files]
[edit system services]
[edit system services web-management]
[edit system static-host-mapping]
[edit system syslog]
[edit system time-zone]
[edit unified-edge]
[edit virtual-chassis]
[edit virtual-chassis locality-bias]
[edit vlans]
```

- Related Documentation**
- [Understanding Junos OS Access Privilege Levels on page 107](#)
 - [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)

- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [system-control on page 991](#)

system-control

Can view system-level configuration information and configure it at the **[edit system]** hierarchy level.

Configuration Hierarchy Levels

```
[edit applications]
[edit chassis system-domains]
[edit dynamic-profiles routing-instances instance forwarding-options helpers
  tftp]
[edit dynamic-profiles routing-instances instance routing-options fate-sharing]
[edit ethernet-switching-options]
[edit forwarding-options helpers bootp]
[edit forwarding-options helpers domain]
[edit forwarding-options helpers port]
[edit forwarding-options helpers tftp]
[edit logical-systems]
[edit logical-systems routing-instances instance forwarding-options helpers
  bootp]
[edit logical-systems routing-instances instance forwarding-options helpers
  domain]
[edit logical-systems routing-instances instance forwarding-options helpers
  port]
[edit logical-systems routing-instances instance forwarding-options helpers
  tftp]
[edit logical-systems routing-instances instance routing-options fate-sharing]
[edit logical-systems routing-options fate-sharing]
[edit logical-systems system]
[edit poe]
[edit routing-instances instance forwarding-options helpers bootp]
[edit routing-instances instance forwarding-options helpers domain]
[edit routing-instances instance forwarding-options helpers port]
[edit routing-instances instance forwarding-options helpers tftp]
[edit routing-instances instance routing-options fate-sharing]
[edit routing-options fate-sharing]
[edit services]
[edit services ggsn charging charging-log traceoptions]
[edit system]
[edit system archival]
[edit system backup-router]
[edit system compress-configuration-files]
[edit system default-address-selection]
[edit system dgasps-in]
[edit system dgasps-usb]
[edit system domain-name]
[edit system domain-search]
[edit system encrypt-configuration-files]
[edit system host-name]
[edit system inet6-backup-router]
[edit system internet-options gre-path-mtu-discovery]
```

```
[edit system internet-options ipip-path-mtu-discovery]
[edit system internet-options ipv6-path-mtu-discovery]
[edit system internet-options ipv6-path-mtu-discovery-timeout]
[edit system internet-options ipv6-reject-zero-hop-limit]
[edit system internet-options no-tcp-reset]
[edit system internet-options no-tcp-rfc1323]
[edit system internet-options no-tcp-rfc1323-paws]
[edit system internet-options path-mtu-discovery]
[edit system internet-options source-port upper-limit]
[edit system internet-options source-quench]
[edit system internet-options tcp-drop-synfin-set]
[edit system internet-options tcp-mss]
[edit system license]
[edit system max-configuration-rollback]
[edit system max-configurations-on-flash]
[edit system mirror-flash-on-disk]
[edit system name-server]
[edit system no-multicast-echo]
[edit system no-neighbor-learn]
[edit system no-redirects]
[edit system ports auxiliary log-out-on-disconnect]
[edit system ports auxiliary port-type]
[edit system ports console log-out-on-disconnect]
[edit system ports console port-type]
[edit system processes]
[edit system saved-core-context]
[edit system saved-core-files]
[edit system services]
[edit system services web-management]
[edit system static-host-mapping]
[edit system syslog]
[edit system time-zone]
[edit virtual-chassis]
[edit vlans]
```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [system on page 985](#)

trace

Can view trace file settings and configure trace file properties.

Commands

```
clear log
  <clear-log>
clear log satellite
  <clear-log-satellite>
```

```
clear unified-edge
clear unified-edge ggsn-pgw
clear unified-edge ggsn-pgw aaa
clear unified-edge ggsn-pgw aaa radius
clear unified-edge ggsn-pgw aaa radius statistics
<clear-mobile-gateway-aaa-radius-statistics>
clear unified-edge ggsn-pgw aaa statistics
<clear-mobile-gateway-aaa-statistics>
clear unified-edge ggsn-pgw address-assignment
clear unified-edge ggsn-pgw address-assignment pool
<clear-mobile-gateway-sm-ippool-pool-sessions>
clear unified-edge ggsn-pgw address-assignment statistics
<clear-mobile-gateway-sm-ippool-statistics>
clear unified-edge ggsn-pgw call-admission-control
clear unified-edge ggsn-pgw call-admission-control statistics
<clear-mobile-gateway-cac-statistics>
clear unified-edge ggsn-pgw charging
clear unified-edge ggsn-pgw charging cdr
<clear-mobile-gateway-charging-clear-cdr>
clear unified-edge ggsn-pgw charging cdr wfa
<clear-mobile-gateway-charging-clear-cdr-wfa>
clear unified-edge ggsn-pgw charging local-persistent-storage
clear unified-edge ggsn-pgw charging local-persistent-storage statistics
<clear-mobile-gateway-charging-clear-lps-stats>
clear unified-edge ggsn-pgw charging path
clear unified-edge ggsn-pgw charging path statistics
<clear-mobile-gateway-charging-clear-path-stats>
clear unified-edge ggsn-pgw charging transfer
clear unified-edge ggsn-pgw charging transfer statistics
<clear-mobile-gateway-charging-clear-xfer-stats>
clear unified-edge ggsn-pgw diameter
clear unified-edge ggsn-pgw diameter dcca-gy
clear unified-edge ggsn-pgw diameter dcca-gy statistics
<clear-mobile-gateway-aaa-diam-stats-gy>
clear unified-edge ggsn-pgw diameter network-element
clear unified-edge ggsn-pgw diameter network-element statistics
<clear-mobile-gateway-aaa-diam-ne-statistics>
clear unified-edge ggsn-pgw diameter pcc-gx
clear unified-edge ggsn-pgw diameter pcc-gx statistics
<clear-mobile-gateway-aaa-diam-stats-gx>
clear unified-edge ggsn-pgw diameter peer
clear unified-edge ggsn-pgw diameter peer statistics
<clear-mobile-gateway-aaa-diam-peer-statistics>
clear unified-edge ggsn-pgw gtp
clear unified-edge ggsn-pgw gtp peer
clear unified-edge ggsn-pgw gtp peer statistics
<clear-mobile-gateway-gtp-peer-statistics>
clear unified-edge ggsn-pgw gtp statistics
<clear-mobile-gateway-gtp-statistics>
clear unified-edge ggsn-pgw ip-reassembly
clear unified-edge ggsn-pgw ip-reassembly statistics
<clear-mobile-gateways-ip-reassembly-statistics>
clear unified-edge ggsn-pgw statistics
<clear-mobile-gateway-statistics>
clear unified-edge ggsn-pgw subscribers
<clear-mobile-gateway-subscribers>
clear unified-edge ggsn-pgw subscribers bearer
clear unified-edge ggsn-pgw subscribers charging
<clear-mobile-gateway-subscribers-charging>
clear unified-edge ggsn-pgw subscribers peer
```

```
<clear-mobile-gateway-subscribers-peer>
clear unified-edge sgw
clear unified-edge sgw call-admission-control
clear unified-edge sgw call-admission-control statistics
<clear-mobile-sgw-cac-statistics>
clear unified-edge sgw charging
clear unified-edge sgw charging cdr
<clear-mobile-gateway-sgw-charging-clear-cdr>
clear unified-edge sgw charging cdr wfa
<clear-mobile-gateway-sgw-charging-clear-cdr-wfa>
clear unified-edge sgw charging local-persistent-storage
clear unified-edge sgw charging local-persistent-storage statistics
<clear-mobile-gateway-sgw-charging-clear-lps-stats>
clear unified-edge sgw charging path
clear unified-edge sgw charging path statistics
<clear-mobile-gateway-sgw-charging-clear-path-stats>
clear unified-edge sgw charging transfer
clear unified-edge sgw charging transfer statistics
<clear-mobile-gateway-sgw-charging-clear-xfer-stats>
clear unified-edge sgw gtp
clear unified-edge sgw gtp peer
clear unified-edge sgw gtp peer statistics
<clear-mobile-sgw-gtp-peer-statistics>
clear unified-edge sgw gtp statistics
<clear-mobile-sgw-gtp-statistics>
clear unified-edge sgw idle-mode-buffering
clear unified-edge sgw idle-mode-buffering statistics
<clear-mobile-gw-sgw-idle-mode-buffering-statistics>
clear unified-edge sgw ip-reassembly
clear unified-edge sgw ip-reassembly statistics
<clear-mobile-gateways-sgw-ip-reassembly-statistics-sgw>
clear unified-edge sgw statistics
<clear-mobile-sgw-statistics>
clear unified-edge sgw subscribers
<clear-mobile-sgw-subscribers>
clear unified-edge sgw subscribers charging
<clear-mobile-sgw-subscribers-charging>
clear unified-edge sgw subscribers peer
<clear-mobile-sgw-subscribers-peer>
clear unified-edge tdf
clear unified-edge tdf aaa
clear unified-edge tdf aaa radius
clear unified-edge tdf aaa radius client
clear unified-edge tdf aaa radius client statistics
<clear-radius-client-statistics>
clear unified-edge tdf aaa radius network-element
clear unified-edge tdf aaa radius network-element statistics
<clear-radius-network-element-statistics>
clear unified-edge tdf aaa radius server
clear unified-edge tdf aaa radius server statistics
<clear-radius-server-statistics>
clear unified-edge tdf aaa radius snoop-segment
clear unified-edge tdf aaa radius snoop-segment statistics
<clear-radius-snoop-segment-statistics>
clear unified-edge tdf aaa statistics
<clear-tdf-gateway-aaa-statistics>
clear unified-edge tdf address-assignment
clear unified-edge tdf address-assignment pool
<clear-mobile-gateway-tdf-sm-ippool-pool-sessions>
clear unified-edge tdf address-assignment statistics
```

```

<clear-mobile-gateway-tdf-sm-ippool-statistics>
clear unified-edge tdf call-admission-control
clear unified-edge tdf call-admission-control statistics
<clear-tdf-cac-statistics>
clear unified-edge tdf diameter
clear unified-edge tdf diameter network-element
clear unified-edge tdf diameter network-element statistics
<clear-diameter-network-element-statistics>
clear unified-edge tdf diameter pcc-gx
clear unified-edge tdf diameter pcc-gx statistics
<clear-diameter-statistics-gx>
clear unified-edge tdf diameter peer
clear unified-edge tdf diameter peer statistics
<clear-diameter-peer-statistics>
clear unified-edge tdf statistics
<clear-tdf-statistics>
clear unified-edge tdf subscribers
<clear-mobile-tdf-subscribers>
clear unified-edge tdf subscribers peer
<clear-mobile-gateway-tdf-subscribers-peer>
monitor
request-monitor-ethernet-delay-measurement
  <request-monitor-ethernet-loss-measurement>
monitor interface
monitor interface traffic
monitor label-switched-path
monitor list
monitor start
monitor static-lsp
monitor stop
request unified-edge
request unified-edge ggsn-pgw
request unified-edge ggsn-pgw call-trace
<monitor-mobile-gateways-call-trace-start>
request unified-edge ggsn-pgw call-trace clear
<get-mobile-gateways-call-trace-clear>
request unified-edge ggsn-pgw call-trace show
<get-mobile-gateways-call-trace-information>
request unified-edge ggsn-pgw call-trace start
<get-mobile-gateways-call-trace-start-information>
request unified-edge ggsn-pgw call-trace stop
<get-mobile-gateways-call-trace-stop-information>
request unified-edge sgw
request unified-edge sgw call-trace
request unified-edge sgw call-trace clear
<get-mobile-gateways-sgw-call-trace-clear>
request unified-edge sgw call-trace show
<get-mobile-gateways-sgw-call-trace-information>
request unified-edge sgw call-trace start
<get-mobile-gateways-sgw-call-trace-start-information>
request unified-edge sgw call-trace stop
<get-mobile-gateways-sgw-call-trace-stop-information>
request unified-edge tdf
request unified-edge tdf call-trace
request unified-edge tdf call-trace clear
<get-mobile-gateways-tdf-call-trace-clear>
request unified-edge tdf call-trace show
<get-mobile-gateways-tdf-call-trace-information>
request unified-edge tdf call-trace start
<get-mobile-gateways-tdf-call-trace-start-information>

```

```
request unified-edge tdf call-trace stop
<get-mobile-gateways-tdf-call-trace-stop-information>
show log
<get-log>
show log user
<get-syslog-events>
```

Configuration Hierarchy Levels

```
[edit unified-edge]
[edit vlans domain multicast-snooping-options traceoptions]
[edit vlans domain protocols igmp-snooping]
[edit vlans domain forwarding-options dhcp-relay traceoptions]
[edit vlans domain protocols igmp-snooping traceoptions]
[edit vlans domain forwarding-options dhcp-relay interface-traceoptions]
[edit vlans domain multicast-snooping-options traceoptions]
[edit vlans domain protocols igmp-snooping traceoptions]
[edit class-of-service application-traffic-control traceoptions]
[edit demux traceoptions]
[edit dynamic-profiles protocols igmp traceoptions]
[edit dynamic-profiles protocols mld traceoptions]
[edit dynamic-profiles class-of-service application-traffic-control
traceoptions]
[edit dynamic-profiles protocols oam ethernet link-fault-management
traceoptions]
[edit dynamic-profiles protocols oam ethernet lmi]
[edit dynamic-profiles protocols router-advertisement traceoptions]
[edit dynamic-profiles protocols oam gre-tunnel traceoptions]
[edit dynamic-profiles routing-instances instance vlans domain
forwarding-options dhcp-relay traceoptions]
[edit dynamic-profiles routing-instances instance vlans domain
multicast-snooping-options traceoptions]
[edit dynamic-profiles routing-instances instance vlans domain protocols
igmp-snooping traceoptions]
[edit dynamic-profiles routing-instances instance forwarding-options dhcp-relay
traceoptions]
[edit dynamic-profiles routing-instances instance multicast-snooping-options
traceoptions]
[edit dynamic-profiles routing-instances instance protocols bgp group neighbor
traceoptions]
[edit dynamic-profiles routing-instances instance protocols bgp group
traceoptions]
[edit dynamic-profiles routing-instances instance protocols bgp traceoptions]
[edit dynamic-profiles routing-instances instance protocols esis traceoptions]
[edit dynamic-profiles routing-instances instance protocols igmp-snooping
traceoptions]
[edit dynamic-profiles routing-instances instance protocols isis traceoptions]
[edit dynamic-profiles routing-instances instance protocols l2vpn traceoptions]
[edit dynamic-profiles routing-instances instance protocols ldp traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp group peer
traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp group
traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp peer
traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp traceoptions]
[edit dynamic-profiles routing-instances instance protocols mvpn traceoptions]
[edit dynamic-profiles routing-instances instance protocols ospf traceoptions]
[edit dynamic-profiles routing-instances instance protocols pim traceoptions]
[edit dynamic-profiles routing-instances instance protocols rip traceoptions]
[edit dynamic-profiles routing-instances instance protocols ripng traceoptions]
```



```

[edit dynamic-profiles routing-instances instance protocols router-discovery
traceoptions]
[edit dynamic-profiles routing-instances instance protocols vpls traceoptions]
[edit dynamic-profiles routing-instances instance routing-options multicast
traceoptions]
[edit dynamic-profiles routing-instances instance routing-options traceoptions]
[edit dynamic-profiles routing-instances instance services mobile-ip
traceoptions]
[edit dynamic-profiles routing-instances instance system services
dhcp-local-server traceoptions]
[edit dynamic-profiles routing-options multicast traceoptions]
[edit fabric protocols bgp group neighbor traceoptions]
[edit fabric protocols bgp group traceoptions]
[edit fabric protocols bgp traceoptions]
[edit fabric routing-instances instance routing-options traceoptions]
[edit fabric routing-options traceoptions]
[edit jnx-example traceoptions]
[edit logical-systems vlans domain forwarding-options dhcp-relay traceoptions]
[edit logical-systems vlans domain forwarding-options dhcp-relay
interface-traceoptions]
[edit logical-systems vlans domain multicast-snooping-options traceoptions]
[edit logical-systems vlans domain protocols igmp-snooping traceoptions]
[edit logical-systems forwarding-options dhcp-relay traceoptions]
[edit logical-systems protocols ancp traceoptions]
[edit logical-systems protocols bgp group neighbor traceoptions]
[edit logical-systems protocols bgp group traceoptions]
[edit logical-systems protocols bgp traceoptions]
[edit logical-systems protocols dot1x traceoptions]
[edit logical-systems protocols dvmrp traceoptions]
[edit logical-systems protocols esis traceoptions]
[edit logical-systems protocols igmp traceoptions]
[edit logical-systems protocols igmp-host traceoptions]
[edit logical-systems protocols ilmi traceoptions]
[edit logical-systems protocols isis traceoptions]
[edit logical-systems protocols l2circuit traceoptions]
[edit logical-systems protocols l2iw traceoptions]
[edit logical-systems protocols lacp traceoptions]
[edit logical-systems protocols layer2-control traceoptions]
[edit logical-systems protocols ldp traceoptions]
[edit logical-systems protocols mld traceoptions]
[edit dynamic-profiles protocols oam ethernet fnp traceoptions]
[edit logical-systems protocols mld-host traceoptions]
[edit logical-systems protocols mpls label-switched-path oam traceoptions]
[edit logical-systems protocols mpls label-switched-path primary oam
traceoptions]
[edit logical-systems protocols mpls label-switched-path secondary oam
traceoptions]
[edit logical-systems protocols mpls oam traceoptions]
[edit logical-systems protocols msdp group peer traceoptions]
[edit logical-systems protocols msdp group traceoptions]
[edit logical-systems protocols msdp peer traceoptions]
[edit logical-systems protocols msdp traceoptions]
[edit logical-systems protocols neighbor-discovery secure traceoptions]
[edit logical-systems protocols oam ethernet fnp traceoptions]
[edit logical-systems protocols oam ethernet link-fault-management traceoptions]
[edit logical-systems protocols oam ethernet lmi traceoptions]
[edit logical-systems protocols ospf traceoptions]
[edit logical-systems protocols pim traceoptions]
[edit logical-systems protocols ppp monitor-session]
[edit logical-systems protocols ppp traceoptions]

```

```
[edit logical-systems protocols ppp-service traceoptions]
[edit logical-systems protocols pppoe traceoptions]
[edit logical-systems protocols rip traceoptions]
[edit logical-systems protocols ripng traceoptions]
[edit logical-systems protocols router-advertisement traceoptions]
[edit logical-systems protocols router-discovery traceoptions]
[edit logical-systems protocols rsvp lsp-set traceoptions]
[edit logical-systems protocols rsvp traceoptions]
[edit logical-systems routing-instances instance vlans domain
multicast-snooping-options traceoptions]
[edit logical-systems routing-instances instance vlans domain protocols
igmp-snooping traceoptions]
[edit logical-systems routing-instances instance forwarding-options dhcp-relay
traceoptions]
[edit logical-systems routing-instances instance multicast-snooping-options
traceoptions]
[edit logical-systems routing-instances instance protocols bgp group neighbor
traceoptions]
[edit logical-systems routing-instances instance protocols bgp group
traceoptions]
[edit logical-systems routing-instances instance protocols bgp traceoptions]
[edit logical-systems routing-instances instance protocols esis traceoptions]
[edit logical-systems routing-instances instance protocols igmp-snooping
traceoptions]
[edit logical-systems routing-instances instance protocols isis traceoptions]
[edit logical-systems routing-instances instance protocols l2vpn traceoptions]
[edit logical-systems routing-instances instance protocols ldp traceoptions]
[edit logical-systems routing-instances instance protocols msdp group peer
traceoptions]
[edit logical-systems routing-instances instance protocols msdp group
traceoptions]
[edit logical-systems routing-instances instance protocols msdp peer
traceoptions]
[edit logical-systems routing-instances instance protocols msdp traceoptions]
[edit logical-systems routing-instances instance protocols mvpn traceoptions]
[edit logical-systems routing-instances instance protocols ospf traceoptions]
[edit logical-systems routing-instances instance protocols pim traceoptions]
[edit logical-systems routing-instances instance protocols rip traceoptions]
[edit logical-systems routing-instances instance protocols ripng traceoptions]
[edit logical-systems routing-instances instance protocols router-discovery
traceoptions]
[edit logical-systems routing-instances instance protocols vpls traceoptions]
[edit logical-systems routing-instances instance routing-options multicast
traceoptions]
[edit logical-systems routing-instances instance routing-options traceoptions]
[edit logical-systems routing-instances instance services mobile-ip
traceoptions]
[edit logical-systems routing-instances instance system services
dhcp-local-server traceoptions]
[edit logical-systems routing-instances instance system services
dhcp-local-server interface-traceoptions]
[edit logical-systems routing-options multicast traceoptions]
[edit logical-systems routing-options traceoptions]
[edit logical-systems services mobile-ip traceoptions]
[edit logical-systems system services dhcp-local-server traceoptions]
[edit logical-systems system services dhcp-local-server interface-traceoptions]
[edit multicast-snooping-options traceoptions]
[edit protocols ancp traceoptions]
[edit protocols bgp group neighbor traceoptions]
[edit protocols bgp group traceoptions]
```

```
[edit protocols bgp traceoptions]
[edit protocols dot1x traceoptions]
[edit protocols dvmp traceoptions]
[edit protocols esis traceoptions]
[edit protocols igmp traceoptions]
[edit protocols igmp-host traceoptions]
[edit protocols ilmi traceoptions]
[edit protocols isis traceoptions]
[edit protocols l2circuit traceoptions]
[edit protocols l2iw traceoptions]
[edit protocols lacp traceoptions]
[edit protocols layer2-control traceoptions]
[edit protocols ldp traceoptions]
[edit protocols mld traceoptions]
[edit protocols mld-host traceoptions]
[edit protocols mpls label-switched-path oam traceoptions]
[edit protocols mpls label-switched-path primary oam traceoptions]
[edit protocols mpls label-switched-path secondary oam traceoptions]
[edit protocols mpls oam traceoptions]
[edit protocols msdp group peer traceoptions]
[edit protocols msdp group traceoptions]
[edit protocols msdp peer traceoptions]
[edit protocols msdp traceoptions]
[edit protocols neighbor-discovery secure traceoptions]
[edit protocols protocols oam ethernet fnp]
[edit protocols oam ethernet connectivity-fault-management traceoptions]
[edit protocols oam ethernet link-fault-management traceoptions]
[edit protocols oam ethernet lmi traceoptions]
[edit protocols ospf traceoptions]
[edit protocols pim traceoptions]
[edit protocols ppp monitor-session]
[edit protocols ppp traceoptions]
[edit protocols ppp-service traceoptions]
[edit protocols pppoe traceoptions]
[edit protocols rip traceoptions]
[edit protocols ripng traceoptions]
[edit protocols router-advertisement traceoptions]
[edit protocols router-discovery traceoptions]
[edit protocols rsvp lsp-set traceoptions]
[edit protocols rsvp traceoptions]
[edit routing-instances instance vlans domain multicast-snooping-options
traceoptions]
[edit routing-instances instance vlans domain protocols igmp-snooping
traceoptions]
[edit routing-instances instance multicast-snooping-options traceoptions]
[edit routing-instances instance protocols bgp group neighbor traceoptions]
[edit routing-instances instance protocols bgp group traceoptions]
[edit routing-instances instance protocols bgp traceoptions]
[edit routing-instances instance protocols esis traceoptions]
[edit routing-instances instance protocols igmp-snooping traceoptions]
[edit routing-instances instance protocols isis traceoptions]
[edit routing-instances instance protocols l2vpn traceoptions]
[edit routing-instances instance protocols ldp traceoptions]
[edit routing-instances instance protocols msdp group peer traceoptions]
[edit routing-instances instance protocols msdp group traceoptions]
[edit routing-instances instance protocols msdp peer traceoptions]
[edit routing-instances instance protocols msdp traceoptions]
[edit routing-instances instance protocols mvpn traceoptions]
[edit routing-instances instance protocols ospf traceoptions]
[edit routing-instances instance protocols pim traceoptions]
```

```
[edit routing-instances instance protocols rip traceoptions]
[edit routing-instances instance protocols ripng traceoptions]
[edit routing-instances instance protocols router-discovery traceoptions]
[edit routing-instances instance protocols vpls traceoptions]
[edit routing-instances instance routing-options multicast traceoptions]
[edit routing-instances instance routing-options traceoptions]
[edit routing-options multicast traceoptions]
[edit routing-options traceoptions]
[edit security idp traceoptions]
[edit security pki traceoptions]
[edit services adaptive-services-pics traceoptions]
[edit services captive-portal-content-delivery]
[edit services l2tp traceoptions]
[edit services server-load-balance traceoptions]
[edit services logging traceoptions]
[edit services mobile-ip traceoptions]
[edit services ssl traceoptions]
[edit system accounting traceoptions]
[edit system auto-configuration traceoptions]
[edit system ddos-protection traceoptions]
[edit system license traceoptions]
[edit system processes app-engine-virtual-machine-management-service
traceoptions]
[edit system processes datapath-trace-service traceoptions]
[edit system processes dhcp-service interface-traceoptions]
[edit system processes dhcp-service traceoptions]
[edit system processes diameter-service traceoptions]
[edit system processes general-authentication-service traceoptions]
[edit system processes mac-validation traceoptions]
[edit system processes mag-service traceoptions]
[edit system processes process-monitor traceoptions]
[edit system processes resource-cleanup traceoptions]
[edit system processes sdk-service traceoptions]
[edit system processes static-subscribers traceoptions]
[edit system services database-replication traceoptions]
[edit system services dhcp traceoptions]
[edit system services local-policy-decision-function traceoptions]
[edit system services outbound-ssh traceoptions]
[edit system services service-deployment traceoptions]
[edit system services subscriber-management traceoptions]
[edit system services subscriber-management-helper traceoptions]
[edit system services web-management traceoptions]
```

**Related
Documentation**

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [trace-control on page 1001](#)

trace-control

Can modify trace file settings and configure trace file properties.

Configuration Hierarchy Levels

```
[edit vlans domain forwarding-options dhcp-relay interface-traceoptions]
[edit vlans domain forwarding-options dhcp-relay traceoptions]
[edit vlans domain multicast-snooping-options traceoptions]
[edit vlans domain protocols igmp-snooping traceoptions]
[edit demux traceoptions]
[edit dynamic-profiles protocols igmp traceoptions]
[edit dynamic-profiles protocols mld traceoptions]
[edit dynamic-profiles protocols oam ethernet link-fault-management
traceoptions]
[dynamic-profiles protocols oam ethernet lmi]
[edit dynamic-profiles protocols router-advertisement traceoptions]
[edit dynamic-profiles protocols oam gre-tunnel traceoptions]
[edit dynamic-profiles routing-instances instance vlans domain
forwarding-options dhcp-relay traceoptions]
[edit dynamic-profiles routing-instances instance vlans domain
multicast-snooping-options traceoptions]
[edit dynamic-profiles routing-instances instance vlans domain protocols
igmp-snooping traceoptions]
[edit dynamic-profiles routing-instances instance forwarding-options dhcp-relay
traceoptions]
[edit dynamic-profiles routing-instances instance multicast-snooping-options
traceoptions]
[edit dynamic-profiles routing-instances instance protocols bgp group neighbor
traceoptions]
[edit dynamic-profiles routing-instances instance protocols bgp group
traceoptions]
[edit dynamic-profiles routing-instances instance protocols bgp traceoptions]
[edit dynamic-profiles routing-instances instance protocols esis traceoptions]
[edit dynamic-profiles routing-instances instance protocols igmp-snooping
traceoptions]
[edit dynamic-profiles routing-instances instance protocols isis traceoptions]
[edit dynamic-profiles routing-instances instance protocols l2vpn traceoptions]
[edit dynamic-profiles routing-instances instance protocols ldp traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp group peer
traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp group
traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp peer
traceoptions]
[edit dynamic-profiles routing-instances instance protocols msdp traceoptions]
[edit dynamic-profiles routing-instances instance protocols mvpn traceoptions]
[edit dynamic-profiles routing-instances instance protocols ospf traceoptions]
[edit dynamic-profiles routing-instances instance protocols pim traceoptions]
[edit dynamic-profiles routing-instances instance protocols rip traceoptions]
[edit dynamic-profiles routing-instances instance protocols ripng traceoptions]
[edit dynamic-profiles routing-instances instance protocols router-discovery
traceoptions]
[edit dynamic-profiles routing-instances instance protocols vpls traceoptions]
[edit dynamic-profiles routing-instances instance routing-options multicast
traceoptions]
[edit dynamic-profiles routing-instances instance routing-options traceoptions]
[edit dynamic-profiles routing-instances instance services mobile-ip
traceoptions]
```

```
[edit dynamic-profiles routing-instances instance system services
dhcp-local-server traceoptions]
[edit dynamic-profiles routing-options multicast traceoptions]
[edit fabric protocols bgp group neighbor traceoptions]
[edit fabric protocols bgp group traceoptions]
[edit fabric protocols bgp traceoptions]
[edit fabric routing-instances instance routing-options traceoptions]
[edit fabric routing-options traceoptions]
[edit forwarding-options dhcp-relay interface-traceoptions]
[edit forwarding-options dhcp-relay traceoptions]
[edit jnx-example traceoptions]
[edit logical-systems vlans domain forwarding-options dhcp-relay
interface-traceoptions]
[edit logical-systems vlans domain forwarding-options dhcp-relay traceoptions]
[edit logical-systems vlans domain multicast-snooping-options traceoptions]
[edit logical-systems vlans domain protocols igmp-snooping traceoptions]
[edit logical-systems forwarding-options dhcp-relay traceoptions]
[edit logical-systems protocols ancp traceoptions]
[edit logical-systems protocols bgp group neighbor traceoptions]
[edit logical-systems protocols bgp group traceoptions]
[edit logical-systems protocols bgp traceoptions]
[edit logical-systems protocols dot1x traceoptions]
[edit logical-systems protocols dvmp traceoptions]
[edit logical-systems protocols esis traceoptions]
[edit logical-systems protocols igmp traceoptions]
[edit logical-systems protocols igmp-host traceoptions]
[edit logical-systems protocols ilmi traceoptions]
[edit logical-systems protocols isis traceoptions]
[edit logical-systems protocols l2circuit traceoptions]
[edit logical-systems protocols l2iw traceoptions]
[edit logical-systems protocols lacp traceoptions]
[edit logical-systems protocols layer2-control traceoptions]
[edit logical-systems protocols ldp traceoptions]
[edit logical-systems protocols mld traceoptions]
[edit logical-systems protocols mld-host traceoptions]
[edit logical-systems protocols mpls label-switched-path oam traceoptions]
[edit logical-systems protocols mpls label-switched-path primary oam
traceoptions]
[edit logical-systems protocols mpls label-switched-path secondary oam
traceoptions]
[edit logical-systems protocols mpls oam traceoptions]
[edit logical-systems protocols msdp group peer traceoptions]
[edit logical-systems protocols msdp group traceoptions]
[edit logical-systems protocols msdp peer traceoptions]
[edit logical-systems protocols msdp traceoptions]
[edit logical-systems protocols neighbor-discovery secure traceoptions]
[edit logical-systems protocols oam ethernet link-fault-management traceoptions]
[edit logical-systems protocols oam ethernet lmi traceoptions]
[edit logical-systems protocols ospf traceoptions]
[edit logical-systems protocols pim traceoptions]
[edit logical-systems protocols ppp monitor-session]
[edit logical-systems protocols ppp traceoptions]
[edit logical-systems protocols ppp-service traceoptions]
[edit logical-systems protocols pppoe traceoptions]
[edit logical-systems protocols rip traceoptions]
[edit logical-systems protocols ripng traceoptions]
[edit logical-systems protocols router-advertisement traceoptions]
[edit logical-systems protocols router-discovery traceoptions]
[edit logical-systems protocols rsvp traceoptions]
[edit logical-systems routing-instances instance vlans domain forwarding-options
```

```

dhcp-relay interface-traceoptions]
[edit logical-systems routing-instances instance vlans domain forwarding-options
dhcp-relay traceoptions]
[edit logical-systems routing-instances instance vlans domain
multicast-snooping-options traceoptions]
[edit logical-systems routing-instances instance vlans domain protocols
igmp-snooping traceoptions]
[edit logical-systems routing-instances instance forwarding-options dhcp-relay
traceoptions]
[edit logical-systems routing-instances instance multicast-snooping-options
traceoptions]
[edit logical-systems routing-instances instance protocols bgp group neighbor
traceoptions]
[edit logical-systems routing-instances instance protocols bgp group
traceoptions]
[edit logical-systems routing-instances instance protocols bgp traceoptions]
[edit logical-systems routing-instances instance protocols esis traceoptions]
[edit logical-systems routing-instances instance protocols igmp-snooping
traceoptions]
[edit logical-systems routing-instances instance protocols isis traceoptions]
[edit logical-systems routing-instances instance protocols l2vpn traceoptions]
[edit logical-systems routing-instances instance protocols ldp traceoptions]
[edit logical-systems routing-instances instance protocols msdp group peer
traceoptions]
[edit logical-systems routing-instances instance protocols msdp group
traceoptions]
[edit logical-systems routing-instances instance protocols msdp peer
traceoptions]
[edit logical-systems routing-instances instance protocols msdp traceoptions]
[edit logical-systems routing-instances instance protocols mvpn traceoptions]
[edit logical-systems routing-instances instance protocols ospf traceoptions]
[edit logical-systems routing-instances instance protocols pim traceoptions]
[edit logical-systems routing-instances instance protocols ripng traceoptions]
[edit logical-systems routing-instances instance protocols ripng traceoptions]
[edit logical-systems routing-instances instance protocols router-discovery
traceoptions]
[edit logical-systems routing-instances instance protocols vpls traceoptions]
[edit logical-systems routing-instances instance routing-options multicast
traceoptions]
[edit logical-systems routing-instances instance routing-options traceoptions]
[edit logical-systems routing-instances instance services mobile-ip
traceoptions]
[edit logical-systems routing-instances instance system services
dhcp-local-server interface-traceoptions]
[edit logical-systems routing-instances instance system services
dhcp-local-server traceoptions]
[edit logical-systems routing-options multicast traceoptions]
[edit logical-systems routing-options traceoptions]
[edit logical-systems services mobile-ip traceoptions]
[edit logical-systems system services dhcp-local-server interface-traceoptions]
[edit logical-systems system services dhcp-local-server traceoptions]
[edit multicast-snooping-options traceoptions]
[edit protocols ancp traceoptions]
[edit protocols bgp group neighbor traceoptions]
[edit protocols bgp group traceoptions]
[edit protocols bgp traceoptions]
[edit protocols dot1x traceoptions]
[edit protocols dvmrp traceoptions]
[edit protocols esis traceoptions]
[edit protocols igmp traceoptions]

```

```
[edit protocols igmp-host traceoptions]
[edit protocols ilmi traceoptions]
[edit protocols isis traceoptions]
[edit protocols l2circuit traceoptions]
[edit protocols l2iw traceoptions]
[edit protocols lacp traceoptions]
[edit protocols layer2-control traceoptions]
[edit protocols ldp traceoptions]
[edit protocols mld traceoptions]
[edit protocols mld-host traceoptions]
[edit protocols mpls label-switched-path oam traceoptions]
[edit protocols mpls label-switched-path primary oam traceoptions]
[edit protocols mpls label-switched-path secondary oam traceoptions]
[edit protocols mpls oam traceoptions]
[edit protocols msdp group peer traceoptions]
[edit protocols msdp group traceoptions]
[edit protocols msdp peer traceoptions]
[edit protocols msdp traceoptions]
[edit protocols neighbor-discovery secure traceoptions]
[edit protocols oam ethernet connectivity-fault-management traceoptions]
[edit protocols oam ethernet link-fault-management traceoptions]
[edit protocols oam ethernet lmi traceoptions]
[edit protocols ospf traceoptions]
[edit protocols pim traceoptions]
[edit protocols ppp monitor-session]
[edit protocols ppp traceoptions]
[edit protocols ppp-service traceoptions]
[edit protocols pppoe traceoptions]
[edit protocols rip traceoptions]
[edit protocols ripng traceoptions]
[edit protocols router-advertisement traceoptions]
[edit protocols router-discovery traceoptions]
[edit protocols rsvp traceoptions]
[edit routing-instances instance vlans domain forwarding-options dhcp-relay
interface-traceoptions]
[edit routing-instances instance vlans domain forwarding-options dhcp-relay
traceoptions]
[edit routing-instances instance vlans domain multicast-snooping-options
traceoptions]
[edit routing-instances instance vlans domain protocols igmp-snooping
traceoptions]
[edit routing-instances instance forwarding-options dhcp-relay traceoptions]
[edit routing-instances instance forwarding-options dhcp-relay
interface-traceoptions]
[edit routing-instances instance multicast-snooping-options traceoptions]
[edit routing-instances instance protocols bgp group neighbor traceoptions]
[edit routing-instances instance protocols bgp group traceoptions]
[edit routing-instances instance protocols bgp traceoptions]
[edit routing-instances instance protocols esis traceoptions]
[edit routing-instances instance protocols igmp-snooping traceoptions]
[edit routing-instances instance protocols isis traceoptions]
[edit routing-instances instance protocols l2vpn traceoptions]
[edit routing-instances instance protocols ldp traceoptions]
[edit routing-instances instance protocols msdp group peer traceoptions]
[edit routing-instances instance protocols msdp group traceoptions]
[edit routing-instances instance protocols msdp peer traceoptions]
[edit routing-instances instance protocols msdp traceoptions]
[edit routing-instances instance protocols mvpn traceoptions]
[edit routing-instances instance protocols ospf traceoptions]
[edit routing-instances instance protocols pim traceoptions]
```



```

[edit routing-instances instance protocols rip traceoptions]
[edit routing-instances instance protocols ripng traceoptions]
[edit routing-instances instance protocols router-discovery traceoptions]
[edit routing-instances instance protocols vpls traceoptions]
[edit routing-instances instance routing-options multicast traceoptions]
[edit routing-instances instance routing-options traceoptions]
[edit routing-instances instance system services dhcp-local-server
interface-traceoptions]
[edit routing-instances instance system services dhcp-local-server traceoptions]
[edit routing-options multicast traceoptions]
[edit routing-options traceoptions]
[edit security idp traceoptions]
[edit security pki traceoptions]
[edit services adaptive-services-pics traceoptions]
[edit services captive-portal-content-delivery]
[edit system ddos-protection traceoptions]
[edit services l2tp traceoptions]
[edit services logging traceoptions]
[edit services mobile-ip traceoptions]
[edit services server-load-balance traceoptions]
[edit services ssl traceoptions]
[edit system accounting traceoptions]
[edit system auto-configuration traceoptions]
[edit system license traceoptions]
[edit system processes datapath-trace-service traceoptions]
[edit system processes diameter-service traceoptions]
[edit system processes general-authentication-service traceoptions]
[edit system processes mac-validation traceoptions]
[edit system processes process-monitor traceoptions]
[edit system processes resource-cleanup traceoptions]
[edit system processes sdk-service traceoptions]
[edit system processes static-subscribers traceoptions]
[edit system services database-replication traceoptions]
[edit system services dhcp traceoptions]
[edit system services dhcp-local-server traceoptions]
[edit system services dhcp-local-server interface-traceoptions]
[edit system services local-policy-decision-function traceoptions]
[edit system services outbound-ssh traceoptions]
[edit system services service-deployment traceoptions]
[edit system services subscriber-management traceoptions]
[edit system services subscriber-management-helper traceoptions]
[edit unified-edge aaa traceoptions]
[edit unified-edge gateways tdf charging traceoptions]

```

Related Documentation

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [trace on page 992](#)

view

Can view current system-wide, routing table, and protocol-specific values and statistics.

Commands

```
clear ipv6 router-advertisement
<clear-ipv6-router-advertisement-information>clear l2circuit auto-sensing
<clear-l2ckt-pw-auto-sensing>
clear services redundancy-group
<clear-services-redundancy-group>
clear services redundancy-group statistics
<clear-services-redundancy-group-statistics>
<clear-services-redundancy-set>
clear services service-sets statistics ids
clear services service-sets statistics ids drops
<clear-service-set-ids-drops-statistics>
clear services traffic-load-balance
clear services traffic-load-balance statistics
<clear-service-traffic-load-balance-statistics>
<request-validation-policy>
show
show access-cac interface-set
<get-access-cac-iflset>
show access-security
show access-security router-advertisement-guard
show access-security router-advertisement-guard entries
<show-as-router-advertisement-entry>
show access-security router-advertisement-guard state
<show-as-ra-state>
show access-security router-advertisement-guard statistics
<get-as-router-advertisement-statistics>
show access-security router-advertisement-guard statistics interface
<get-as-router-advertisement-interface>
show accounting
show accounting profile
<get-accounting-profile-information>
show accounting records
<get-accounting-record-information>
show amt
show amt statistics
<get-amt-statistics>
show amt summary
<get-amt-summary>
show amt tunnel
<get-amt-tunnel-information>
show amt tunnel gateway-address
<get-amt-tunnel-gateway-address>
show amt tunnel tunnel-interface
<get-amt-tunnel-interface>
show analytics collector
<get-analytics-collector>
show ancp
show ancp cos
<get-ancp-cos-information>
show ancp cos last-update
```

```

    <get-ancp-cos-last-update-information>

show ancp cos pending-update
    <get-ancp-cos-pending-information>

show ancp neighbor
    <get-ancp-neighbor-information>
show ancp statistics
    <get-ancp-stats-information>
show ancp subscriber
    <get-ancp-subscriber-information>

show ancp subscriber identifier
    <get-ancp-subscriber-identifier-information>
show ancp subscriber ip-address
    <get-ancp-subscriber-neighbor-information>
show ancp subscriber system-name
    <get-ancp-subscriber-mac-information>
show ancp subscriber neighbor
show app-engine
show app-engine information
show app-engine packages
show app-engine packages remote
    <get-virtual-machine-package-remote>
show app-engine packages system
    <get-virtual-machine-package-system>
show app-engine processes
show app-engine resource-usage
show app-engine route-table
show app-engine routing-instance
show app-engine routing-instance compute-clusters
show app-engine routing-instance virtual-machines
show app-engine status
show app-engine virtual-machine package
    <get-virtual-machine-package-information>
show application-monitor
    <get-application-monitor-information>
show application-monitor probe
show application-monitor probe flows
    <get-application-monitor-probe-flows-information>
show application-monitor probe measurements
    <get-application-monitor-probe-measurements>
show application-monitor probe mirrors
    <get-application-monitor-probe-mirrors>
show app-engine virtual-machine vm-instance
show aps
    <get-aps-information>

show aps group
    <get-aps-group-information>
show aps interface
    <get-aps-interface-information>
show arp
    <get-arp-table-information>

show as-path
    <get-as-path>
show as-path domain
    <get-as-path-domain>
show auto-configuration
show auto-configuration interfaces

```

```
show backup-selection
<get-backup-selection>
show backup-selection instance
<get-backup-selection-instance>
show bfd
show bfd session
  <get-bfd-session-information>

show bfd session address
  <get-bfd-session-address>
show bfd session client
  <get-bfd-session-client>
show bfd session client rsvp-oam
  <get-bfd-session-client-rsvp>
show bfd session client vpls-oam
  <get-bfd-session-client-vpls>
show bfd session client vpls-oam instance
  <get-bfd-session-client-vpls-instance>
show bfd session discriminator
  <get-bfd-session-discriminator>
show bfd session prefix
  <get-bfd-session-prefix>
show bfd subscriber
show bfd subscriber session
  <get-bfd-subscriber-session>
show bgp
show bgp bmp
  <get-bgp-monitoring-protocol-statistics>
show bgp group
  <get-bgp-group-information>
show bgp group output-queues
  <get-bgp-group-output-queue-information>

show bgp group rtf
  <get-bgp-rtf-information>

show bgp group traffic-statistics
  <get-bgp-traffic-statistics-information>

show bgp neighbor
  <get-bgp-neighbor-information>

show bgp neighbor orf
  <get-bgp-orf-information>
show bgp neighbor output-queue
  <get-bgp-output-queue-information>
show bgp output-scheduler

show bgp replication
  <get-bgp-replication-information>
show bgp summary
  <get-bgp-summary-information>

show bridge
show bridge domain
  <get-bridge-instance-information>

show bridge domain operational
  <get-operational-bridge-instance-information>
show bridge domain satellite
```

```

<get-satellite-control-bridge-domain>
show bridge evpn
show bridge evpn arp-table
<get-bridge-evpn-arp-table>
show bridge evpn nd-table
<get-bridge-evpn-nd-table>
show bridge evpn peer-gateway-macs
<get-bridge-peer-gateway-mac>
<get-bridge-flood-information>
show bridge flood
show bridge flood event-queue
    <get-bridge-domain-event-queue-information>
show bridge flood next-hops
show bridge flood next-hops satellite
<get-satellite-control-composite-next-hop>
show bridge flood route
show bridge flood route all-ce-flood
    <get-show-bridge-domain-all-ce-flood-route-information>

show bridge flood route all-ve-flood
    <get-show-bridge-domain-ve-flood-route-information>
show bridge flood route alt-root-flood
    <get-bridge-domain-alt-root-flood-route-information>
show bridge flood route bd-flood
    <get-bridge-domain-bd-flood-route-information>
show bridge flood route mlp-flood
    <get-bridge-domain-mlp-flood-route-information>
show bridge flood route re-flood
    <get-bridge-domain-re-flood-route-information>
show bridge flood satellite
<get-satellite-control-flood-ethernet>
show bridge interface
show bridge interface satellite
<get-satellite-control-bridge-interface>
show bridge mac-table
    <get-bridge-mac-table>
show bridge mac-table interface
    <get-bridge-interface-mac-table>
show bridge mac-table satellite
<get-satellite-control-bridge-mac-table>
show bridge satellite
show bridge satellite device
<get-satellite-device-db>
show bridge satellite events
<get-satellite-control-history-information>
show bridge satellite logging
<get-satellite-control-logging-information>
show bridge satellite summary
<get-satellite-control-bridge-summary>

show bridge statistics
    <get-bridge-statistics-information>
show chassis
show chassis adc
show chassis alarms
    <get-alarm-information>
show chassis alarms fpc
<get-fpc-alarm-information>
show chassis alarms satellite
<get-chassis-alarm-satellite-information>

```

```
show chassis beacon
  get-chassis-beacon-information>
show chassis beacon cb
  <get-chassis-cb-beacon-information>
show chassis environment adc
show chassis environment ccg
  <get-environment-ccg-information>
show chassis cfeb
  <get-cfeb-information>
show chassis cip
show chassis craft-interface
  <get-craft-information>
show chassis environment
  <get-environment-information>
show chassis environment cb
  <get-environment-cb-information>
show chassis environment cip
  <get-environment-cip-information>
show chassis environment feb
  <get-environment-feb-information>
show chassis environment fan
show chassis environment fpc
  <get-environment-fpc-information>
show chassis environment fpc satellite
  <get-chassis-environment-fpc-satellite-info>
show chassis environment fpm
  <get-environment-fpm-information>
show chassis environment mcs
  <get-environment-mcs-information>
show chassis environment pcg
  <get-environment-pcg-information>
show chassis environment pdu
  <get-environment-pdu-information>
show chassis environment pem
  <get-environment-pem-information>
show chassis environment pem satellite
  <get-chassis-environment-pem-satellite-info>
show chassis environment psm
show chassis environment psu
  <get-environment-psu-information>
show chassis environment routing-engine
  <get-environment-re-information>
show chassis environment routing-engine satellite
  <get-chassis-environment-re-satellite-info>
show chassis environment satellite
  <get-chassis-environment-satellite-information>
show chassis environment scg
  <get-environment-scg-information>
show chassis environment service-node
  <get-environment-service-node-information>
show chassis environment sfb
show chassis environment sfm
  <get-environment-sfm-information>

show chassis environment sib
  <get-environment-sib-information>

show chassis environment sib f13
show chassis environment sib f2s
show chassis ethernet-switch
```

```
show chassis ethernet-switch errors
show chassis ethernet-switch statistics
show chassis ethernet-switch temperature
show chassis fabric
show chassis fabric degraded-fabric-reachability
show chassis fabric device
    <get-chassis-fabric-information-device>
show chassis fabric connectivity
    <get-chassis-fabric-connectivity-information>
show chassis fabric degradation
    <get-fm-degradation-information>
show chassis fabric degradation actions
    <get-fm-degradation-information-details>
show chassis fabric destinations
    <get-fm-fabric-destinations-state>
show chassis fabric errors
show chassis fabric errors autoheal
    <get-fm-plane-autoheal-errors>
show chassis fabric errors fpc
    <get-fm-fpc-errors>

show chassis fabric errors sib
    <get-fm-sib-errors>

show chassis fabric errors sib f13
show chassis fabric errors sib f2s
show chassis fabric feb
show chassis fabric fpcs
    <get-fm-fpc-state-information>

show chassis fabric links
    <get-chassis-fabric-link-information>
show chassis fabric map
show chassis fabric plane
    <get-fm-plane-state-information>

show chassis fabric plane-location
show chassis fabric reachability
    <get-fm-fabric-reachability-information>
show chassis fabric sibs
    <get-fm-sib-state-information>
show chassis fabric spray-weights
    <get-chassis-fabric-spray-weight-information>
show chassis fabric spray-weights from
show chassis fabric spray-weights to
show chassis fabric summary
    <get-fm-state-information>

show chassis fabric topology
    <get-chassis-fabric-topology-information>
show chassis fabric unreachable-destinations
    <get-fm-unreachable-dest-information>
show chassis fan
show chassis fan satellite
get-chassis-fan-satellite-information
show chassis feb
    <get-feb-brief-information>

show chassis feb detail
    <get-feb-information>
```

```
show chassis firmware
  <get-firmware-information>

show chassis firmware detail
  <get-firmware-information-detail>
show chassis firmware satellite
<get-chassis-firmware-satellite-information>
show chassis forwarding
  <get-fwdd-information>

show chassis fpc
  <get-fpc-information>

show chassis fpc errors
  <get-fpc-error-information>
show chassis fpc optical-properties
<get-fpc-optical-information>
show chassis fpc optical-properties alarms
<get-fpc-optical-alarms-information>
show chassis fpc optical-properties amplifier-chain
show chassis fpc optical-properties amplifier-chain ila
<get-fpc-optical-amplifier-chain-information>
show chassis fpc optical-properties amplifier-chain ila alarms
<get-fpc-optical-ila-alarms-information>
show chassis fpc optical-properties amplifier-chain ila edfa
<get-fpc-optical-ila-edfa-information>
show chassis fpc optical-properties amplifier-chain ila osc
<get-fpc-optical-ila-osc-information>
show chassis fpc optical-properties amplifier-chain ila pm-current
<get-fpc-optical-ila-pm-current-information>
show chassis fpc optical-properties amplifier-chain ila pm-currentday
<get-fpc-optical-ila-pm-currentday-information>
show chassis fpc optical-properties amplifier-chain ila pm-interval
<get-fpc-optical-ila-pm-interval-information>
show chassis fpc optical-properties amplifier-chain ila pm-previousday
<get-fpc-optical-ila-pm-previousday-information>
show chassis fpc optical-properties amplifier-chain ila summary
<get-fpc-optical-ila-summary-information>
show chassis fpc optical-properties amplifier-chain ila voa
<get-fpc-optical-ila-voa-information>
show chassis fpc optical-properties amplifier-topology
<get-fpc-optical-amplifier-topology-information>
show chassis fpc optical-properties edfa
<get-fpc-optical-edfa-information>
show chassis fpc optical-properties mfg-info
<get-fpc-optical-mfg-info-information>
show chassis fpc optical-properties ocm
<get-fpc-optical-ocm-information>
show chassis fpc optical-properties pm-current
<get-fpc-optical-pm-current-information>
show chassis fpc optical-properties pm-currentday
<get-fpc-optical-pm-currentday-information>
show chassis fpc optical-properties pm-interval
<get-fpc-optical-pm-interval-information>
show chassis fpc optical-properties pm-previousday
<get-fpc-optical-pm-previousday-information>
show chassis fpc optical-properties status
<get-fpc-optical-status-information>
show chassis fpc optical-properties topology
```



```
<get-fpc-optical-topology-information>
show chassis fpc optical-properties wss
<get-fpc-optical-wss-information>
show chassis fpc pic-status
    <get-pic-information>
show chassis fpc port-status
<get-fpc-port-information>
show chassis fpc-feb-connectivity
    <get-fpc-feb-connectivity-information>

show chassis hardware
    <get-chassis-inventory>
show chassis hardware satellite
<get-chassis-hardware-satellite-information>
show chassis hss
show chassis hss link-quality
show chassis in-service-upgrade
show chassis ioc-npc-connectivity
    <get-ioc-npc-connectivity-information>
show chassis jam-test
<get-jam-test-information>
show chassis lcc-mode
<get-chassis-lcc-mode-information>

show chassis lccs
    <get-fru-information>
<get-chassis-led-satellite-information>
show chassis location
    <get-chassis-location>

show chassis location fpc
show chassis location interface
show chassis location interface by-name
    <get-interface-location-name-information>

show chassis location interface by-slot
    <get-interface-location-information>
show chassis mac-addresses
show chassis multicast-loadbalance
<get-chassis-ae-lb-information>

show chassis network-services
    <network-services>
show chassis network-slices
<get-gnf-information>

show chassis nonstop-upgrade
show chassis pic
    <get-pic-detail>

show chassis power
    <get-power-usage-information>

show chassis power detail
<get-power-usage-information-detail>
show chassis power sequence
show chassis power upgrade

show chassis power-ratings
    <get-power-management>
```

```
show chassis psd
  <get-psd-information>

show chassis redundancy
show chassis redundancy feb
  <get-feb-redundancy-information>

show chassis redundancy feb errors
  <get-feb-redundancy-error-information>

show chassis redundancy feb redundancy-group
  <get-feb-redundancy-group-information>

show chassis redundant-power-system
  <get-rps-chassis-information>

show chassis routing-engine
  <get-route-engine-information>

show chassis routing-engine bios
  <get-bios-version-information>
show chassis routing-engine bios satellite
  <get-chassis-routing-engine-bios-satellite-info>
show chassis routing-engine errors
  <get-chassis-routing-engine-errors>
show chassis routing-engine satellite
  <get-chassis-routing-engine-satellite-information>
show chassis satellite
  <get-chassis-satellite-information>
show chassis satellite extended-port
  <get-chassis-satellite-extended-port-information>
show chassis satellite interface
  <get-chassis-satellite-interface-information>
show chassis satellite neighbor
  <get-chassis-satellite-neighbor-information>
show chassis satellite neighbor statistics
  <get-chassis-satellite-neighbor-statistics>
  show chassis satellite power-budget-statistics
    <get-power-budget-information>
show chassis satellite redundancy-group
  <get-chassis-satellite-redundancy-group-info>
show chassis satellite redundancy-group devices
  <get-chassis-satellite-redundacy-grp-devices-info>
show chassis satellite redundancy-group devices history
  <get-chassis-satellite-redundancy-grp-dev-history>
show chassis satellite software
  <get-satellite-management-software-information>
show chassis satellite statistics
  <get-chassis-satellite-statistics>
  show chassis satellite unprovision
    <get-chassis-satellite-unprovision-information>
  show chassis satellite upgrade-group
    <get-chassis-satellite-upgrade-group-information>
show chassis satellite-cluster
  <get-chassis-satellite-cluster-information>
  show chassis satellite-cluster route
    <get-chassis-satellite-cluster-route>
show chassis satellite-cluster statistics
  <get-chassis-satellite-cluster-statistics>
```

```
show chassis scb
    <get-scb-information>

show chassis service-node
    <get-service-node-information>

show chassis sfm
    <get-sfm-information>

show chassis sfm detail
show chassis sibs
    <get-sib-information>

show chassis spmb
    <get-spmb-information>
show chassis spmb errors
    <get-spmb-error-information>

show chassis spmb sibs
    <get-spmb-sib-information>

show chassis ssb
    <get-ssb-information>

show chassis synchronization
    <get-clock-synchronization-information>

show chassis synchronization backup
show chassis synchronization gnss
show chassis synchronization master
show chassis system-mode
    <get-system-mode-information>
show chassis temperature-thresholds
    <get-temperature-threshold-information>
show chassis temperature-thresholds satellite
    <get-chassis-temp-thresholds-satellite-info>
show chassis vcpu
show chassis zones
    <get-chassis-zones-information>
show class-of-service
    <get-cos-information>

show class-of-service adaptive-shaper
    <get-cos-adaptive-shaper-information>

show class-of-service application-traffic-control
show class-of-service application-traffic-control counter
show class-of-service application-traffic-control rate-limiters
show class-of-service application-traffic-control rate-limiters rl-all
    <get-appqos-swrl-stat-all>
show class-of-service application-traffic-control rate-limiters rl-name
    <get-appqos-swrl-stat-name>
show class-of-service application-traffic-control rate-limiters summary
    <get-appqos-swrl-stat-summary>
show class-of-service application-traffic-control statistics
show class-of-service application-traffic-control statistics rate-limiter
    <get-appqos-rule-statistics>
show class-of-service bind-point
    <get-cos-bind-point-feature-information>
```

```
show class-of-service bind-point interface
<get-cos-interface-feature-information>
show class-of-service bind-point interface-set
<get-cos-interface-set-feature-information>
show class-of-service bind-point routing-instance
<get-cos-routing-instance-feature-information>
show class-of-service bind-point-ownership
<get-cos-bind-point-ownership-summary>
show class-of-service classifier
  <get-cos-classifier-information>
show class-of-service client
show class-of-service client internal-id
<get-cos-junos-client-information>
show class-of-service client name
<get-cos-junos-client-information>
show class-of-service client summary
<get-cos-junos-client-summary>

show class-of-service code-point-aliases
  <get-cos-code-point-map-information>

show class-of-service congestion-notification
  <get-cos-congestion-notification-information>
show class-of-service drop-profile
  <get-cos-drop-profile-information>

show class-of-service fabric
show class-of-service fabric scheduler-map
  <get-cos-fabric-scheduler-map-information>

show class-of-service fabric statistics
  <get-fabric-queue-information>

show class-of-service fabric statistics detail
<get-fabric-queue-detailed-information>

show class-of-service forwarding-class
  <get-cos-forwarding-class-information>

show class-of-service forwarding-class-set
  <get-cos-forwarding-class-set-information>
show class-of-service forwarding-table
  <get-cos-table-information>

show class-of-service forwarding-table classifier
  <get-cos-classifier-table-information>

show class-of-service forwarding-table classifier mapping
  <get-cos-classifier-table-map-information>

show class-of-service forwarding-table drop-profile
  <get-cos-red-information>

show class-of-service forwarding-table fabric
show class-of-service forwarding-table fabric scheduler-map
  <get-cos-fwtab-fabric-scheduler-map-information>

show class-of-service forwarding-table forwarding-class-map
  <get-cos-forwarding-class-map-table-information>
```

```
show class-of-service forwarding-table forwarding-class-map mapping
  <get-cos-forwarding-class-map-interface-table-information>

show class-of-service forwarding-table loss-priority-map
  <get-cos-loss-priority-map-table-information>

show class-of-service forwarding-table loss-priority-map mapping
  <get-cos-loss-priority-map-table-binding-information>

show class-of-service forwarding-table loss-priority-rewrite
  <get-cos-loss-priority-rewrite-table-information>
show class-of-service forwarding-table loss-priority-rewrite mapping
  <get-cos-loss-priority-rewrite-table-binding-information>
show class-of-service forwarding-table policer
  <get-cos-policer-table-map-information>
show class-of-service forwarding-table policy-map
  <get-cos-policy-map-table-information>
show class-of-service forwarding-table policy-map mapping
  <get-cos-policy-map-table-map-information>
show class-of-service forwarding-table
  rewrite-rule
  <get-cos-rewrite-table-information>

show class-of-service forwarding-table rewrite-rule mapping
  <get-cos-rewrite-table-map-information>

show class-of-service forwarding-table scheduler-map
  <get-cos-scheduler-map-table-information>
show class-of-service forwarding-table scheduler-map mapping
  <get-cos-scheduler-map-table-map-information>

show class-of-service forwarding-table shaper
  <get-cos-shaper-table-map-information>

show class-of-service forwarding-table translation-table
  <get-cos-translation-table-information>

show class-of-service forwarding-table translation-table mapping
  <get-cos-translation-table-mapping-information>

show class-of-service fragmentation-map
  <get-cos-fragmentation-map-information>

show class-of-service interface
  <get-cos-interface-map-information>

show class-of-service interface-set
  <get-cos-interface-set-map-information>

show class-of-service l2tp-session
  <get-cos-l2tp-session-map-information>

show class-of-service loss-priority-map
  <get-cos-loss-priority-map-information>

show class-of-service loss-priority-rewrite
  <get-cos-loss-priority-rewrite-information>
show class-of-service multi-destination
  <get-cos-multi-destination-information>
show class-of-service multi-destination classifier-binding
  <get-cos-multi-destination-classifier-binding-information>
```

```
show class-of-service packet-buffer
<get-cos-packet-buffer-information>
show class-of-service packet-buffer usage
<get-cos-packet-buffer-usage-information>
show class-of-service policy-map
<get-cos-policy-map-information>

show class-of-service rewrite-rule
<get-cos-rewrite-information>

show class-of-service routing-instance
<get-cos-routing-instance-map-information>

show class-of-service scheduler-hierarchy
show class-of-service scheduler-hierarchy interface
<get-interface-scheduler-hierarchy-information>

show class-of-service scheduler-hierarchy interface-set
<get-interface-set-scheduler-hierarchy-information>

show class-of-service scheduler-map
<get-cos-scheduler-map-information>

show class-of-service traffic-control-profile
<get-cos-traffic-control-profile-information>

show class-of-service translation-table
<get-cos-translation-table-map-information>

show class-of-service virtual-channel
<get-cos-virtual-channel-information>

show class-of-service virtual-channel-group
<get-cos-virtual-channel-group-information>

show cli
show cli authorization
<get-authorization-information>
show cli commands
show cli commands
show cli directory
<get-current-working-directory>
show cli history
show cloud-analytics
show cloud-analytics connections
<get-cloud-analytics-connections>
show cloud-analytics discovery-service
<get-cloud-analytics-discovery-service>
show cloud-analytics linecard
<get-cloud-analytics-lc>
show cloud-analytics resources
<get-cloud-analytics-resources>
show cloud-analytics resources-sampling
<get-cloud-analytics-resources-sampling>
show cloud-analytics resources-summary
<get-cloud-analytics-resources-summary>
show cloud-analytics sensors
<sensor-information>
show cloud-analytics streaming-policies
```

```

<get-cloud-analytics-streaming-policies>
show configuration
show connections
  <get-ccc-information>
show database-replication
show database-replication statistics
  <get-database-replication-statistics-information>

show database-replication summary
  <get-database-replication-summary-information>
show ddos-protection
show ddos-protection protocols
  <get-ddos-protocols-information>
show ddos-protection protocols all-fiber-channel-enode
  <get-ddos-all-fc-enode-information>
show ddos-protection protocols all-fiber-channel-enode aggregate
  <get-ddos-all-fc-enode-aggregate>
show ddos-protection protocols all-fiber-channel-enode aggregate culprit-flows
  <get-ddos-all-fc-enode-aggregate-flows>
show ddos-protection protocols all-fiber-channel-enode culprit-flows
  <get-ddos-all-fc-enode-flows>
show ddos-protection protocols all-fiber-channel-enode flow-detection
  <get-ddos-all-fc-enode-flow-parameters>
show ddos-protection protocols all-fiber-channel-enode parameters
  <get-ddos-all-fc-enode-parameters>
show ddos-protection protocols all-fiber-channel-enode statistics
  <get-ddos-all-fc-enode-statistics>
show ddos-protection protocols all-fiber-channel-enode violations
  <get-ddos-all-fc-enode-violations>
show ddos-protection protocols amtv4
show ddos-protection protocols amtv4 aggregate
show ddos-protection protocols amtv4 aggregate culprit-flows
show ddos-protection protocols amtv4 culprit-flows
show ddos-protection protocols amtv4 flow-detection
show ddos-protection protocols amtv4 parameters
show ddos-protection protocols amtv4 statistics
show ddos-protection protocols amtv4 violations
show ddos-protection protocols amtv6
show ddos-protection protocols amtv6 aggregate
show ddos-protection protocols amtv6 aggregate culprit-flows
show ddos-protection protocols amtv6 culprit-flows
show ddos-protection protocols amtv6 flow-detection
show ddos-protection protocols amtv6 statistics
show ddos-protection protocols amtv6 violations

show ddos-protection protocols ancp
  <get-ddos-ancp-information>

show ddos-protection protocols ancp aggregate
  <get-ddos-ancp-aggregate>
show ddos-protection protocols ancp parameters
  <get-ddos-ancp-parameters>

show ddos-protection protocols ancp statistics
  <get-ddos-ancp-statistics>
show ddos-protection protocols ancp violations
  <get-ddos-ancp-violations>
show ddos-protection protocols ancpv6
  <get-ddos-ancpv6-information>

```

```
show ddos-protection protocols ancpv6 aggregate
  get-ddos-ancpv6-aggregate
show ddos-protection protocols ancpv6 parameters
  get-ddos-ancpv6-parameters
show ddos-protection protocols ancpv6 statistics
  get-ddos-ancpv6-statistics
show ddos-protection protocols ancpv6 violations
  get-ddos-ancpv6-violations
show ddos-protection protocols arp
  get-ddos-arp-information
show ddos-protection protocols arp aggregate
  get-ddos-arp-aggregate
show ddos-protection protocols arp parameters
  get-ddos-arp-parameters
show ddos-protection protocols arp statistics
  get-ddos-arp-statistics
show ddos-protection protocols arp violations
  get-ddos-arp-violations
show ddos-protection protocols arp-snoop
  <get-ddos-arp-snoop-information>
show ddos-protection protocols arp-snoop aggregate
  <get-ddos-arp-snoop-aggregate>
show ddos-protection protocols arp-snoop aggregate culprit-flows
  <get-ddos-arp-snoop-aggregate-flows>
show ddos-protection protocols arp-snoop culprit-flows
  <get-ddos-arp-snoop-flows>
show ddos-protection protocols arp-snoop flow-detection
  <get-ddos-arp-snoop-flow-parameters>
show ddos-protection protocols arp-snoop parameters
  <get-ddos-arp-snoop-parameters>
  show ddos-protection protocols arp-snoop statistics
  <get-ddos-arp-snoop-statistics>
show ddos-protection protocols arp-snoop violations
  <get-ddos-arp-snoop-violations>
show ddos-protection protocols atm
  get-ddos-atm-information
show ddos-protection protocols atm aggregate
  get-ddos-atm-aggregate
show ddos-protection protocols atm parameters
  get-ddos-atm-parameters
show ddos-protection protocols atm statistics
  get-ddos-atm-statistics
show ddos-protection protocols atm violations
  get-ddos-atm-violations
show ddos-protection protocols bfd
  get-ddos-bfd-information
show ddos-protection protocols bfd aggregate
  get-ddos-bfd-aggregate
show ddos-protection protocols bfd parameters
  get-ddos-bfd-parameters
show ddos-protection protocols bfd statistics
  get-ddos-bfd-statistics
show ddos-protection protocols bfd violations
  get-ddos-bfd-violations
show ddos-protection protocols bfdv6
  get-ddos-bfdv6-information
show ddos-protection protocols bfdv6 aggregate
  get-ddos-bfdv6-aggregate
show ddos-protection protocols bfdv6 parameters
  get-ddos-bfdv6-parameters
```



```

show ddos-protection protocols bfdv6 statistics
  get-ddos-bfdv6-statistics
show ddos-protection protocols bfdv6 violations
  get-ddos-bfdv6-violations
show ddos-protection protocols bgp
  get-ddos-bgp-information
show ddos-protection protocols bgp aggregate
  get-ddos-bgp-aggregate
show ddos-protection protocols bgp parameters
  get-ddos-bgp-parameters
show ddos-protection protocols bgp statistics
  get-ddos-bgp-statistics
show ddos-protection protocols bgp violations
  get-ddos-bgp-violations
show ddos-protection protocols bgpv6
  get-ddos-bgpv6-information
show ddos-protection protocols bgpv6 aggregate
  get-ddos-bgpv6-aggregate
show ddos-protection protocols bgpv6 parameters
  get-ddos-bgpv6-parameters
show ddos-protection protocols bgpv6 statistics
  get-ddos-bgpv6-statistics
show ddos-protection protocols bgpv6 violations
  get-ddos-bgpv6-violations
show ddos-protection protocols bridge-control
<get-ddos-brg-ctrl-information>
show ddos-protection protocols bridge-control aggregate
<get-ddos-brg-ctrl-aggregate>
show ddos-protection protocols bridge-control aggregate culprit-flows
<get-ddos-brg-ctrl-aggregate-flows>
show ddos-protection protocols bridge-control culprit-flows
<get-ddos-brg-ctrl-flows>
show ddos-protection protocols bridge-control flow-detection
<get-ddos-brg-ctrl-flow-parameters>
show ddos-protection protocols bridge-control parameters
<get-ddos-brg-ctrl-parameters>
show ddos-protection protocols bridge-control statistics
<get-ddos-brg-ctrl-statistics>
show ddos-protection protocols bridge-control violations
<get-ddos-brg-ctrl-violations>
show ddos-protection protocols demux-autosense
  get-ddos-demuxauto-information
show ddos-protection protocols demux-autosense aggregate
  get-ddos-demuxauto-aggregate
show ddos-protection protocols demux-autosense parameters
  get-ddos-demuxauto-parameters
show ddos-protection protocols demux-autosense statistics
  get-ddos-demuxauto-statistics
show ddos-protection protocols demux-autosense violations
  get-ddos-demuxauto-violations
show ddos-protection protocols dhcpv4
  get-ddos-dhcpv4-information
show ddos-protection protocols dhcpv4 ack
  get-ddos-dhcpv4-ack
show ddos-protection protocols dhcpv4 aggregate
  get-ddos-dhcpv4-aggregate
show ddos-protection protocols dhcpv4 bad-packets
  get-ddos-dhcpv4-bad-pack
show ddos-protection protocols dhcpv4 bootp
  get-ddos-dhcpv4-bootp
show ddos-protection protocols dhcpv4 decline

```

```
get-ddos-dhcpv4-decline
show ddos-protection protocols dhcpv4 discover
get-ddos-dhcpv4-discover
show ddos-protection protocols dhcpv4 force-renew
get-ddos-dhcpv4-forcerenew
show ddos-protection protocols dhcpv4 inform
get-ddos-dhcpv4-inform
show ddos-protection protocols dhcpv4 lease-active
get-ddos-dhcpv4-leaseact
show ddos-protection protocols dhcpv4 lease-query
get-ddos-dhcpv4-leasequery
show ddos-protection protocols dhcpv4 lease-unassigned
get-ddos-dhcpv4-leaseuna
show ddos-protection protocols dhcpv4 lease-unknown
get-ddos-dhcpv4-leaseunk
show ddos-protection protocols dhcpv4 nak
get-ddos-dhcpv4-nak
show ddos-protection protocols dhcpv4 no-message-type
get-ddos-dhcpv4-no-msgtype
show ddos-protection protocols dhcpv4 offer
get-ddos-dhcpv4-offer
show ddos-protection protocols dhcpv4 offer culprit-flows
show ddos-protection protocols dhcpv4 parameters
get-ddos-dhcpv4-parameters
show ddos-protection protocols dhcpv4 release
get-ddos-dhcpv4-release
show ddos-protection protocols dhcpv4 renew
get-ddos-dhcpv4-renew
show ddos-protection protocols dhcpv4 request
get-ddos-dhcpv4-request
show ddos-protection protocols dhcpv4 statistics
get-ddos-dhcpv4-statistics
show ddos-protection protocols dhcpv4 unclassified
get-ddos-dhcpv4-unclass
show ddos-protection protocols dhcpv4 violations
get-ddos-dhcpv4-violations
show ddos-protection protocols dhcpv4v6
<get-ddos-dhcpv4v6-information>
show ddos-protection protocols dhcpv4v6 aggregate
<get-ddos-dhcpv4v6-aggregate>
show ddos-protection protocols dhcpv4v6 aggregate culprit-flows
<get-ddos-dhcpv4v6-aggregate-flows>
show ddos-protection protocols dhcpv4v6 culprit-flows
<get-ddos-dhcpv4v6-flows>
show ddos-protection protocols dhcpv4v6 flow-detection
<get-ddos-dhcpv4v6-flow-parameters>
show ddos-protection protocols dhcpv4v6 parameters
<get-ddos-dhcpv4v6-parameters>
show ddos-protection protocols dhcpv4v6 statistics
<get-ddos-dhcpv4v6-statistics>
show ddos-protection protocols dhcpv4v6 violations
<get-ddos-dhcpv4v6-violations>
show ddos-protection protocols dhcpv6
get-ddos-dhcpv6-information
show ddos-protection protocols dhcpv6 advertise
get-ddos-dhcpv6-advertise
show ddos-protection protocols dhcpv6 advertise culprit-flows
show ddos-protection protocols dhcpv6 aggregate
get-ddos-dhcpv6-aggregate
show ddos-protection protocols dhcpv6 confirm
```

```
get-ddos-dhcpv6-confirm
show ddos-protection protocols dhcpv6 decline
get-ddos-dhcpv6-decline
show ddos-protection protocols dhcpv6 information-request
get-ddos-dhcpv6-info-req
show ddos-protection protocols dhcpv6 leasequery
get-ddos-dhcpv6-leasequery
show ddos-protection protocols dhcpv6 leasequery culprit-flows
show ddos-protection protocols dhcpv6 leasequery-data
get-ddos-dhcpv6-leaseq-da
show ddos-protection protocols dhcpv6 leasequery-done
get-ddos-dhcpv6-leaseq-do
show ddos-protection protocols dhcpv6 leasequery-reply
get-ddos-dhcpv6-leaseq-re
show ddos-protection protocols dhcpv6 parameters
get-ddos-dhcpv6-parameters
show ddos-protection protocols dhcpv6 rebind
get-ddos-dhcpv6-rebind
show ddos-protection protocols dhcpv6 reconfigure
get-ddos-dhcpv6-reconfig
show ddos-protection protocols dhcpv6 relay-forward
get-ddos-dhcpv6-relay-for
show ddos-protection protocols dhcpv6 relay-reply
get-ddos-dhcpv6-relay-rep
show ddos-protection protocols dhcpv6 release
get-ddos-dhcpv6-release
show ddos-protection protocols dhcpv6 renew
get-ddos-dhcpv6-renew
show ddos-protection protocols dhcpv6 reply
get-ddos-dhcpv6-reply
show ddos-protection protocols dhcpv6 request
get-ddos-dhcpv6-request
show ddos-protection protocols dhcpv6 solicit
get-ddos-dhcpv6-solicit
show ddos-protection protocols dhcpv6 statistics
get-ddos-dhcpv6-statistics
show ddos-protection protocols dhcpv6 unclassified
get-ddos-dhcpv6-unclass
show ddos-protection protocols dhcpv6 unclassified culprit-flows
show ddos-protection protocols dhcpv6 violations
get-ddos-dhcpv6-violations
show ddos-protection protocols diameter
get-ddos-diameter-information
show ddos-protection protocols diameter aggregate
get-ddos-diameter-aggregate
show ddos-protection protocols diameter parameters
get-ddos-diameter-parameters
show ddos-protection protocols diameter statistics
get-ddos-diameter-statistics
show ddos-protection protocols diameter violations
get-ddos-diameter-violations
show ddos-protection protocols dns
get-ddos-dns-information
show ddos-protection protocols dns aggregate
get-ddos-dns-aggregate
show ddos-protection protocols dns parameters
get-ddos-dns-parameters
show ddos-protection protocols dns statistics
get-ddos-dns-statistics
show ddos-protection protocols dns violations
```

```
get-ddos-dns-violations
show ddos-protection protocols dtcp
get-ddos-dtcp-information
show ddos-protection protocols dtcp aggregate
get-ddos-dtcp-aggregate
show ddos-protection protocols dtcp aggregate culprit-flows
show ddos-protection protocols dtcp parameters
get-ddos-dtcp-parameters
show ddos-protection protocols dtcp statistics
get-ddos-dtcp-statistics
show ddos-protection protocols dtcp violations
get-ddos-dtcp-violations
show ddos-protection protocols dynamic-vlan
get-ddos-dynvlan-information
show ddos-protection protocols dynamic-vlan aggregate
get-ddos-dynvlan-aggregate
show ddos-protection protocols dynamic-vlan parameters
get-ddos-dynvlan-parameters
show ddos-protection protocols dynamic-vlan statistics
get-ddos-dynvlan-statistics
show ddos-protection protocols dynamic-vlan violations
get-ddos-dynvlan-violations
show ddos-protection protocols egpv6
get-ddos-egpv6-information
show ddos-protection protocols egpv6 aggregate
get-ddos-egpv6-aggregate
show ddos-protection protocols egpv6 parameters
get-ddos-egpv6-parameters
show ddos-protection protocols egpv6 statistics
get-ddos-egpv6-statistics
show ddos-protection protocols egpv6 violations
get-ddos-egpv6-violations
show ddos-protection protocols eoam
get-ddos-eoam-information
show ddos-protection protocols eoam aggregate
get-ddos-eoam-aggregate
show ddos-protection protocols eoam parameters
get-ddos-eoam-parameters
show ddos-protection protocols eoam statistics
get-ddos-eoam-statistics
show ddos-protection protocols eoam violations
get-ddos-eoam-violations
show ddos-protection protocols esmc
get-ddos-esmc-information
show ddos-protection protocols esmc aggregate
get-ddos-esmc-aggregate
show ddos-protection protocols esmc parameters
get-ddos-esmc-parameters
show ddos-protection protocols esmc statistics
get-ddos-esmc-statistics
show ddos-protection protocols esmc violations
get-ddos-esmc-violations
show ddos-protection protocols ethernet-tcc
<get-ddos-eth-tcc-information>
show ddos-protection protocols ethernet-tcc aggregate
<get-ddos-eth-tcc-aggregate>
show ddos-protection protocols ethernet-tcc aggregate culprit-flows
<get-ddos-eth-tcc-aggregate-flows>
show ddos-protection protocols ethernet-tcc culprit-flows
<get-ddos-eth-tcc-flows>
```

```

show ddos-protection protocols ethernet-tcc flow-detection
<get-ddos-eth-tcc-flow-parameters>
show ddos-protection protocols ethernet-tcc parameters
<get-ddos-eth-tcc-parameters>
show ddos-protection protocols ethernet-tcc statistics
<get-ddos-eth-tcc-statistics>
show ddos-protection protocols ethernet-tcc violations
<get-ddos-eth-tcc-violations>
show ddos-protection protocols exceptions
<get-ddos-exception-information>
show ddos-protection protocols exceptions aggregate
<get-ddos-exception-aggregate>
show ddos-protection protocols exceptions aggregate culprit-flows
<get-ddos-exception-aggregate-flows>
show ddos-protection protocols exceptions culprit-flows
<get-ddos-exception-flows>
show ddos-protection protocols exceptions flow-detection
<get-ddos-exception-flow-parameters>
show ddos-protection protocols exceptions mcast-rpf-err
<get-ddos-exception-mcast-rpf>
show ddos-protection protocols exceptions mcast-rpf-err culprit-flows
<get-ddos-exception-mcast-rpf-flows>
show ddos-protection protocols exceptions mtu-exceeded
<get-ddos-exception-mtu-exceed>
show ddos-protection protocols exceptions mtu-exceeded culprit-flows
<get-ddos-exception-mtu-exceed-flows>
show ddos-protection protocols exceptions parameters
<get-ddos-exception-parameters>
show ddos-protection protocols exceptions statistics
<get-ddos-exception-statistics>
show ddos-protection protocols exceptions unclassified
<get-ddos-exception-unclass>
show ddos-protection protocols exceptions unclassified culprit-flows
<get-ddos-exception-unclass-flows>
show ddos-protection protocols exceptions violations
<get-ddos-exception-violations>

show ddos-protection protocols fab-probe
<get-ddos-fab-probe-information>
show ddos-protection protocols fab-probe aggregate
<get-ddos-fab-probe-aggregate>
show ddos-protection protocols fab-probe parameters
<get-ddos-fab-probe-parameters>
show ddos-protection protocols fab-probe statistics
<get-ddos-fab-probe-statistics>
show ddos-protection protocols fab-probe violations
<get-ddos-fab-probe-violations>
show ddos-protection protocols firewall-host
  get-ddos-fw-host-information
show ddos-protection protocols firewall-host aggregate
  get-ddos-fw-host-aggregate
show ddos-protection protocols firewall-host parameters
  get-ddos-fw-host-parameters
show ddos-protection protocols firewall-host statistics
  get-ddos-fw-host-statistics
show ddos-protection protocols firewall-host violations
  get-ddos-fw-host-violations

show ddos-protection protocols ftp

```

```
get-ddos-ftp-information
show ddos-protection protocols ftp aggregate
get-ddos-ftp-aggregate
show ddos-protection protocols ftp parameters
get-ddos-ftp-parameters
show ddos-protection protocols ftp statistics
get-ddos-ftp-statistics
show ddos-protection protocols ftp violations
get-ddos-ftp-violations
show ddos-protection protocols ftpv6
get-ddos-ftpv6-information
show ddos-protection protocols ftpv6 aggregate
get-ddos-ftpv6-aggregate
show ddos-protection protocols ftpv6 parameters
get-ddos-ftpv6-parameters
show ddos-protection protocols ftpv6 statistics
get-ddos-ftpv6-statistics
show ddos-protection protocols ftpv6 violations
get-ddos-ftpv6-violations
show ddos-protection protocols garp-reply
<get-ddos-garp-reply-information>
show ddos-protection protocols garp-reply aggregate
<get-ddos-garp-reply-aggregate>
show ddos-protection protocols garp-reply aggregate culprit-flows
<get-ddos-garp-reply-aggregate-flows>
show ddos-protection protocols garp-reply culprit-flows
<get-ddos-garp-reply-flows>
show ddos-protection protocols garp-reply flow-detection
<get-ddos-garp-reply-flow-parameters>
show ddos-protection protocols garp-reply parameters
<get-ddos-garp-reply-parameters>
show ddos-protection protocols garp-reply statistics
<get-ddos-garp-reply-statistics>
show ddos-protection protocols garp-reply violations
<get-ddos-garp-reply-violations>
show ddos-protection protocols gre
get-ddos-gre-information
show ddos-protection protocols gre aggregate
get-ddos-gre-aggregate
show ddos-protection protocols gre hbc
<get-ddos-gre-hbc>
show ddos-protection protocols gre hbc culprit-flows
<get-ddos-gre-hbc-flows>
show ddos-protection protocols gre parameters
get-ddos-gre-parameters
show ddos-protection protocols gre punt
<get-ddos-gre-punt>
show ddos-protection protocols gre punt culprit-flows
<get-ddos-gre-punt-flows>
show ddos-protection protocols gre statistics
get-ddos-gre-statistics
show ddos-protection protocols gre violations
get-ddos-gre-violations
show ddos-protection protocols icmp
get-ddos-icmp-information
show ddos-protection protocols icmp aggregate
get-ddos-icmp-aggregate
show ddos-protection protocols icmp parameters
get-ddos-icmp-parameters
show ddos-protection protocols icmp statistics
```

```

    get-ddos-icmp-statistics
show ddos-protection protocols icmp violations
    get-ddos-icmp-violations
show ddos-protection protocols icmpv6
<get-ddos-icmpv6-information>
show ddos-protection protocols icmpv6 aggregate
<get-ddos-icmpv6-aggregate>
show ddos-protection protocols icmpv6 aggregate culprit-flows
<get-ddos-icmpv6-aggregate-flows>
show ddos-protection protocols icmpv6 parameters
<get-ddos-icmpv6-parameters>
show ddos-protection protocols icmpv6 statistics
<get-ddos-icmpv6-statistics>
show ddos-protection protocols icmpv6 violations
<get-ddos-icmpv6-violations>
show ddos-protection protocols igmp
    get-ddos-igmp-information
show ddos-protection protocols igmp aggregate
    get-ddos-igmp-aggregate
show ddos-protection protocols igmp aggregate culprit-flows
show ddos-protection protocols igmp parameters
    get-ddos-igmp-parameters
show ddos-protection protocols igmp statistics
    get-ddos-igmp-statistics
show ddos-protection protocols igmp violations
    get-ddos-igmp-violations
show ddos-protection protocols igmp-snoop
    get-ddos-igmp-snoop-information
show ddos-protection protocols igmp-snoop aggregate
    get-ddos-igmp-snoop-aggregate
show ddos-protection protocols igmp-snoop parameters
    get-ddos-igmp-snoop-parameters
show ddos-protection protocols igmp-snoop statistics
    get-ddos-igmp-snoop-statistics
show ddos-protection protocols igmp-snoop violations
    get-ddos-igmp-snoop-violations
show ddos-protection protocols igmpv4v6
    get-ddos-igmpv4v6-information
show ddos-protection protocols igmpv4v6 aggregate
    get-ddos-igmpv4v6-aggregate
show ddos-protection protocols igmpv4v6 aggregate culprit-flows
show ddos-protection protocols igmpv4v6 parameters
    get-ddos-igmpv4v6-parameters
show ddos-protection protocols igmpv4v6 statistics
    get-ddos-igmpv4v6-statistics
show ddos-protection protocols igmpv4v6 violations
    get-ddos-igmpv4v6-violations
show ddos-protection protocols igmpv6
    get-ddos-igmpv6-information
show ddos-protection protocols igmpv6 aggregate
    get-ddos-igmpv6-aggregate
show ddos-protection protocols igmpv6 parameters
    get-ddos-igmpv6-parameters
show ddos-protection protocols igmpv6 statistics
    get-ddos-igmpv6-statistics
show ddos-protection protocols igmpv6 violations
    get-ddos-igmpv6-violations
show ddos-protection protocols ip-fragments
    get-ddos-ip-frag-information
show ddos-protection protocols ip-fragments aggregate

```

```
get-ddos-ip-frag-aggregate
show ddos-protection protocols ip-fragments first-fragment
get-ddos-ip-frag-first-frag
show ddos-protection protocols ip-fragments parameters
get-ddos-ip-frag-parameters
show ddos-protection protocols ip-fragments statistics
get-ddos-ip-frag-statistics
show ddos-protection protocols ip-fragments trail-fragment
get-ddos-ip-frag-trail-frag
show ddos-protection protocols ip-fragments violations
get-ddos-ip-frag-violations
show ddos-protection protocols ip-options
get-ddos-ip-opt-information
show ddos-protection protocols ip-options aggregate
get-ddos-ip-opt-aggregate
show ddos-protection protocols ip-options non-v4v6
<get-ddos-ip-opt-non-v4v6>
show ddos-protection protocols ip-options parameters
get-ddos-ip-opt-parameters
show ddos-protection protocols ip-options router-alert
get-ddos-ip-opt-rt-alert
show ddos-protection protocols ip-options statistics
get-ddos-ip-opt-statistics
show ddos-protection protocols ip-options unclassified
get-ddos-ip-opt-unclass
show ddos-protection protocols ipmc-reserved culprit-flows
<get-ddos-ipmc-reserved-flows>
show ddos-protection protocols ipmc-reserved flow-detection
<get-ddos-ipmc-reserved-flow-parameters>
show ddos-protection protocols ipmc-reserved parameters
<get-ddos-ipmc-reserved-parameters>
show ddos-protection protocols ipmc-reserved statistics
<get-ddos-ipmc-reserved-statistics>
show ddos-protection protocols ipmc-reserved violations
<get-ddos-ipmc-reserved-violations>
show ddos-protection protocols ipmcast-miss
<get-ddos-ipmcast-miss-information>
show ddos-protection protocols ipmcast-miss aggregate
<get-ddos-ipmcast-miss-aggregate>
show ddos-protection protocols ipmcast-miss aggregate culprit-flows
<get-ddos-ipmcast-miss-aggregate-flows>
show ddos-protection protocols ipmcast-miss culprit-flows
<get-ddos-ipmcast-miss-flows>
show ddos-protection protocols ipmcast-miss flow-detection
<get-ddos-ipmcast-miss-flow-parameters>
show ddos-protection protocols ipmcast-miss parameters
<get-ddos-ipmcast-miss-parameters>
show ddos-protection protocols ipmcast-miss statistics
<get-ddos-ipmcast-miss-statistics>
show ddos-protection protocols ipmcast-miss violations
<get-ddos-ipmcast-miss-violations>
show ddos-protection protocols ip-options violations
get-ddos-ip-opt-violations
show ddos-protection protocols ipv4-unclassified
get-ddos-ipv4-uncls-information
show ddos-protection protocols ipv4-unclassified aggregate
get-ddos-ipv4-uncls-aggregate
show ddos-protection protocols ipv4-unclassified parameters
get-ddos-ipv4-uncls-parameters
show ddos-protection protocols ipv4-unclassified statistics
```



```
get-ddos-ipv4-uncls-statistics
show ddos-protection protocols ipv4-unclassified violations
get-ddos-ipv4-uncls-violations
show ddos-protection protocols ipv6-unclassified
get-ddos-ipv6-uncls-information
show ddos-protection protocols ipv6-unclassified aggregate
get-ddos-ipv6-uncls-aggregate
show ddos-protection protocols ipv6-unclassified parameters
get-ddos-ipv6-uncls-parameters
show ddos-protection protocols ipv6-unclassified statistics
get-ddos-ipv6-uncls-statistics
show ddos-protection protocols ipv6-unclassified violations
get-ddos-ipv6-uncls-violations
show ddos-protection protocols isis
get-ddos-isis-information
show ddos-protection protocols isis aggregate
get-ddos-isis-aggregate
show ddos-protection protocols isis parameters
get-ddos-isis-parameters
show ddos-protection protocols isis statistics
get-ddos-isis-statistics
show ddos-protection protocols isis violations
get-ddos-isis-violations
show ddos-protection protocols iso-tcc
<get-ddos-iso-tcc-information>
show ddos-protection protocols iso-tcc aggregate
<get-ddos-iso-tcc-aggregate>
show ddos-protection protocols iso-tcc aggregate culprit-flows
<get-ddos-iso-tcc-aggregate-flows>
show ddos-protection protocols iso-tcc culprit-flows
<get-ddos-iso-tcc-flows>
show ddos-protection protocols iso-tcc flow-detection
<get-ddos-iso-tcc-flow-parameters>
show ddos-protection protocols iso-tcc parameters
<get-ddos-iso-tcc-parameters>
show ddos-protection protocols iso-tcc statistics
<get-ddos-iso-tcc-statistics>
show ddos-protection protocols iso-tcc violations
<get-ddos-iso-tcc-violations>
show ddos-protection protocols jfm
get-ddos-jfm-information
show ddos-protection protocols jfm aggregate
get-ddos-jfm-aggregate
show ddos-protection protocols jfm parameters
get-ddos-jfm-parameters
show ddos-protection protocols jfm statistics
get-ddos-jfm-statistics
show ddos-protection protocols jfm violations
get-ddos-jfm-violations
show ddos-protection protocols l2tp
get-ddos-l2tp-information
show ddos-protection protocols l2tp aggregate
get-ddos-l2tp-aggregate
show ddos-protection protocols l2tp parameters
get-ddos-l2tp-parameters
show ddos-protection protocols l2tp statistics
get-ddos-l2tp-statistics
show ddos-protection protocols l2tp violations
get-ddos-l2tp-violations
show ddos-protection protocols l3dest-miss
```

```
<get-ddos-l3dest-miss-information>
show ddos-protection protocols l3dest-miss aggregate
<get-ddos-l3dest-miss-aggregate>
show ddos-protection protocols l3dest-miss aggregate culprit-flows
<get-ddos-l3dest-miss-aggregate-flows>
show ddos-protection protocols l3dest-miss culprit-flows
<get-ddos-l3dest-miss-flows>
show ddos-protection protocols l3dest-miss flow-detection
<get-ddos-l3dest-miss-flow-parameters>
show ddos-protection protocols l3dest-miss parameters
<get-ddos-l3dest-miss-parameters>
show ddos-protection protocols l3dest-miss statistics
<get-ddos-l3dest-miss-statistics>
show ddos-protection protocols l3dest-miss violations
<get-ddos-l3dest-miss-violations>
show ddos-protection protocols l3mc-sgv-hit-icl
<get-ddos-l3mc-sgv-hit-icl-information>
show ddos-protection protocols l3mc-sgv-hit-icl aggregate
<get-ddos-l3mc-sgv-hit-icl-aggregate>
show ddos-protection protocols l3mc-sgv-hit-icl aggregate culprit-flows
<get-ddos-l3mc-sgv-hit-icl-aggregate-flows>
show ddos-protection protocols l3mc-sgv-hit-icl culprit-flows
<get-ddos-l3mc-sgv-hit-icl-flows>
show ddos-protection protocols l3mc-sgv-hit-icl flow-detection
<get-ddos-l3mc-sgv-hit-icl-flow-parameters>
show ddos-protection protocols l3mc-sgv-hit-icl parameters
<get-ddos-l3mc-sgv-hit-icl-parameters>
show ddos-protection protocols l3mc-sgv-hit-icl statistics
<get-ddos-l3mc-sgv-hit-icl-statistics>
show ddos-protection protocols l3mc-sgv-hit-icl violations
<get-ddos-l3mc-sgv-hit-icl-violations>
show ddos-protection protocols l3mtu-fail
<get-ddos-l3mtu-fail-information>
show ddos-protection protocols l3mtu-fail aggregate
<get-ddos-l3mtu-fail-aggregate>
show ddos-protection protocols l3mtu-fail aggregate culprit-flows
<get-ddos-l3mtu-fail-aggregate-flows>
show ddos-protection protocols l3mtu-fail culprit-flows
<get-ddos-l3mtu-fail-flows>
show ddos-protection protocols l3mtu-fail flow-detection
<get-ddos-l3mtu-fail-flow-parameters>
show ddos-protection protocols l3mtu-fail parameters
<get-ddos-l3mtu-fail-parameters>
show ddos-protection protocols l3mtu-fail statistics
<get-ddos-l3mtu-fail-statistics>
show ddos-protection protocols l3mtu-fail violations
<get-ddos-l3mtu-fail-violations>
show ddos-protection protocols l3nhop
<get-ddos-l3nhop-information>
show ddos-protection protocols l3nhop aggregate
<get-ddos-l3nhop-aggregate>
show ddos-protection protocols l3nhop aggregate culprit-flows
<get-ddos-l3nhop-aggregate-flows>
show ddos-protection protocols l3nhop culprit-flows
<get-ddos-l3nhop-flows>
show ddos-protection protocols l3nhop flow-detection
<get-ddos-l3nhop-flow-parameters>
show ddos-protection protocols l3nhop parameters
<get-ddos-l3nhop-parameters>
show ddos-protection protocols l3nhop statistics
```

```
<get-ddos-l3nhop-statistics>
show ddos-protection protocols l3nhop violations
<get-ddos-l3nhop-violations>
show ddos-protection protocols l3nhop
<get-ddos-lacp-information>
show ddos-protection protocols lacp aggregate
<get-ddos-lacp-aggregate>
show ddos-protection protocols lacp parameters
<get-ddos-lacp-parameters>
show ddos-protection protocols lacp statistics
<get-ddos-lacp-statistics>
show ddos-protection protocols lacp violations
<get-ddos-lacp-violations>
show ddos-protection protocols ldp
<get-ddos-ldp-information>
show ddos-protection protocols ldp aggregate
<get-ddos-ldp-aggregate>
show ddos-protection protocols ldp parameters
<get-ddos-ldp-parameters>
show ddos-protection protocols ldp statistics
<get-ddos-ldp-statistics>
show ddos-protection protocols ldp violations
<get-ddos-ldp-violations>
show ddos-protection protocols ldp-hello
<get-ddos-ldp-hello-information>
show ddos-protection protocols ldp-hello aggregate
<get-ddos-ldp-hello-aggregate>
show ddos-protection protocols ldp-hello aggregate culprit-flows
<get-ddos-ldp-hello-aggregate-flows>
show ddos-protection protocols ldp-hello culprit-flows
<get-ddos-ldp-hello-flows>
show ddos-protection protocols ldp-hello flow-detection
<get-ddos-ldp-hello-flow-parameters>
show ddos-protection protocols ldp-hello parameters
<get-ddos-ldp-hello-parameters>
show ddos-protection protocols ldp-hello statistics
<get-ddos-ldp-hello-statistics>
show ddos-protection protocols ldp-hello violations
<get-ddos-ldp-hello-violations>
show ddos-protection protocols ldpv6
<get-ddos-ldpv6-information>
show ddos-protection protocols ldpv6 aggregate
<get-ddos-ldpv6-aggregate>
show ddos-protection protocols ldpv6 parameters
<get-ddos-ldpv6-parameters>
show ddos-protection protocols ldpv6 statistics
<get-ddos-ldpv6-statistics>
show ddos-protection protocols ldpv6 violations
<get-ddos-ldpv6-violations>
show ddos-protection protocols lldp
<get-ddos-lldp-information>
show ddos-protection protocols lldp aggregate
<get-ddos-lldp-aggregate>
show ddos-protection protocols lldp parameters
<get-ddos-lldp-parameters>
show ddos-protection protocols lldp statistics
<get-ddos-lldp-statistics>
show ddos-protection protocols lldp violations
<get-ddos-lldp-violations>
show ddos-protection protocols lmp
```

```
<get-ddos-lmp-information>
show ddos-protection protocols lmp aggregate
<get-ddos-lmp-aggregate>
show ddos-protection protocols lmp parameters
<get-ddos-lmp-parameters>
show ddos-protection protocols lmp statistics
<get-ddos-lmp-statistics>
show ddos-protection protocols lmp violations
<get-ddos-lmp-violations>
show ddos-protection protocols lmpv6
<get-ddos-lmpv6-information>
show ddos-protection protocols lmpv6 aggregate
<get-ddos-lmpv6-aggregate>
show ddos-protection protocols lmpv6 parameters
<get-ddos-lmpv6-parameters>
show ddos-protection protocols lmpv6 statistics
<get-ddos-lmpv6-statistics>
show ddos-protection protocols lmpv6 violations
<get-ddos-lmpv6-violations>
show ddos-protection protocols localnh
  <get-ddos-localnh-information>
show ddos-protection protocols localnh aggregate
  <get-ddos-localnh-aggregate>
show ddos-protection protocols localnh aggregate culprit-flows
  <get-ddos-localnh-aggregate-flows>
show ddos-protection protocols localnh culprit-flows
  <get-ddos-localnh-flows>
show ddos-protection protocols localnh flow-detection
  <get-ddos-localnh-flow-parameters>
show ddos-protection protocols localnh parameters
  <get-ddos-localnh-parameters>
show ddos-protection protocols localnh statistics
  <get-ddos-localnh-statistics>
show ddos-protection protocols localnh violations
  <get-ddos-localnh-violations>
show ddos-protection protocols mac-host
  <get-ddos-mac-host-information>
show ddos-protection protocols mac-host aggregate
  <get-ddos-mac-host-aggregate>
show ddos-protection protocols mac-host aggregate culprit-flows
  <get-ddos-mac-host-aggregate-flows>
show ddos-protection protocols mac-host culprit-flows
  <get-ddos-mac-host-flows>
show ddos-protection protocols mac-host flow-detection
  <get-ddos-mac-host-flow-parameters>
show ddos-protection protocols mac-host parameters
  <get-ddos-mac-host-parameters>
show ddos-protection protocols mac-host statistics
  <get-ddos-mac-host-statistics>
show ddos-protection protocols mac-host violations
  <get-ddos-mac-host-violations>
show ddos-protection protocols martian-address
  <get-ddos-martian-address-information>
show ddos-protection protocols martian-address aggregate
  <get-ddos-martian-address-aggregate>
show ddos-protection protocols martian-address aggregate culprit-flows
  <get-ddos-martian-address-aggregate-flows>
show ddos-protection protocols martian-address culprit-flows
  <get-ddos-martian-address-flows>
show ddos-protection protocols martian-address flow-detection
```

```

    <get-ddos-martian-address-flow-parameters>
show ddos-protection protocols martian-address parameters
    <get-ddos-martian-address-parameters>
show ddos-protection protocols martian-address statistics
    <get-ddos-martian-address-statistics>
show ddos-protection protocols martian-address violations
    <get-ddos-martian-address-violations>
show ddos-protection protocols mac-host
    <get-ddos-mac-host-information>
show ddos-protection protocols mac-host aggregate
    <get-ddos-mac-host-aggregate>
show ddos-protection protocols mac-host parameters
    <get-ddos-mac-host-parameters>
show ddos-protection protocols mac-host statistics
    <get-ddos-mac-host-statistics>
show ddos-protection protocols mac-host violations
    <get-ddos-mac-host-violations>
show ddos-protection protocols mcast-snoop mld
    <get-ddos-mcast-snoop-mld>
show ddos-protection protocols mcast-snoop mld culprit-flows
    <get-ddos-mcast-snoop-mld-flows>
show ddos-protection protocols mld
    <get-ddos-mld-information>
show ddos-protection protocols mld aggregate
    <get-ddos-mld-aggregate>
show ddos-protection protocols mld aggregate culprit-flows
    <get-ddos-mld-aggregate-flows>
show ddos-protection protocols mld culprit-flows
    <get-ddos-mld-flows>
show ddos-protection protocols mld flow-detection
    <get-ddos-mld-flow-parameters>
show ddos-protection protocols mld parameters
    <get-ddos-mld-parameters>
show ddos-protection protocols mld statistics
    <get-ddos-mld-statistics>
show ddos-protection protocols mld violations
    <get-ddos-mld-violations>
show ddos-protection protocols mlp
    <get-ddos-mlp-information>
show ddos-protection protocols mlp add
    <get-ddos-mlp-add>
show ddos-protection protocols mlp add culprit-flows
    <get-ddos-mlp-add-flows>
show ddos-protection protocols mlp aggregate
    <get-ddos-mlp-aggregate>
show ddos-protection protocols mlp aggregate culprit-flows
    <get-ddos-mlp-aggregate-flows>
show ddos-protection protocols mlp culprit-flows
    <get-ddos-mlp-flows>
show ddos-protection protocols mlp delete
    <get-ddos-mlp-delete>
show ddos-protection protocols mlp delete culprit-flows
    <get-ddos-mlp-delete-flows>
show ddos-protection protocols mlp flow-detection
    <get-ddos-mlp-flow-parameters>
show ddos-protection protocols mlp lookup
    <get-ddos-mlp-lookup>
show ddos-protection protocols mlp lookup culprit-flows
    <get-ddos-mlp-lookup-flows>
show ddos-protection protocols mlp macpin-exception
    <get-ddos-mlp-mac-pinning>

```

```
show ddos-protection protocols mlp macpin-exception culprit-flows
<get-ddos-mlp-mac-pinning-flows>
show ddos-protection protocols mlp aging-exception
<get-ddos-mlp-aging-exc>
show ddos-protection protocols mlp packets
<get-ddos-mlp-packets>
show ddos-protection protocols mlp parameters
get-ddos-mlp-parameters
show ddos-protection protocols mlp statistics
<get-ddos-mlp-statistics>
show ddos-protection protocols mlp unclassified
<get-ddos-mlp-unclass>
show ddos-protection protocols mlp violations
<get-ddos-mlp-violations>
show ddos-protection protocols msdp
<get-ddos-msdp-information>
show ddos-protection protocols msdp aggregate
<get-ddos-msdp-aggregate>
show ddos-protection protocols msdp parameters
<get-ddos-msdp-parameters>
show ddos-protection protocols msdp statistics
<get-ddos-msdp-statistics>
show ddos-protection protocols msdp violations
<get-ddos-msdp-violations>
show ddos-protection protocols msdpv6
<get-ddos-msdpv6-information>
show ddos-protection protocols msdpv6 aggregate
<get-ddos-msdpv6-aggregate>
show ddos-protection protocols msdpv6 parameters
<get-ddos-msdpv6-parameters>
show ddos-protection protocols msdpv6 statistics
<get-ddos-msdpv6-statistics>
show ddos-protection protocols msdpv6 violations
<get-ddos-msdpv6-violations>
show ddos-protection protocols multihop-bfd
<get-ddos-mhop-bfd-information>
show ddos-protection protocols multihop-bfd aggregate
<get-ddos-mhop-bfd-aggregate>
show ddos-protection protocols multihop-bfd aggregate culprit-flows
<get-ddos-mhop-bfd-aggregate-flows>
show ddos-protection protocols multihop-bfd culprit-flows
<get-ddos-mhop-bfd-flows>
show ddos-protection protocols multihop-bfd flow-detection
<get-ddos-mhop-bfd-flow-parameters>
show ddos-protection protocols multihop-bfd parameters
<get-ddos-mhop-bfd-parameters>
show ddos-protection protocols multihop-bfd statistics
<get-ddos-mhop-bfd-statistics>
show ddos-protection protocols multihop-bfd violations
<get-ddos-mhop-bfd-violations>
show ddos-protection protocols multicast-copy
<get-ddos-mcast-copy-information>
show ddos-protection protocols multicast-copy aggregate
<get-ddos-mcast-copy-aggregate>
show ddos-protection protocols multicast-copy parameters
<get-ddos-mcast-copy-parameters>
show ddos-protection protocols multicast-copy statistics
<get-ddos-mcast-copy-statistics>
show ddos-protection protocols multicast-copy violations
<get-ddos-mcast-copy-violations>
show ddos-protection protocols mvrp
```

```

    <get-ddos-mvrp-information>
show ddos-protection protocols mvrp aggregate
    <get-ddos-mvrp-aggregate>
show ddos-protection protocols mvrp parameters
    <get-ddos-mvrp-parameters>
show ddos-protection protocols mvrp statistics
    <get-ddos-mvrp-statistics>
show ddos-protection protocols mvrp violations
    <get-ddos-mvrp-violations>
show ddos-protection protocols ndpv6
    <get-ddos-ndpv6-information>
show ddos-protection protocols ndpv6 aggregate
    <get-ddos-ndpv6-aggregate>
show ddos-protection protocols ndpv6 aggregate culprit-flows
    <get-ddos-ndpv6-aggregate-flows>
show ddos-protection protocols ndpv6 culprit-flows
    <get-ddos-ndpv6-flows>
show ddos-protection protocols ndpv6 flow-detection
    <get-ddos-ndpv6-flow-parameters>
show ddos-protection protocols ndpv6 neighbor-advertisement
    <get-ddos-ndpv6-neighb-adv>
show ddos-protection protocols ndpv6 neighbor-advertisement culprit-flows
    <get-ddos-ndpv6-neighb-adv-flows>
show ddos-protection protocols ndpv6 neighbor-solicitation
    <get-ddos-ndpv6-neighb-sol>
show ddos-protection protocols ndpv6 neighbor-solicitation culprit-flows
    <get-ddos-ndpv6-neighb-sol-flows>
show ddos-protection protocols ndpv6 parameters
    <get-ddos-ndpv6-parameters>
show ddos-protection protocols ndpv6 redirect
    <get-ddos-ndpv6-redirect>
show ddos-protection protocols ndpv6 redirect culprit-flows
    <get-ddos-ndpv6-redirect-flows>
show ddos-protection protocols ndpv6 router-advertisement
    <get-ddos-ndpv6-router-adv>
show ddos-protection protocols ndpv6 router-advertisement culprit-flows
    <get-ddos-ndpv6-router-adv-flows>
show ddos-protection protocols ndpv6 router-solicitation
    <get-ddos-ndpv6-router-sol>
show ddos-protection protocols ndpv6 router-solicitation culprit-flows
    <get-ddos-ndpv6-router-sol-flows>
show ddos-protection protocols nonucast-switch
    <get-ddos-nonucast-switch-information>
show ddos-protection protocols nonucast-switch aggregate
    <get-ddos-nonucast-switch-aggregate>
show ddos-protection protocols nonucast-switch aggregate culprit-flows
    <get-ddos-nonucast-switch-aggregate-flows>
show ddos-protection protocols nonucast-switch culprit-flows
    <get-ddos-nonucast-switch-flows>
show ddos-protection protocols nonucast-switch flow-detection
    <get-ddos-nonucast-switch-flow-parameters>
show ddos-protection protocols nonucast-switch parameters
    <get-ddos-nonucast-switch-parameters>
show ddos-protection protocols nonucast-switch statistics
    <get-ddos-nonucast-switch-statistics>
show ddos-protection protocols nonucast-switch violations
    <get-ddos-nonucast-switch-violations>
show ddos-protection protocols ntp
    get-ddos-ntp-information
show ddos-protection protocols ntp aggregate

```

```
get-ddos-ntp-aggregate
show ddos-protection protocols ntp parameters
get-ddos-ntp-parameters
show ddos-protection protocols ntp statistics
get-ddos-ntp-statistics
show ddos-protection protocols ntp violations
get-ddos-ntp-violations
show ddos-protection protocols oam-cfm
get-ddos-oam-cfm-information
show ddos-protection protocols oam-cfm aggregate
<get-ddos-oam-cfm-aggregate>
show ddos-protection protocols oam-cfm aggregate culprit-flows
<get-ddos-oam-cfm-aggregate-flows>
show ddos-protection protocols oam-cfm culprit-flows
<get-ddos-oam-cfm-flows>
show ddos-protection protocols oam-cfm flow-detection
<get-ddos-oam-cfm-flow-parameters>
show ddos-protection protocols oam-cfm parameters
<get-ddos-oam-cfm-parameters>
show ddos-protection protocols oam-cfm statistics
<get-ddos-oam-cfm-statistics>
show ddos-protection protocols oam-cfm violations
<get-ddos-oam-cfm-violations>
show ddos-protection protocols oam-lfm
get-ddos-oam-lfm-information
show ddos-protection protocols oam-lfm aggregate
get-ddos-oam-lfm-aggregate
show ddos-protection protocols oam-lfm parameters
get-ddos-oam-lfm-parameters
show ddos-protection protocols oam-lfm statistics
get-ddos-oam-lfm-statistics
show ddos-protection protocols oam-lfm violations
get-ddos-oam-lfm-violations
show ddos-protection protocols ospf
get-ddos-ospf-information
show ddos-protection protocols ospf aggregate
get-ddos-ospf-aggregate
show ddos-protection protocols ospf parameters
get-ddos-ospf-parameters
show ddos-protection protocols ospf statistics
get-ddos-ospf-statistics
show ddos-protection protocols ospf violations
get-ddos-ospf-violations
show ddos-protection protocols ospf-hello
<get-ddos-ospf-hello-information>
show ddos-protection protocols ospf-hello aggregate
<get-ddos-ospf-hello-aggregate>
show ddos-protection protocols ospf-hello aggregate culprit-flows
<get-ddos-ospf-hello-aggregate-flows>
show ddos-protection protocols ospf-hello culprit-flows
<get-ddos-ospf-hello-flows>
show ddos-protection protocols ospf-hello flow-detection
<get-ddos-ospf-hello-flow-parameters>
show ddos-protection protocols ospf-hello parameters
<get-ddos-ospf-hello-parameters>
show ddos-protection protocols ospf-hello statistics
<get-ddos-ospf-hello-statistics>
show ddos-protection protocols ospf-hello violations
<get-ddos-ospf-hello-violations>
show ddos-protection protocols ospfv3v6
```



```

get-ddos-ospfv3v6-information
show ddos-protection protocols ospfv3v6 aggregate
get-ddos-ospfv3v6-aggregate
show ddos-protection protocols ospfv3v6 parameters
get-ddos-ospfv3v6-parameters
show ddos-protection protocols ospfv3v6 statistics
get-ddos-ospfv3v6-statistics
show ddos-protection protocols ospfv3v6 violations
get-ddos-ospfv3v6-violations
show ddos-protection protocols parameters
get-ddos-protocols-parameters
show ddos-protection protocols pfe-alive
get-ddos-pfe-alive-information
show ddos-protection protocols pfe-alive aggregate
get-ddos-pfe-alive-aggregate
show ddos-protection protocols pfe-alive parameters
get-ddos-pfe-alive-parameters
show ddos-protection protocols pfe-alive statistics
get-ddos-pfe-alive-statistics
show ddos-protection protocols pfe-alive violations
get-ddos-pfe-alive-violations
show ddos-protection protocols pim
get-ddos-pim-information
show ddos-protection protocols pim aggregate
get-ddos-pim-aggregate
show ddos-protection protocols pim aggregate culprit-flows
show ddos-protection protocols pim parameters
get-ddos-pim-parameters
show ddos-protection protocols pim statistics
get-ddos-pim-statistics
show ddos-protection protocols pim violations
get-ddos-pim-violations
show ddos-protection protocols pim-ctrl
<get-ddos-pim-ctrl-information>
show ddos-protection protocols pim-ctrl aggregate
<get-ddos-pim-ctrl-aggregate>
show ddos-protection protocols pim-ctrl aggregate culprit-flows
<get-ddos-pim-ctrl-aggregate-flows>
show ddos-protection protocols pim-ctrl culprit-flows
<get-ddos-pim-ctrl-flows>
show ddos-protection protocols pim-ctrl flow-detection
<get-ddos-pim-ctrl-flow-parameters>
show ddos-protection protocols pim-ctrl parameters
<get-ddos-pim-ctrl-parameters>
show ddos-protection protocols pim-ctrl statistics
<get-ddos-pim-ctrl-statistics>
show ddos-protection protocols pim-ctrl violations
<get-ddos-pim-ctrl-violations>
show ddos-protection protocols pim-data
<get-ddos-pim-data-information>
show ddos-protection protocols pim-data aggregate
<get-ddos-pim-data-aggregate>
show ddos-protection protocols pim-data aggregate culprit-flows
<get-ddos-pim-data-aggregate-flows>
show ddos-protection protocols pim-data culprit-flows
<get-ddos-pim-data-flows>
show ddos-protection protocols pim-data flow-detection
<get-ddos-pim-data-flow-parameters>
show ddos-protection protocols pim-data parameters
<get-ddos-pim-data-parameters>

```

```
show ddos-protection protocols pim-data statistics
<get-ddos-pim-data-statistics>
show ddos-protection protocols pim-data violations
<get-ddos-pim-data-violations>
show ddos-protection protocols pimv6
  <get-ddos-pimv6-information>
show ddos-protection protocols pimv6 aggregate
  <get-ddos-pimv6-aggregate>
show ddos-protection protocols pimv6 aggregate culprit-flows
show ddos-protection protocols pimv6 parameters
  <get-ddos-pimv6-parameters>
show ddos-protection protocols pimv6 statistics
  <get-ddos-pimv6-statistics>
show ddos-protection protocols pimv6 violations
  <get-ddos-pimv6-violations>
show ddos-protection protocols pkt-inject
  <get-ddos-pkt-inject-information>
show ddos-protection protocols pkt-inject aggregate
  <get-ddos-pkt-inject-aggregate>
show ddos-protection protocols pkt-inject aggregate culprit-flows
  <get-ddos-pkt-inject-aggregate-flows>
show ddos-protection protocols pkt-inject culprit-flows
  <get-ddos-pkt-inject-flows>
show ddos-protection protocols pkt-inject flow-detection
  <get-ddos-pkt-inject-flow-parameters>
show ddos-protection protocols pkt-inject parameters
  <get-ddos-pkt-inject-parameters>
show ddos-protection protocols pkt-inject statistics
  <get-ddos-pkt-inject-statistics>
show ddos-protection protocols pkt-inject violations
  <get-ddos-pkt-inject-violations>

show ddos-protection protocols pmvrp
  get-ddos-pmvrp-information
show ddos-protection protocols pmvrp aggregate
  get-ddos-pmvrp-aggregate
show ddos-protection protocols pmvrp parameters
  get-ddos-pmvrp-parameters
show ddos-protection protocols pmvrp statistics
  get-ddos-pmvrp-statistics
show ddos-protection protocols pmvrp violations
  get-ddos-pmvrp-violations
show ddos-protection protocols pos
  get-ddos-pos-information
show ddos-protection protocols pos aggregate
  get-ddos-pos-aggregate
show ddos-protection protocols pos aggregate culprit-flows
show ddos-protection protocols pos parameters
  get-ddos-pos-parameters
show ddos-protection protocols pos statistics
  get-ddos-pos-statistics
show ddos-protection protocols pos violations
  get-ddos-pos-violations
show ddos-protection protocols ppp
  get-ddos-ppp-information
show ddos-protection protocols ppp aggregate
  get-ddos-ppp-aggregate
show ddos-protection protocols ppp authentication
  get-ddos-ppp-auth
```

```

show ddos-protection protocols ppp authentication culprit-flows
show ddos-protection protocols ppp ipcp
  get-ddos-ppp-ipcp
show ddos-protection protocols ppp ipv6cp
  get-ddos-ppp-ipv6cp
show ddos-protection protocols ppp isis
  get-ddos-ppp-isis
show ddos-protection protocols ppp isis culprit-flows
show ddos-protection protocols ppp lcp
  get-ddos-ppp-lcp
show ddos-protection protocols ppp lcp culprit-flows
show ddos-protection protocols ppp mplsdp
  get-ddos-ppp-mplsdp
show ddos-protection protocols ppp mplsdp culprit-flows
show ddos-protection protocols ppp parameters
  get-ddos-ppp-parameters
show ddos-protection protocols ppp statistics
  get-ddos-ppp-statistics
show ddos-protection protocols ppp unclassified
<get-ddos-ppp-unclass>
show ddos-protection protocols ppp violations
  get-ddos-ppp-violations
show ddos-protection protocols pppoe
  get-ddos-pppoe-information
show ddos-protection protocols pppoe aggregate
  get-ddos-pppoe-aggregate
show ddos-protection protocols pppoe padi
  get-ddos-pppoe-padi
show ddos-protection protocols pppoe padm
  get-ddos-pppoe-padm
show ddos-protection protocols pppoe padn
  get-ddos-pppoe-padn
show ddos-protection protocols pppoe pado
  get-ddos-pppoe-pado
show ddos-protection protocols pppoe padr
  get-ddos-pppoe-padr
show ddos-protection protocols pppoe pads
  get-ddos-pppoe-pads
show ddos-protection protocols pppoe padt
  get-ddos-pppoe-padt
show ddos-protection protocols pppoe parameters
  get-ddos-pppoe-parameters
show ddos-protection protocols pppoe statistics
  get-ddos-pppoe-statistics
show ddos-protection protocols pppoe violations
  get-ddos-pppoe-violations
show ddos-protection protocols proto-802-1x
<get-ddos-8021x-information>
show ddos-protection protocols proto-802-1x aggregate
<get-ddos-8021x-aggregate>
show ddos-protection protocols proto-802-1x aggregate culprit-flows
  get-ddos-8021x-aggregate-flows
show ddos-protection protocols proto-802-1x culprit-flows
<get-ddos-8021x-flows>
show ddos-protection protocols proto-802-1x flow-detection
<get-ddos-8021x-flow-parameters>
show ddos-protection protocols proto-802-1x parameters
<get-ddos-8021x-parameters>
show ddos-protection protocols proto-802-1x statistics
<get-ddos-8021x-statistics>

```

```
show ddos-protection protocols proto-802-1x violations
<get-ddos-8021x-violations>
show ddos-protection protocols ptp
  get-ddos-ntp-information
show ddos-protection protocols ptp aggregate
  get-ddos-ntp-aggregate
show ddos-protection protocols ptp aggregate culprit-flows
show ddos-protection protocols ptp parameters
  get-ddos-ntp-parameters
show ddos-protection protocols ptp statistics
  get-ddos-ntp-statistics
show ddos-protection protocols ptp violations
  get-ddos-ntp-violations
show ddos-protection protocols ptpv6
<get-ddos-ntpv6-information>
show ddos-protection protocols ptpv6 aggregate
<get-ddos-ntpv6-aggregate>
show ddos-protection protocols ptpv6 aggregate culprit-flows
<get-ddos-ntpv6-aggregate-flows>
show ddos-protection protocols ptpv6 culprit-flows
<get-ddos-ntpv6-flows>
show ddos-protection protocols ptpv6 flow-detection
<get-ddos-ntpv6-flow-parameters>
show ddos-protection protocols ptpv6 parameters
<get-ddos-ntpv6-parameters>
show ddos-protection protocols ptpv6 statistics
<get-ddos-ntpv6-statistics>
show ddos-protection protocols ptpv6 violations
<get-ddos-ntpv6-violations>
show ddos-protection protocols pvstp
  get-ddos-pvstp-information
show ddos-protection protocols pvstp aggregate
  get-ddos-pvstp-aggregate
show ddos-protection protocols pvstp parameters
  get-ddos-pvstp-parameters
show ddos-protection protocols pvstp statistics
  get-ddos-pvstp-statistics
show ddos-protection protocols pvstp violations
  get-ddos-pvstp-violations
show ddos-protection protocols radius
  get-ddos-radius-information
show ddos-protection protocols radius accounting
  get-ddos-radius-account
show ddos-protection protocols radius aggregate
  get-ddos-radius-aggregate
show ddos-protection protocols radius accounting culprit-flows
show ddos-protection protocols radius authorization
  get-ddos-radius-auth
show ddos-protection protocols radius parameters
  get-ddos-radius-parameters
show ddos-protection protocols radius server
  get-ddos-radius-server
show ddos-protection protocols radius statistics
  get-ddos-radius-statistics
show ddos-protection protocols radius violations
  get-ddos-radius-violations
show ddos-protection protocols re-services
  <get-ddos-re-services-information>
show ddos-protection protocols re-services aggregate
  <get-ddos-re-services-aggregate>
```

```

show ddos-protection protocols re-services aggregate culprit-flows
  <get-ddos-re-services-aggregate-flows>
show ddos-protection protocols re-services captive-portal
  <get-ddos-re-services-captive-portal>
show ddos-protection protocols re-services captive-portal culprit-flows
  <get-ddos-re-services-captive-portal-flows>
show ddos-protection protocols re-services culprit-flows
  <get-ddos-re-services-flows>
show ddos-protection protocols re-services flow-detection
  <get-ddos-re-services-flow-parameters>
show ddos-protection protocols re-services parameters
  <get-ddos-re-services-parameters>
show ddos-protection protocols re-services statistics
  <get-ddos-re-services-statistics>
show ddos-protection protocols re-services violations
  <get-ddos-re-services-violations>
show ddos-protection protocols re-services-v6
  <get-ddos-re-services-v6-information>
show ddos-protection protocols re-services-v6 aggregate
  <get-ddos-re-services-v6-aggregate>
show ddos-protection protocols re-services-v6 aggregate culprit-flows
  <get-ddos-re-services-v6-aggregate-flows>
show ddos-protection protocols re-services-v6 captive-portal
  <get-ddos-re-services-v6-captive-portal-v6>
show ddos-protection protocols re-services-v6 captive-portal culprit-flows
  <get-ddos-re-services-v6-captive-portal-v6-flows>
show ddos-protection protocols re-services-v6 culprit-flows
  <get-ddos-re-services-v6-flows>
show ddos-protection protocols re-services-v6 flow-detection
  <get-ddos-re-services-v6-flow-parameters>
show ddos-protection protocols re-services-v6 parameters
  <get-ddos-re-services-v6-parameters>
show ddos-protection protocols re-services-v6 statistics
  <get-ddos-re-services-v6-statistics>
show ddos-protection protocols re-services-v6 violations
  <get-ddos-re-services-v6-violations>
show ddos-protection protocols redirect
  get-ddos-redirect-information
show ddos-protection protocols redirect aggregate
  get-ddos-redirect-aggregate
show ddos-protection protocols redirect parameters
  get-ddos-redirect-parameters
show ddos-protection protocols redirect statistics
  get-ddos-redirect-statistics
show ddos-protection protocols redirect violations
  get-ddos-redirect-violations

show ddos-protection protocols reject
  <get-ddos-reject-information>
show ddos-protection protocols reject aggregate
  <get-ddos-reject-aggregate>
show ddos-protection protocols reject parameters
  <get-ddos-reject-parameters>
show ddos-protection protocols reject statistics
  <get-ddos-reject-statistics>
show ddos-protection protocols reject violations
  <get-ddos-reject-violations>
show ddos-protection protocols rejectv6show ddos-protection protocols rejectv6
  aggregate

```

```
show ddos-protection protocols rejectv6 aggregate culprit-flows
show ddos-protection protocols rejectv6 flow-detection
show ddos-protection protocols rejectv6 parameters
show ddos-protection protocols rejectv6 statistics
show ddos-protection protocols rejectv6 violations
show ddos-protection protocols rip
  get-ddos-rip-information
show ddos-protection protocols rip aggregate
  get-ddos-rip-aggregate
show ddos-protection protocols rip aggregate culprit-flows
show ddos-protection protocols rip culprit-flows
show ddos-protection protocols rip parameters
  get-ddos-rip-parameters
show ddos-protection protocols rip statistics
  get-ddos-rip-statistics
show ddos-protection protocols rip violations
  get-ddos-rip-violations
show ddos-protection protocols ripv6
  get-ddos-ripv6-information
show ddos-protection protocols ripv6 aggregate
  get-ddos-ripv6-aggregate
show ddos-protection protocols ripv6 aggregate culprit-flows
show ddos-protection protocols ripv6 parameters
  get-ddos-ripv6-parameters
show ddos-protection protocols ripv6 statistics
  get-ddos-ripv6-statistics
show ddos-protection protocols ripv6 violations
  get-ddos-ripv6-violations
show ddos-protection protocols rsvp
  get-ddos-rsvp-information
show ddos-protection protocols rsvp aggregate
  get-ddos-rsvp-aggregate
show ddos-protection protocols rsvp aggregate culprit-flows
show ddos-protection protocols rsvp parameters
  get-ddos-rsvp-parameters
show ddos-protection protocols rsvp statistics
  get-ddos-rsvp-statistics
show ddos-protection protocols rsvp violations
  get-ddos-rsvp-violations
show ddos-protection protocols rsvpv6
  get-ddos-rsvpv6-information
show ddos-protection protocols rsvpv6 aggregate
  get-ddos-rsvpv6-aggregate
show ddos-protection protocols rsvpv6 aggregate culprit-flows
show ddos-protection protocols rsvpv6 parameters
  get-ddos-rsvpv6-parameters
show ddos-protection protocols rsvpv6 statistics
  get-ddos-rsvpv6-statistics
show ddos-protection protocols rsvpv6 violations
  get-ddos-rsvpv6-violations
show ddos-protection protocols sample
  <get-ddos-sample-information>
show ddos-protection protocols sample aggregate
  <get-ddos-sample-aggregate>
show ddos-protection protocols sample aggregate culprit-flows
show ddos-protection protocols sample host
  <get-ddos-sample-host>
show ddos-protection protocols sample parameters
  <get-ddos-sample-parameters>
show ddos-protection protocols sample pfe
```

```
<get-ddos-sample-pfe>
show ddos-protection protocols sample pfe culprit-flows
show ddos-protection protocols sample sflow
<get-ddos-sample-sflow>
show ddos-protection protocols sample sflow culprit-flows
<get-ddos-sample-sflow-flows>
show ddos-protection protocols sample statistics
<get-ddos-sample-statistics>
show ddos-protection protocols sample syslog
show ddos-protection protocols sample tap
<get-ddos-sample-tap>
show ddos-protection protocols sample tap culprit-flows
show ddos-protection protocols sample violations
<get-ddos-sample-violations>
show ddos-protection protocols services
    get-ddos-services-information
show ddos-protection protocols sample-dest
<get-ddos-sample-dest-information>
show ddos-protection protocols sample-dest aggregate
<get-ddos-sample-dest-aggregate>
show ddos-protection protocols sample-dest aggregate culprit-flows
<get-ddos-sample-dest-aggregate-flows>
show ddos-protection protocols sample-dest culprit-flows
<get-ddos-sample-dest-flows>
show ddos-protection protocols sample-dest flow-detection
<get-ddos-sample-dest-flow-parameters>
show ddos-protection protocols sample-dest parameters
<get-ddos-sample-dest-parameters>
show ddos-protection protocols sample-dest statistics
<get-ddos-sample-dest-statistics>
show ddos-protection protocols sample-dest violations
<get-ddos-sample-dest-violations>
show ddos-protection protocols sample-source
<get-ddos-sample-source-information>
show ddos-protection protocols sample-source aggregate
<get-ddos-sample-source-aggregate>
show ddos-protection protocols sample-source aggregate culprit-flows
<get-ddos-sample-source-aggregate-flows>
show ddos-protection protocols sample-source culprit-flows
<get-ddos-sample-source-flows>
show ddos-protection protocols sample-source flow-detection
<get-ddos-sample-source-flow-parameters>
show ddos-protection protocols sample-source parameters
<get-ddos-sample-source-parameters>
show ddos-protection protocols sample-source statistics
<get-ddos-sample-source-statistics>
show ddos-protection protocols sample-source violations
<get-ddos-sample-source-violations>
show ddos-protection protocols services aggregate
    <get-ddos-services-aggregate>
show ddos-protection protocols services parameters
    <get-ddos-services-parameters>
show ddos-protection protocols services statistics
    <get-ddos-services-statistics>
show ddos-protection protocols syslog
    <get-ddos-syslog-information>
show ddos-protection protocols syslog aggregate
    <get-ddos-syslog-aggregate>
show ddos-protection protocols syslog aggregate culprit-flows
    <get-ddos-syslog-aggregate-flows>
```

```
show ddos-protection protocols syslog culprit-flows
  <get-ddos-syslog-flows>
show ddos-protection protocols syslog flow-detection
  <get-ddos-syslog-flow-parameters>
show ddos-protection protocols syslog parameters
  <get-ddos-syslog-parameters>
show ddos-protection protocols syslog statistics
  <get-ddos-syslog-statistics>
show ddos-protection protocols syslog violations
  <get-ddos-syslog-violations>
show ddos-protection protocols services violations
  get-ddos-services-violations
show ddos-protection protocols snmp
  get-ddos-snmp-information
show ddos-protection protocols snmp aggregate
  get-ddos-snmp-aggregate
show ddos-protection protocols snmp aggregate culprit-flows
show ddos-protection protocols snmp parameters
  get-ddos-snmp-parameters
show ddos-protection protocols snmp statistics
  get-ddos-snmp-statistics
show ddos-protection protocols snmp violations
  get-ddos-snmp-violations
show ddos-protection protocols snmpv6
  get-ddos-snmpv6-information
show ddos-protection protocols snmpv6 aggregate
  get-ddos-snmpv6-aggregate
show ddos-protection protocols snmpv6 aggregate culprit-flows
show ddos-protection protocols snmpv6 parameters
  get-ddos-snmpv6-parameters
show ddos-protection protocols snmpv6 statistics
  get-ddos-snmpv6-statistics
show ddos-protection protocols snmpv6 violations
  get-ddos-snmpv6-violations
show ddos-protection protocols ssh
  get-ddos-ssh-information
show ddos-protection protocols ssh aggregate
  get-ddos-ssh-aggregate
show ddos-protection protocols ssh parameters
  get-ddos-ssh-parameters
show ddos-protection protocols ssh statistics
  get-ddos-ssh-statistics
show ddos-protection protocols ssh violations
  get-ddos-ssh-violations
show ddos-protection protocols sshv6
  get-ddos-sshv6-information
show ddos-protection protocols sshv6 aggregate
  get-ddos-sshv6-aggregate
show ddos-protection protocols sshv6 parameters
  get-ddos-sshv6-parameters
show ddos-protection protocols sshv6 statistics
  <get-ddos-sshv6-statistics>
show ddos-protection protocols sshv6 violations
  <get-ddos-sshv6-violations>
show ddos-protection protocols statistics
  <get-ddos-protocols-statistics>
show ddos-protection protocols stp
  <get-ddos-stp-information>
show ddos-protection protocols stp aggregate
  <get-ddos-stp-aggregate>
```



```
show ddos-protection protocols stp parameters
  <get-ddos-stp-parameters>
show ddos-protection protocols stp statistics
  <get-ddos-stp-statistics>
show ddos-protection protocols stp violations
  <get-ddos-stp-violations>
show ddos-protection protocols tacacs
  <get-ddos-tacacs-information>
show ddos-protection protocols tacacs aggregate
  <get-ddos-tacacs-aggregate>
show ddos-protection protocols tacacs parameters
  <get-ddos-tacacs-parameters>
show ddos-protection protocols tacacs statistics
  <get-ddos-tacacs-statistics>
show ddos-protection protocols tacacs violations
  <get-ddos-tacacs-violations>

show ddos-protection protocols tcc
  <get-ddos-tcc-information>
show ddos-protection protocols tcc aggregate
  <get-ddos-tcc-aggregate>
show ddos-protection protocols tcc aggregate culprit-flows
  <get-ddos-tcc-aggregate-flows>
show ddos-protection protocols tcc culprit-flows
  <get-ddos-tcc-flows>
show ddos-protection protocols tcc ethernet-tcc
  <get-ddos-tcc-ethernet-tcc>
show ddos-protection protocols tcc ethernet-tcc culprit-flows
  <get-ddos-tcc-ethernet-tcc-flows>
show ddos-protection protocols tcc flow-detection
  <get-ddos-tcc-flow-parameters>
show ddos-protection protocols tcc iso-tcc
  <get-ddos-tcc-iso-tcc>
show ddos-protection protocols tcc iso-tcc culprit-flows
  <get-ddos-tcc-iso-tcc-flows>
show ddos-protection protocols tcc parameters
  <get-ddos-tcc-parameters>
show ddos-protection protocols tcc statistics
  <get-ddos-tcc-statistics>
show ddos-protection protocols tcc unclassified
  <get-ddos-tcc-unclass>
show ddos-protection protocols tcc unclassified culprit-flows
  <get-ddos-tcc-unclass-flows>
show ddos-protection protocols tcc violations
  <get-ddos-tcc-violations>
show ddos-protection protocols tcp-flags
  <get-ddos-tcp-flags-information>
show ddos-protection protocols tcp-flags aggregate
  <get-ddos-tcp-flags-aggregate>
show ddos-protection protocols tcp-flags established
  <get-ddos-tcp-flags-establish>
show ddos-protection protocols tcp-flags initial
  <get-ddos-tcp-flags-initial>
show ddos-protection protocols tcp-flags parameters
  <get-ddos-tcp-flags-parameters>
show ddos-protection protocols tcp-flags statistics
  <get-ddos-tcp-flags-statistics>
show ddos-protection protocols tcp-flags unclassified
  <get-ddos-tcp-flags-unclass>
show ddos-protection protocols tcp-flags violations
```

```
<get-ddos-tcp-flags-violations>
show ddos-protection protocols telnet
<get-ddos-telnet-information>
show ddos-protection protocols telnet aggregate
<get-ddos-telnet-aggregate>
show ddos-protection protocols telnet aggregate culprit-flows
show ddos-protection protocols telnet parameters
<get-ddos-telnet-parameters>
show ddos-protection protocols telnet statistics
<get-ddos-telnet-statistics>
show ddos-protection protocols telnet violations
<get-ddos-telnet-violations>
show ddos-protection protocols telnetv6
<get-ddos-telnetv6-information>
show ddos-protection protocols telnetv6 aggregate
<get-ddos-telnetv6-aggregate>
show ddos-protection protocols telnetv6 aggregate culprit-flows
show ddos-protection protocols telnetv6 parameters
<get-ddos-telnetv6-parameters>
show ddos-protection protocols telnetv6 statistics
<get-ddos-telnetv6-statistics>
show ddos-protection protocols telnetv6 violations
<get-ddos-telnetv6-violations>
show ddos-protection protocols ttl
<get-ddos-ttl-information>
show ddos-protection protocols ttl aggregate
<get-ddos-ttl-aggregate>
show ddos-protection protocols ttl parameters
<get-ddos-ttl-parameters>
show ddos-protection protocols ttl statistics
<get-ddos-ttl-statistics>
show ddos-protection protocols ttl violations
<get-ddos-ttl-violations>
show ddos-protection protocols tunnel-fragment
<get-ddos-tun-frag-information>
show ddos-protection protocols tunnel-fragment aggregate
<get-ddos-tun-frag-aggregate>
show ddos-protection protocols tunnel-fragment aggregate culprit-flows
show ddos-protection protocols tunnel-fragment parameters
<get-ddos-tun-frag-parameters>
show ddos-protection protocols tunnel-fragment statistics
<get-ddos-tun-frag-statistics>
show ddos-protection protocols tunnel-fragment violations
<get-ddos-tun-frag-violations>
show ddos-protection protocols tunnel-ka
<get-ddos-tunnel-ka-information>
show ddos-protection protocols tunnel-ka aggregate
<get-ddos-tunnel-ka-aggregate>
show ddos-protection protocols tunnel-ka aggregate culprit-flows
<get-ddos-tunnel-ka-aggregate-flows>
show ddos-protection protocols tunnel-ka culprit-flows
<get-ddos-tunnel-ka-flows>
show ddos-protection protocols tunnel-ka flow-detection
<get-ddos-tunnel-ka-flow-parameters>
show ddos-protection protocols tunnel-ka parameters
<get-ddos-tunnel-ka-parameters>
show ddos-protection protocols tunnel-ka statistics
<get-ddos-tunnel-ka-statistics>
show ddos-protection protocols tunnel-ka violations
<get-ddos-tunnel-ka-violations>
```

```
show ddos-protection protocols unknown-l2mc
  <get-ddos-unknown-l2mc-information>
show ddos-protection protocols unknown-l2mc aggregate
  <get-ddos-unknown-l2mc-aggregate>
show ddos-protection protocols unknown-l2mc aggregate culprit-flows
  <get-ddos-unknown-l2mc-aggregate-flows>
show ddos-protection protocols unknown-l2mc culprit-flows
  <get-ddos-unknown-l2mc-flows>
show ddos-protection protocols unknown-l2mc flow-detection
  <get-ddos-unknown-l2mc-flow-parameters>
show ddos-protection protocols unknown-l2mc parameters
  <get-ddos-unknown-l2mc-parameters>
show ddos-protection protocols unknown-l2mc statistics
  <get-ddos-unknown-l2mc-statistics>
show ddos-protection protocols unknown-l2mc violations
  <get-ddos-unknown-l2mc-violations>
show ddos-protection protocols unclassified
  <get-ddos-uncls-information>
show ddos-protection protocols unclassified aggregate
  <get-ddos-uncls-aggregate>
show ddos-protection protocols unclassified parameters
  <get-ddos-uncls-parameters>
show ddos-protection protocols unclassified resolve-v4
show ddos-protection protocols unclassified resolve-v4 culprit-flows
show ddos-protection protocols unclassified resolve-v6
show ddos-protection protocols unclassified resolve-v6 culprit-flows
show ddos-protection protocols unclassified statistics
  <get-ddos-uncls-statistics>
show ddos-protection protocols unclassified violations
  <get-ddos-uncls-violations>
show ddos-protection protocols urpf-fail
  <get-ddos-urpf-fail-information>
show ddos-protection protocols urpf-fail aggregate
  <get-ddos-urpf-fail-aggregate>
show ddos-protection protocols urpf-fail aggregate culprit-flows
  <get-ddos-urpf-fail-aggregate-flows>
show ddos-protection protocols urpf-fail culprit-flows
  <get-ddos-urpf-fail-flows>
show ddos-protection protocols urpf-fail flow-detection
  <get-ddos-urpf-fail-flow-parameters>
show ddos-protection protocols urpf-fail parameters
  <get-ddos-urpf-fail-parameters>
show ddos-protection protocols urpf-fail statistics
  <get-ddos-urpf-fail-statistics>
show ddos-protection protocols urpf-fail violations
  <get-ddos-urpf-fail-violations>
show ddos-protection protocols vcipc-udp
  <get-ddos-vcipc-udp-information>
show ddos-protection protocols vcipc-udp aggregate
  <get-ddos-vcipc-udp-aggregate>
show ddos-protection protocols vcipc-udp aggregate culprit-flows
  <get-ddos-vcipc-udp-aggregate-flows>
show ddos-protection protocols vcipc-udp culprit-flows
  <get-ddos-vcipc-udp-flows>
show ddos-protection protocols vcipc-udp flow-detection
  <get-ddos-vcipc-udp-flow-parameters>
show ddos-protection protocols vcipc-udp parameters
  <get-ddos-vcipc-udp-parameters>
show ddos-protection protocols vcipc-udp statistics
  <get-ddos-vcipc-udp-statistics>
```

```
show ddos-protection protocols vcipc-udp violations
  <get-ddos-vcipc-udp-violations>
show ddos-protection protocols violations
  get-ddos-protocols-violations
show ddos-protection protocols virtual-chassis
  get-ddos-vchassis-information
show ddos-protection protocols virtual-chassis aggregate
  get-ddos-vchassis-aggregate
show ddos-protection protocols virtual-chassis aggregate culprit-flows
show ddos-protection protocols virtual-chassis control-high
  get-ddos-vchassis-control-hi
show ddos-protection protocols virtual-chassis control-low
  get-ddos-vchassis-control-lo
show ddos-protection protocols virtual-chassis parameters
  get-ddos-vchassis-parameters
show ddos-protection protocols virtual-chassis statistics
  get-ddos-vchassis-statistics
show ddos-protection protocols virtual-chassis unclassified
  get-ddos-vchassis-unclass
show ddos-protection protocols virtual-chassis vc-packets
  get-ddos-vchassis-vc-packets
show ddos-protection protocols virtual-chassis vc-ttl-errors
  get-ddos-vchassis-vc-ttl-err
show ddos-protection protocols virtual-chassis violations
  get-ddos-vchassis-violations
show ddos-protection protocols vrrp
  get-ddos-vrrp-information
show ddos-protection protocols vrrp aggregate
  get-ddos-vrrp-aggregate
show ddos-protection protocols vrrp aggregate culprit-flows
show ddos-protection protocols vrrp parameters
  get-ddos-vrrp-parameters
show ddos-protection protocols vrrp statistics
  get-ddos-vrrp-statistics
show ddos-protection protocols vrrp violations
  get-ddos-vrrp-violations
show ddos-protection protocols vrrpv6
  get-ddos-vrrpv6-information
show ddos-protection protocols vrrpv6 aggregate
  get-ddos-vrrpv6-aggregate
show ddos-protection protocols vrrpv6 aggregate culprit-flows
show ddos-protection protocols vrrpv6 parameters
  get-ddos-vrrpv6-parameters
show ddos-protection protocols vrrpv6 statistics
  get-ddos-vrrpv6-statistics
show ddos-protection protocols vrrpv6 violations
  get-ddos-vrrpv6-violations
show ddos-protection statistics
  get-ddos-statistics-information
show ddos-protection version
  get-ddos-version
show ddos-protection protocols vxlan
  <get-ddos-vxlan-information>
show ddos-protection protocols vxlan aggregate
  <get-ddos-vxlan-aggregate>
show ddos-protection protocols vxlan aggregate culprit-flows
  <get-ddos-vxlan-aggregate-flows>
show ddos-protection protocols vxlan culprit-flows
  <get-ddos-vxlan-flows>
show ddos-protection protocols vxlan flow-detection
```

```

    <get-ddos-vxlan-flow-parameters>
show ddos-protection protocols vxlan parameters
    <get-ddos-vxlan-parameters>
show ddos-protection protocols vxlan statistics
    <get-ddos-vxlan-statistics>
show ddos-protection protocols vxlan violations
    <get-ddos-vxlan-violations>
show dhcp
show dhcp proxy-client
show dhcp proxy-client binding
show dhcp proxy-client servers
show dhcp proxy-client statistics
    <get-proxy-dhcp-client-statistics-information>
show dhcp relay
show dhcp relay binding
    <get-dhcp-relay-binding-information>

show dhcp relay binding interface
<get-dhcp-relay-interface-bindings>
show dhcp relay binding lease-time-violation
<get-dhcp-relay-binding-ltv-information>
show dhcp relay statistics
    <get-dhcp-relay-statistics-information>
show dhcp relay statistics bulk-leasequery-connections
<get-dhcp-relay-bulk-leasequery-conn-statistics>
show dhcp relay statistics leasequery
<get-dhcp-relay-leasequery-statistics>

show dhcp server
show dhcp server binding
    <get-dhcp-server-binding-information>

show dhcp server binding interface
<get-dhcp-relay-binding-interface>
show dhcp server binding lease-time-violation
<get-dhcp-server-binding-ltv-information>
show dhcp server statistics
    <get-dhcp-server-statistics-information>
show dhcp statistics
    <get-dhcp-service-statistics-information>
show dhcp-security
<get-dhcp-security-arp-inspection-statistics>
show dhcp-security binding
<get-dhcp-security-binding>
show dhcp-security binding interface
<get-dhcp-security-binding-interface>
show dhcp-security binding ip-address
<get-dhcp-security-binding-ip-address>
show dhcp-security binding ip-source-guard
<get-dhcp-security-ip-source-guard>
show dhcp-security binding statistics
<get-dhcp-security-binding-statistics>
show dhcp-security binding vlan
get-dhcp-security-binding-vlan
show dhcp-security ipv6
show dhcp-security ipv6 binding
<get-dhcpv6-security-binding>
show dhcp-security ipv6 binding interface
<get-dhcpv6-security-binding-interface>
show dhcp-security ipv6 binding ipv6-address

```

```
<get-dhcpv6-security-binding-ip-address>
show dhcp-security ipv6 binding vlan
<get-dhcpv6-security-binding-vlan>
show dhcp-security ipv6 statistics
<get-dhcp-ipv6-statistics>
show dhcp-security neighbor-discovery-inspection
show dhcp-security neighbor-discovery-inspection statistics
<get-dhcp-security-nd-inspection-statistics>
show dhcp-security neighbor-discovery-inspection statistics interface
<get-dhcp-security-ndi-interface>
show dhcp-security statistics
<get-dhcp-security-statistics>

show dhcpv6
show dhcpv6 client
show dhcpv6 client binding
get-dhcpv6-client-binding-information
show dhcpv6 client binding interface
<get-dhcpv6-client-binding-information-by-interface>
show dhcpv6 client statistics
<get-dhcpv6-client-statistics-information>
show dhcpv6 proxy-client
show dhcpv6 proxy-client binding
show dhcpv6 proxy-client statistics
  <get-proxy-dhcpv6-client-statistics-information>
show dhcpv6 relay
show dhcpv6 relay binding
  <get-dhcpv6-relay-binding-information>
show dhcpv6 relay binding interface
<get-dhcpv6-relay-binding-interface>
show dhcpv6 relay binding lease-time-violation
<get-dhcpv6-relay-binding-ltv-information>
show dhcpv6 relay statistics
  <get-dhcpv6-relay-statistics-information>
show dhcpv6 relay statistics bulk-leasequery-connections
<get-dhcpv6-relay-bulk-leasequery-conn-statistics>
show dhcpv6 relay statistics leasequery
<get-dhcpv6-relay-leasequery-statistics>
show dhcpv6 server
show dhcpv6 server binding
  <get-dhcpv6-server-binding-information>

show dhcpv6 server binding interface
<get-dhcpv6-server-binding-interface>
show dhcpv6 server binding lease-time-violation
<get-dhcpv6-server-binding-ltv-information>
show dhcpv6 server statistics
  <get-dhcpv6-server-statistics-information>
show dhcpv6 server statistics bulk-leasequery-connections
<get-dhcpv6-server-bulk-leasequery-conn-statistics>
show dhcpv6 statistics
  <get-dhcpv6-service-statistics-information>
show diagnostics
show diagnostics tdr
<get-tdr-interface-information>
show diagnostics tdr interface
<get-tdr-interface-status>
show diameter
  <get-diameter-information>
show diameter function
```

```

    <get-diameter-function-information>
show diameter function statistics
    <get-diameter-function-statistics>
show diameter instance
    <get-diameter-instance-information>
show diameter network-element
    <get-diameter-network-element-information>
show diameter network-element map
    <get-diameter-network-element-map-information>
show diameter peer
    <get-diameter-peer-information>
show diameter peer map
    <get-diameter-peer-map-information>
show diameter peer statistics
    <get-diameter-peer-statistics>
show diameter route
    <get-diameter-route-information>
show dot1x
show dot1x accounting-attributes
get-dot1x-accounting-attributes
show dot1x accounting-attributes interface
<get-dot1x-interface-accounting-attributes>show dot1x
authentication-failed-users
    <get-dot1x-authentication-failed-users>
show dot1x interface
    <get-dot1x-interface-information>
show dot1x static-mac-address
    <get-dot1x-static-mac-addresses>
show dot1x static-mac-address interface
    <get-dot1x-interface-mac-addresses>
show dvmrp
show dvmrp interfaces
    <get-dvmrp-interfaces-information>
show dvmrp neighbors
    <get-dvmrp-neighbors-information>
show dvmrp prefix
    <get-dvmrp-prefix-information>
show dvmrp prunes
    <get-dvmrp-prunes-information>
show dynamic-profile
    <get-dynamic-profile>
show dynamic-profile session
    <get-dynamic-profile-session-information>
show dynamic-tunnels
show dynamic-tunnels database
    <get-dynamic-tunnels-database>
show ethernet-switching mac-learning-log
    <get-ethernet-switching-log-information>
show ethernet-switching mac-notification
    <get-ethernet-switching-mac-notification-information>
show ethernet-switching flood next-hops
show ethernet-switching flood next-hops satellite
    <get-satellite-control-composite-next-hop>
show ethernet-switching flood satellite
    <get-satellite-control-flood>
show ethernet-switching nh-learn-entity
    <get-l2-learning-nh-learn-entries>
show ethernet-switching redundancy-groups
    <get-ethernet-switching-redundancy-groups>
show ethernet-switching satellite

```

```
show ethernet-switching satellite device
<get-satellite-device-db>
show ethernet-switching satellite events
<get-satellite-control-history-information>
show ethernet-switching satellite logging
<get-satellite-control-logging-information>
show ethernet-switching satellite summary
<get-satellite-control-bridge-summary>
show ethernet-switching table satellite
<get-satellite-control-bridge-mac-table>
show ethernet-switching vxlan-tunnel-end-point esi
<get-ethernet-switching-vxlan-esi-info>
show ethernet-switching vxlan-tunnel-end-point remote
<get-ethernet-switching-vxlan-rvtep-info>
show ethernet-switching vxlan-tunnel-end-point remote esi
<get-ethernet-switching-vxlan-esi-info>
show ethernet-switching vxlan-tunnel-end-point remote vtep-source-interface
<get-ethernet-switching-vxlan-remote-svtep-ip-information>
show ethernet-switching vxlan-tunnel-end-point source ip
<get-ethernet-switching-vxlan-svtep-ip-information>
show ephemeral-configuration
show esis
show esis adjacency
  <get-esis-adjacency-information>
show esis interface
  <get-esis-interface-information>
show esis statistics
  <get-esis-statistics-information>
show event-options
show event-options event-scripts
show event-options event-scripts policies
  <get-event-scripts-policies>
<get-event-summary>
show evpn
show evpn arp-table
<get-evpn-arp-table>
show evpn flood
<get-evpn-flood-information>
show evpn flood event-queue
<get-evpn-event-queue-information>
show evpn flood route
show evpn flood route all-ce-flood
<get-evpn-all-ce-flood-route-information>
show evpn flood route all-flood
<get-evpn-all-flood-route-information>
show evpn flood route alt-root-flood
<get-evpn-alt-root-flood-route-information>
show evpn flood route ce-flood
<get-evpn-ce-flood-route-information>
show evpn flood route mlp-flood
<get-evpn-mlp-flood-route-information>
show evpn flood route re-flood
<get-evpn-re-flood-route-information>
show evpn instance
<get-evpn-instance-information>show evpn ip-prefix-database
<get-evpn-ip-prefix-database-information>
show evpn l3-context
<get-evpn-l3-context-information>
show evpn mac-table
<get-evpn-mac-table>
```



```
show evpn mac-table interface
<get-evpn-interface-mac-table>
show evpn nd-table
<get-evpn-nd-table>
show evpn peer-gateway-macs
<get-evpn-peer-gateway-mac>
show evpn statistics
<get-evpn-statistics-information>
show evpn vpws-instance
<get-evpn-vpws-information>
show extensible-subscriber-services
show extensible-subscriber-services accounting
<get-extensible-subscriber-services-accounting>
show extensible-subscriber-services counters
<get-extensible-subscriber-services-counters>
show extensible-subscriber-services dictionary
<get-extensible-subscriber-services-dictionary>
show extensible-subscriber-services services
<get-extensible-subscriber-services-services>
show extensible-subscriber-services sessions
<get-extensible-subscriber-services-sessions>
show extension-provider
show extension-provider system
show extension-provider system connections
<get-mspinfo-connections>
show extension-provider system packages
<get-mspinfo-packages>
show extension-provider system processes
<get-mspinfo-processes>
show extension-provider system processes brief
<get-mspinfo-processes-brief>
show extension-provider system processes extensive
<get-mspinfo-processes-extensive>
show extension-provider system uptime
<get-mspinfo-uptime>
show extension-provider system virtual-memory
<get-core-key-list>
<get-fabric-summary-information>
<get-key-vg-binding>
<get-mac-ip-binding-information>
<get-mc-ccpc-cache-ccpc-select>
<get-mc-ccpc-cache-root-candidates>
<get-mc-ccpc-cache-spf>
<get-mc-ccpc-src-mod-filters>
<get-mc-edge-cache-ccpc-select>
<get-mc-edge-map-to-key-binding>
<get-mc-edge-key-to-map-binding>
<get-mc-edge-vg-portmap>
<get-mc-nsf>
<get-mc-root-cache-trunk>
<get-mc-root-key-to-map-binding>
<get-layer2-group-membership-entries>
<get-layer3-group-membership-entries>
<get-layer3-multicast-pending-routes>
<get-layer3-multicast-receivers>
<get-mc-root-map-to-key-binding>
<get-mc-root-vg-pfemap>
<get-fabric-multicast-statistics>
<get-mc-vccpdf-adjacency-database>
<get-mspinfo-virtual-memory>
```

```
get-fabric-statistics
get-fabric-summary-information
  <get-vlan-domain-map-information>
show fabric multicast dirty-key-info
  <get-mc-dirty-key-info>
show fabric multicast edge corekey-ifls-filters
  <get-mc-edge-corekey-ifls-filters>
show fabric multicast edge ine-ifls-filters
  <get-mc-edge-ine-ifls-filters>
show fabric multicast edge src-mod-filters
  <get-mc-edge-src-mod-filters>
show fabric multicast graph
show fabric multicast graph core-tree
  <get-fabric-multicast-graph>
show fabric multicast steal-key-info
  <get-mc-steal-key-info>
show forwarding-options
show forwarding-options enhanced-hash-key
show forwarding-options enhanced-hash-key fpc
show forwarding-options hyper-mode
  <get forwarding-options hyper-mode>
show forwarding-options load-balance
show forwarding-options next-hop-group
  <get-forwarding-options-next-hop-group>
show forwarding-options port-mirroring
  <get-forwarding-options-port-mirroring>
show helper
show helper statistics
  <get-helper-statistics-information>
show hfrr
show hfrr profiles
show iccp
  <get-inter-chassis-control-protocol-information>
show igmp
show igmp group
  <get-igmp-group-information>
show igmp interface
  <get-igmp-interface-information>
show igmp output-group
  <get-igmp-output-group-information>
show igmp snooping
show igmp snooping interface
  <get-igmp-snooping-interface-information>
show igmp snooping interface bridge-domain
  <get-igmp-snooping-bridge-domain-interface>
show igmp snooping membership
  <get-igmp-snooping-membership-information>
show igmp snooping membership bridge-domain
show igmp snooping options
  <get-igmp-snooping-options-information>
show igmp snooping options
  get-igmp-snooping-options-information
show igmp snooping statistics
  <get-igmp-snooping-statistics-information>
show igmp snooping statistics bridge-domain
  <get-igmp-snooping-bridge-domain-membership>
show igmp statistics
  <get-igmp-statistics-information>

show ike
```

```
show ike security-associations
  <get-ike-security-associations-information>

show ilmi
  <get-ilmi-information>
show ilmi interface
  <get-ilmi-interface-information>
show ilmi statistics
  <get-ilmi-statistics>
show ingress-replication
  <get-ingress-replication-information>
show interfaces
  <get-interface-information>
show interfaces anchor-group
show interfaces controller
  <get-interface-controller-information>
show interfaces destination-class
  <get-destination-class-statistics>

show interfaces destination-class all
  <get-all-destination-class-statistics>
show interfaces diagnostics
show interfaces diagnostics optics
  <get-interface-optics-diagnostics-information>
show interfaces diagnostics optics satellite
  <show-interface-optics-diagnostics-satellite>
show interfaces distribution-list
  <get-distribution-list-information>

show interfaces far-end-interval
  <show-interfaces-far-end-interval>
show interfaces filters
  <get-interface-filter-information>

show interfaces forwarding-class-counters
  <get-interface-fc-counters-information>

show interfaces interface-set
  <get-interface-set-information>
show interfaces interface-set queue
  <get-interface-set-queue-information>

show interfaces interval
  <show-interfaces-interval>
show interfaces lib-clients
  <get-dcd-lib-client-data>
show interfaces load-balancing
  <interface-load-balancing>
show interfaces mac-database
  <get-mac-database>

show interfaces mc-ae
  <get-mc-ae-interface-information>
show interfaces mc-ae revertive-info
  <get-mc-ae-revertive-information>
show interfaces policers
  <get-interface-policer-information>

show interfaces queue
  <get-interface-queue-information>
```

```
show interfaces redundancy
  <get-redundancy-status>
show interfaces redundancy detail
  <get-redundancy-status-details>
show interfaces routing
show interfaces source-class
  <get-source-class-statistics>

show interfaces source-class all
<get-all-source-class-statistics>
show interfaces targeting
  <get-targeting-information>
show interfaces transport
<get-interface-transport-information>
show interfaces transport optics
<get-interface-transport-optics-information>
show interfaces transport optics interval
<get-interface-transport-optics-interval-information>
show interfaces voq
<get-interface-voq-information>
show ipsec
show ipsec redundancy
show ipsec redundancy interface
  <get-ipsec-pic-redundancy-information>

show ipsec redundancy security-associations
  <get-ipsec-tunnel-redundancy-information>

show ipsec security-associations
  <get-security-associations-information>

show ipv6
show ipv6 neighbors
  <get-ipv6-nd-information>

show ipv6 router-advertisement
  <get-ipv6-ra-information>

show isis
show isis adjacency
  <get-isis-adjacency-information>

show isis authentication
  <get-isis-authentication-information>

show isis backup
show isis backup coverage
  <get-isis-backup-coverage-information>

show isis backup label-switched-path
  <get-isis-backup-lsp-information>

show isis backup spf

show isis backup spf results
  <get-isis-backup-spf-results-information>
show isis bgp-orr
<get-isis-bgprr-information>
```

```
show isis context-identifier
  <get-isis-context-identifier-information>

show isis context-identifier identifier
  <get-isis-context-identifier-origin-information>
show isis database
  <get-isis-database-information>

show isis hostname
  <get-isis-hostname-information>

show isis interface
  <get-isis-interface-information>
show isis interface-group
  <get-isis-interface-group-information>
show isis layer2-map
  <get-isis-layer2-map-information>

show isis overview
  <get-isis-overview-information>

show isis route
  <get-isis-route-information>

show isis spf
show isis spf brief
  <get-isis-spf-results-brief-information>

show isis spf log
  <get-isis-spf-log-information>

show isis spf results
  <get-isis-spf-results-information>

show isis statistics
  <get-isis-statistics-information>

show l2-learning
show l2-learning backbone-instance
  <get-l2-learning-backbone-instance>
show l2-learning evpn
show l2-learning evpn arp-statistics
  <get-evpn-arp-statistics>
show l2-learning evpn arp-statistics interface
  <get-evpn-arp-statistics-interface>
show l2-learning evpn nd-statistics
  <get-evpn-nd-statistics>
show l2-learning evpn nd-statistics interface
  <get-evpn-nd-statistics-interface>
show l2-learning global-information
  <get-l2-learning-global-information>
show l2-learning global-mac-count
  <get-l2-learning-global-mac-count>
show l2-learning instance
  <get-l2-learning-routing-instances>
show l2-learning interface
  <get-l2-learning-interface-information>
show l2-learning mac-move-buffer
  <get-l2-learning-mac-move-buffer-information>
show l2-learning provider-instance
```

```
<get-l2-learning-provider-instance>
show l2-learning redundancy-groups
<get-l2-learning-redundancy-groups>
show l2-learning remote-backbone-edge-bridges
<get-l2-learning-remote-backbone-edge-bridges>
show l2-learning vxlan-tunnel-end-point
show l2-learning vxlan-tunnel-end-point esi
<get-l2-learning-vxlan-esi-info>show l2-learning vxlan-tunnel-end-point remote
<get-l2-learning-vxlan-rvtep-info>
show l2-learning vxlan-tunnel-end-point remote ip
<get-l2-learning-vxlan-rvtep-ip-information>
show l2-learning vxlan-tunnel-end-point remote mac-table
<get-l2-learning-vxlan-rvtep-mactable-information>
show l2-learning vxlan-tunnel-end-point remote vtep-source-interface
<get-l2-learning-vxlan-remote-svtep-ip-information>
show l2-learning vxlan-tunnel-end-point source
<get-l2-learning-vxlan-svtep-info>
show l2-learning vxlan-tunnel-end-point source ip
<get-l2-learning-vxlan-svtep-ip-information>
show l2circuit
show l2circuit auto-sensing
<get-l2ckt-pw-auto-sensing-information>
show l2circuit connections
    <get-l2ckt-connection-information>

show l2cpd
show l2cpd task
<get-l2cpd-task-information>
show l2cpd task io
    <get-l2cpd-tasks-io-statistics>
show l2cpd task memory
    <get-l2cpd-task-memory>
show l2cpd task replication
    <get-l2cpd-replication-information>
show l2vpn
show l2vpn connections
    <get-l2vpn-connection-information>

show lacp
show lacp interfaces
    <get-lacp-interface-information>
show lacp statistics
show lacp statistics interfaces
    <get-lacp-interface-statistics>
show lacp timeouts
show ldp
show ldp database
    <get-ldp-database-information>

show ldp fec-filters
    <get-ldp-fec-filters-information>

show ldp interface
    <get-ldp-interface-information>

show ldp neighbor
    <get-ldp-neighbor-information>

show ldp oam
<get-ldp-oam-information>
```

```
show ldp overview
  <get-ldp-overview-information>
show ldp p2mp
show ldp p2mp fec
  <get-ldp-p2mp-fec-information>
show ldp p2mp path
  <get-ldp-p2mp-path-information>
show ldp p2mp tunnel
  <get-ldp-p2mp-tunnel-information>
show ldp path
  <get-ldp-path-information>

show ldp rib-groups
  <get-ldp-rib-groups-information>
show ldp route
  <get-ldp-route-information>

show ldp session
  <get-ldp-session-information>

show ldp statistics
  <get-ldp-statistics-information>

show ldp traffic-statistics
  <get-ldp-traffic-statistics-information>

show link-management
  <get-lm-information>

show link-management peer
  <get-lm-peer-information>

show link-management routing
  <get-lm-routing-information>

show link-management routing peer
  <get-lm-routing-peer-information>

show link-management routing resource
  <get-lm-routing-resource-information>

show link-management routing te-link
  <get-lm-routing-te-link-information>

show lldp
  <get-lldp-information>

show lldp detail
  <get-lldp-information-detail>

show lldp local-information
  <get-lldp-local-info>

show lldp neighbors
  <get-lldp-neighbors-information>

show lldp neighbors interface
  <get-lldp-interface-neighbors>
show lldp remote-global-statistics
  <get-lldp-remote-global-statistics>
```

```
show lldp statistics
  <get-lldp-statistics-information>

show lldp statistics interface
  <get-lldp-interface-statistics>
show loop-detect
show loop-detect interface
  <get-loop-detect-interface-information>
show loop-detect statistics
show loop-detect statistics interface
  <get-loop-detect-interface-statistics-information>
show link-management statistics
  <get-lm-statistics-information>

show link-management statistics peer
  <get-lm-peer-statistics>

show link-management te-link
  <get-lm-te-link-information>

show mac-rewrite
show mac-rewrite interface
  <get-mac-rewrite-interface-information>
show mld
show mld group
  <get-mld-group-information>

show mld interface
  <get-mld-interface-information>

show mld output-group
  <get-mld-output-group-information>

show mld snooping
show mld snooping interface
  <get-mld-snooping-interface-information>
show mld snooping interface bridge-domain
  <get-mld-snooping-bridge-domain-interface>
show mld snooping interface vlan
  <get-mld-snooping-vlan-interface>
show mld snooping membership
  <get-mld-snooping-membership-information>
show mld snooping membership bridge-domain
  <get-mld-snooping-bridge-domain-membership>
show mld snooping membership vlan
  <get-mld-snooping-vlan-membership>
show mld snooping statistics
  <get-mld-snooping-statistics-information>
show mld snooping statistics bridge-domain
  <get-mld-snooping-bridge-domain-statistics>
show mld snooping statistics vlan
  <get-mld-snooping-vlan-statistics>
show mld statistics
  <get-mld-statistics-information>

show mobile-ip
show mobile-ip home-agent
show mobile-ip home-agent binding
  <get-mip-binding-information>
```



```
show mobile-ip home-agent binding ip-address
  <get-ip-mip-binding-information>

show mobile-ip home-agent binding nai
  <get-nai-mip-binding-information>

show mobile-ip home-agent binding summary
  <get-summary-mip-binding-information>

show mobile-ip home-agent interface
  <get-mip-ha-interface-information>

show mobile-ip home-agent overview
  <get-mip-ha-overview-information>

show mobile-ip home-agent traffic
  <get-mip-ha-traffic-information>

show mobile-ip home-agent virtual-network
  <get-mip-ha-virtual-network-information>

show mobile-ip tunnel
  <get-mip-tunnel-information>
show mobile-ip wimax
show mobile-ip wimax release
  <get-mip-wimax-release-information>

show mpls
show mpls abstract-hop-membership
  <get-mpls-abstract-hop-membership-information>
show mpls admin-groups
  <get-mpls-admin-group-information>

show mpls admin-groups-extended
  <get-mpls-admin-group-extended-information>
show mpls association
show mpls association iif
  <get-mpls-association-iif-information>
show mpls association oif
  <get-mpls-association-oif-information>
show mpls association path
  <get-mpls-association-path-information>
show mpls call-admission-control
  <get-mpls-call-admission-control-information>

show mpls context-identifier
  <get-mpls-context-identifier-information>
show mpls correlation
show mpls correlation label
  <get-mpls-correlation-label-information>
show mpls correlation nexthop-id
  <get-mpls-correlation-nexthop-information>

show network-access address-assignment preserved
  <get-address-assignment-preserved-table>
show network-access domain-map
show network-access domain-map statistics
  <get-domain-map-statistics>
show mpls cspf
```

```
<get-mps-cspf-information>

show mpls diffserv-te
  <get-mps-diffserv-te-information>
show mpls egress-protection
show mpls interface
  <get-mps-interface-information>
show mpls label
  <get mpls-label-space>
show mpls label usage
  <get mpls-label-space-usage>

show mpls lsp
  <get-mps-lsp-information>
show mpls lsp abstract-computation
  <get-mps-lsp-abstract-computation>

show mpls lsp autobandwidth
  <get-mps-lsp-autobandwidth>
show mpls srlg
  <get-mps-srlg-information>
show oam ethernet fnp
show oam ethernet fnp interface
show oam ethernet fnp messages
show oam ethernet fnp status
  <get-fnp-status>
show mpls lsp defaults
  <get-mps-lsp-defaults-information>

show mpls path
  <get-mps-path-information>

show mpls static-lsp
  <get-mps-static-lsp-information>
show mpls traceroute
show mpls traceroute database
show mpls traceroute database ldp
  <get-mps-traceroute-database-ldp>
show msdp
  <get-msdp-information>
show msdp source
  <get-msdp-source-information>

show msdp source-active
  <get-msdp-source-active-information>

show msdp statistics
  <get-msdp-statistics-information>
show multi-chassis
show multi-chassis mc-lag
show multi-chassis mc-lag configuration-consistency
  <get-mclag-config-consistency-information>
show multi-chassis mc-lag configuration-consistency global-config
  <get-mclag-global-config-consistency-information>
show multi-chassis mc-lag configuration-consistency icl-config
  <get-mclag-icl-config-consistency-information>
show multi-chassis mc-lag configuration-consistency
list-of-parameters<get-mclag-config-consistency-information-params>
show multi-chassis mc-lag configuration-consistency mcae-config
get-mclag-config-consistency-information-mcae
```

```
show multi-chassis mc-lag configuration-consistency vlan-config
<get-mclag-vlan-config-consistency-information>
show multi-chassis mc-lag configuration-consistency vrrp-config
<get-mclag-vrrp-config-consistency-information>
show multicast
show multicast backup-pe-groups
  <get-multicast-backup-pe-groups-information>

show multicast backup-pe-groups address
  <get-multicast-backup-pe-address-information>

show multicast backup-pe-groups group
<get-multicast-backup-pe-group-information>
show multicast ecid-mapping
show multicast ecid-mapping satellite
<get-satellite-control-ecid>
show multicast flow-map
  <get-multicast-flow-maps-information>

show multicast interface
  <get-multicast-interface-information>

show multicast next-hops
  <get-multicast-next-hops-information>
show multicast next-hops satellite
<get-satellite-control-next-hop>

show multicast pim-to-igmp-proxy
  <get-multicast-pim-to-igmp-proxy-information>

show multicast pim-to-mld-proxy
  <get-multicast-pim-to-mld-proxy-information>

show multicast route
  <get-multicast-route-information>

show multicast rpf
  <get-multicast-rpf-information>

show multicast scope
  <get-multicast-scope-information>

show multicast sessions
  <get-multicast-sessions-information>

show multicast snooping
show multicast snooping next-hops
  <get-multicast-snooping-next-hops-information>

show multicast snooping next-hops satellite
<get-satellite-control-indirect-next-hop>
show multicast snooping route
  <get-multicast-snooping-route-information>
show multicast snooping route satellite
get-satellite-control-multicast

show multicast statistics
  <get-multicast-statistics-information>
show multicast statistics satellite
```

```
<get-satellite-control-statistics>
show multicast summary
show multicast summary satellite
<get-satellite-control-summary>

show multicast usage
  <get-multicast-usage-information>

show mvpn
show mvpn c-multicast
<get-mvpn-c-multicast-route>
show mvpn instance
  <get-mvpn-instance-information>

show mvpn neighbor
<get-mvpn-neighbor-information>
show mvpn suppressed
get-mvpn-suppressed-information
show mvrp
  <get-mvrp-information>

show mvrp applicant-state
  <get-mvrp-applicant-information>

show mvrp dynamic-vlan-memberships
  <get-mvrp-dynamic-vlan-memberships>

show mvrp interface
  <get-mvrp-interface-information>

show mvrp registration-state
  <get-mvrp-registration-state>

show mvrp statistics
  <get-mvrp-interface-statistics>

show network-access
show network-access aaa
show network-access aaa radius-servers
<get-radius-servers-table>
show network-access aaa statistics
  <get-aaa-module-statistics>

show network-access aaa statistics address-assignment
show network-access aaa statistics address-assignment client
<get-address-assignment-client-statistics>
show network-access aaa statistics address-assignment pool
<get-address-assignment-pool-statistics>
show network-access aaa subscribers
  <get-aaa-subscriber-table>

show network-access aaa subscribers session-id

show network-access aaa subscribers statistics
  <get-aaa-subscriber-statistics>

show network-access aaa terminate-code
  <get-aaa-terminate-code>
show network-access aaa terminate-code aaa
  <get-aaa-terminate-code-aaa>
```

```

show network-access aaa terminate-code dhcp
  <get-aaa-terminate-code-dhcp>
show network-access aaa terminate-code l2tp
  <get-aaa-terminate-code-l2tp>
show network-access aaa terminate-code ppp
  <get-aaa-terminate-code-ppp>
show network-access aaa terminate-code reverse
  <get-aaa-terminate-code-reverse>
show network-access aaa terminate-code reverse aaa
  <get-aaa-terminate-code-reverse-aaa>
show network-access aaa terminate-code reverse dhcp
  <get-aaa-terminate-code-reverse-dhcp>
show network-access aaa terminate-code reverse l2tp
  <get-aaa-terminate-code-reverse-l2tp>
show network-access aaa terminate-code reverse ppp
  <get-aaa-terminate-code-reverse-ppp>
show network-access address-assignment
show network-access address-assignment pool
  <get-address-assignment-pool-table>
show network-access nasreq
show network-access nasreq statistics
  <get-nasreq-counters>
show network-access ocs
show network-access ocs state
  <get-ocs-state-information>
show network-access ocs statistics
  <get-ocs-statistics-information>
show network-access pcrf
show network-access pcrf state
  <get-pcrf-state-information>
show network-access pcrf statistics
  <get-pcrf-statistics-information>

show network-access requests
show network-access requests pending
  <get-authentication-pending-table>

show network-access requests statistics
  <get-authentication-statistics>

show network-access securid-node-secret-file
  <get-node-secret-file-table>

show nonstop-routing
  <get-nonstop-routing-information>

show ntp
show ntp associations
show ntp status
show oam
show oam ethernet
show oam ethernet connectivity-fault-management sla-iterator-history
  <get-cfm-iterator-history>
show oam ethernet connectivity-fault-management
show oam ethernet connectivity-fault-management adjacencies
  <get-cfm-adjacency-information>
show oam ethernet connectivity-fault-management delay-statistics
  <get-cfm-delay-statistics>

show oam ethernet connectivity-fault-management forwarding-state

```

```
show oam ethernet connectivity-fault-management forwarding-state instance
  <get-cfm-forwarding-state-instance-information>

show oam ethernet connectivity-fault-management forwarding-state interface
  <get-cfm-forwarding-state-interface-information>

show oam ethernet connectivity-fault-management interfaces
  <get-cfm-interfaces-information>
show oam ethernet connectivity-fault-management loss-statistics
  <get-cfm-loss-statistics>
show oam ethernet connectivity-fault-management mep-database
  <get-cfm-mep-database>

show oam ethernet connectivity-fault-management mep-statistics
  <get-cfm-mep-statistics>

show oam ethernet connectivity-fault-management mip
  <get-cfm-mip-information>

show oam ethernet connectivity-fault-management path-database
  <get-cfm-linktrace-path-database>

show oam ethernet connectivity-fault-management policer
  <get-evc-information>

show oam ethernet connectivity-fault-management sla-iterator-statistics
  <get-cfm-iterator-statistics>
show oam ethernet evc
  <get-evc-information>
show oam ethernet link-fault-management
  <get-lfmd-information>

show oam ethernet lmi
  <get-elmi-information>

show oam ethernet lmi statistics
  <get-elmi-statistics>

show openflow
show openflow capability
show openflow controller
show openflow filters
show openflow flows
show openflow interfaces
show openflow statistics
show openflow statistics flows
show openflow statistics interfaces
show openflow statistics packet
show openflow statistics packet in
show openflow statistics packet out
show openflow statistics queue
show openflow statistics summary
show openflow statistics tables
show openflow summary
show openflow switch

show ospf
show ospf backup
show ospf backup coverage
  <get-ospf-backup-coverage-information>
```

```
show ospf backup lsp
    <get-ospf-backup-lsp-information>

show ospf backup neighbor
    <get-ospf-backup-neighbor-information>

show ospf backup spf
    <get-ospf-backup-spf-information>
show ospf bgp-orr
    <get-ospf-bgprr-information>

show ospf context-identifier
    <get-ospf-context-id-information>

show ospf database
    <get-ospf-database-information>

show ospf interface
    <get-ospf-interface-information>

show ospf io-statistics
    <get-ospf-io-statistics-information>

show ospf log
    <get-ospf-log-information>

show ospf neighbor
    <get-ospf-neighbor-information>

show ospf overview
    <get-ospf-overview-information>

show ospf route
    <get-ospf-route-information>

show ospf statistics
    <get-ospf-statistics-information>

show ospf3
show ospf3 backup
show ospf3 backup coverage
    <get-ospf3-backup-coverage-information>

show ospf3 backup lsp
    <get-ospf3-backup-lsp-information>

show ospf3 backup neighbor
    <get-ospf3-backup-neighbor-information>

show ospf3 backup spf
    <get-ospf3-backup-spf-information>
show ospf3 bgp-orr
    <get-ospf-bgprr-information>

show ospf3 database
    <get-ospf3-database-information>

show ospf3 interface
    <get-ospf3-interface-information>
```

```
show ospf3 io-statistics
  <get-ospf3-io-statistics-information>

show ospf3 log
  <get-ospf3-log-information>

show ospf3 neighbor
  <get-ospf3-neighbor-information>

show ospf3 overview
  <get-ospf3-overview-information>

show ospf3 route
  <get-ospf3-route-information>

show ospf3 statistics
  <get-ospf3-statistics-information>
show overlay
  <get-cloud-analytics-overlay-information>
show overlay vxlan
  <get-cloud-analytics-overlay-vxlan-information>
show overlay vxlan vni
  <get-application-monitor-overlay-vxlan-information>
show overlay vxlan vtep
  <get-application-monitor-overlay-vtep-information>
show ovsdb
show ovsdb commit
show ovsdb commit failures
  <get-ovsdb-commit-failure-information>

show ovsdb tunnels
  <get-ovsdb-tunnels-information>
show ovsdb virtual-tunnel-end-point
  <get-ovsdb-vtep-information>
show passive-monitoring
  <get-passive-monitoring-information>

show passive-monitoring error
  <get-passive-monitoring-error-information>

show passive-monitoring flow
  <get-passive-monitoring-flow-information>

show passive-monitoring memory
  <get-passive-monitoring-memory-information>

show passive-monitoring status
  <get-passive-monitoring-status-information>

show passive-monitoring usage
  <get-passive-monitoring-usage-information>
show path-computation-client
show path-computation-client active-pce
show path-computation-client lsp-retry-pending
  <get-path-computation-client-lsp-retry-pending>
show path-computation-client statistics
show performance-monitoring
show performance-monitoring mpls
show performance-monitoring mpls lsp
```



```

<get-pm-mpis-lsp-information>
show pfe
show pfe cfeb
show pfe data
<get-pfe-data>
show pfe feb
show pfe filter
show pfe filter hw
show pfe filter hw summary
show pfe fpc
show pfe fwdd
show pfe lcc
show pfe next-hop
show pfe pfem
show pfe pfem detail
show pfe pfem extensive
show pfe route
show pfe route clnp
show pfe route clnp table
show pfe route inet6
show pfe route inet6 hw
show pfe route inet6 hw host
show pfe route inet6 hw lpm
show pfe route inet6 hw multicast

show pfe route inet6 table
show pfe route ip
show pfe route ip table
show pfe route iso
show pfe route iso table
show pfe scb
show pfe sfm
show pfe ssb
show pfe statistics
show pfe statistics exceptions
show pfe statistics fabric
show pfe statistics ip
show pfe route ip hw
show pfe route ip hw host
show pfe route ip hw lpm
show pfe route ip hw multicast
show pfe route summary
show pfe route summary hw
show pfe statistics ip6
show pfe statistics traffic
  <get-pfe-statistics>
show pfe statistics traffic bandwidth
<get-pfe-traffic-statistics-bandwidth>

show pfe statistics traffic cpu
show pfe statistics traffic cpu fpe
show pfe statistics traffic detail
<get-pfe-traffic-statistics>
show pfe statistics traffic egress-queues
show pfe statistics traffic egress-queues fpc
show pfe statistics traffic multicast
show pfe statistics traffic multicast fpcshow pfe statistics traffic protocol
show pfe tcam
show pfe tcam app
<get-pfe-tcam-app-list>

```

```
show pfe tcam app bd-dtag-validate
<get-pfe-tcam-app-list-bd-dtag-validate>
show pfe tcam app bd-dtag-validate detail
show pfe tcam app bd-dtag-validate list-related-apps
show pfe tcam app bd-dtag-validate list-shared-apps
show pfe tcam app bd-dtag-validate shared-usage
show pfe tcam app bd-dtag-validate shared-usage detail
show pfe tcam app bd-tpid-swap
<get-pfe-tcam-app-list-bd-tpid-swap>
show pfe tcam app bd-tpid-swap detail
show pfe tcam app bd-tpid-swap list-related-apps
show pfe tcam app bd-tpid-swap list-shared-apps
show pfe tcam app bd-tpid-swap shared-usage
show pfe tcam app bd-tpid-swap shared-usage detail
show pfe tcam app cfm-bd-filter
<get-pfe-tcam-app-list-cfm-bd-filter>
show pfe tcam app cfm-bd-filter detail
show pfe tcam app cfm-bd-filter list-related-apps
show pfe tcam app cfm-bd-filter list-shared-apps
show pfe tcam app cfm-bd-filter shared-usage
show pfe tcam app cfm-bd-filter shared-usage detail
show pfe tcam app cfm-filter
<get-pfe-tcam-app-list-cfm-filter>
show pfe tcam app cfm-filter list-related-apps
show pfe tcam app cfm-filter list-shared-apps
show pfe tcam app cfm-filter shared-usage
show pfe tcam app cfm-filter shared-usage detail
show pfe tcam app cfm-vpls-filter
<get-pfe-tcam-app-list-cfm-vpls-filter>
show pfe tcam app cfm-vpls-filter detail
show pfe tcam app cfm-vpls-filter list-related-apps
show pfe tcam app cfm-vpls-filter list-shared-apps
show pfe tcam app cfm-vpls-filter shared-usage
show pfe tcam app cfm-vpls-filter shared-usage detail
show pfe tcam app cfm-vpls-ifl-filter
<get-pfe-tcam-app-list-cfm-vpls-ifl-filter>
show pfe tcam app cfm-vpls-ifl-filter detail
show pfe tcam app cfm-vpls-ifl-filter list-related-apps
show pfe tcam app cfm-vpls-ifl-filter list-shared-apps
show pfe tcam app cfm-vpls-ifl-filter shared-usage
show pfe tcam app cfm-vpls-ifl-filter shared-usage detail
show pfe tcam app cos-fc
<get-pfe-tcam-app-list-cos-fc>
show pfe tcam app cos-fc detail
show pfe tcam app cos-fc list-related-apps
show pfe tcam app cos-fc list-shared-apps
show pfe tcam app cos-fc shared-usage
show pfe tcam app cos-fc shared-usage detail
show pfe tcam app fw-ccc-in
<get-pfe-tcam-app-list-fw-ccc-in>
show pfe tcam app fw-ccc-in detail
show pfe tcam app fw-ccc-in list-related-apps
show pfe tcam app fw-ccc-in list-shared-apps
show pfe tcam app fw-ccc-in shared-usage
show pfe tcam app fw-ccc-in shared-usage detail
show pfe tcam app fw-family-out
<get-pfe-tcam-app-list-fw-family-out>
show pfe tcam app fw-family-out detail
show pfe tcam app fw-family-out list-related-apps
show pfe tcam app fw-family-out list-shared-apps
```

```
show pfe tcam app fw-family-out shared-usage
show pfe tcam app fw-family-out shared-usage detail
show pfe tcam app fw-fbf
<get-pfe-tcam-app-list-fw-fbf>
show pfe tcam app fw-fbf detail
show pfe tcam app fw-fbf list-related-apps
show pfe tcam app fw-fbf list-shared-apps
show pfe tcam app fw-fbf shared-usage
show pfe tcam app fw-fbf shared-usage detail
  show pfe tcam app fw-fbf-inet6
<get-pfe-tcam-app-list-fw-fbf-inet6>
show pfe tcam app fw-fbf-inet6 detail
show pfe tcam app fw-fbf-inet6 list-related-apps
show pfe tcam app fw-fbf-inet6 list-shared-apps
show pfe tcam app fw-fbf-inet6 shared-usage
show pfe tcam app fw-fbf-inet6 shared-usage detail
show pfe tcam app fw-ifl-in
<get-pfe-tcam-app-list-fw-ifl-in>
show pfe tcam app fw-ifl-in detail
show pfe tcam app fw-ifl-in list-related-apps
show pfe tcam app fw-ifl-in list-shared-apps
show pfe tcam app fw-ifl-in shared-usage
show pfe tcam app fw-ifl-in shared-usage detail
show pfe tcam app fw-ifl-out
<get-pfe-tcam-app-list-fw-ifl-out>
show pfe tcam app fw-ifl-out detail
show pfe tcam app fw-ifl-out list-related-apps
show pfe tcam app fw-ifl-out list-shared-apps
show pfe tcam app fw-ifl-out shared-usage
show pfe tcam app fw-ifl-out shared-usage detail
show pfe tcam app fw-inet-ftf
<get-pfe-tcam-app-list-fw-inet-ftf>
show pfe tcam app fw-inet-ftf detail
show pfe tcam app fw-inet-ftf list-related-apps
show pfe tcam app fw-inet-ftf list-shared-apps
show pfe tcam app fw-inet-ftf shared-usage
show pfe tcam app fw-inet-ftf shared-usage detail
show pfe tcam app fw-inet-in
<get-pfe-tcam-app-list-fw-inet-in>
show pfe tcam app fw-inet-in detail
show pfe tcam app fw-inet-in list-related-apps
show pfe tcam app fw-inet-in list-shared-apps
show pfe tcam app fw-inet-in shared-usage
show pfe tcam app fw-inet-in shared-usage detail
show pfe tcam app fw-inet-pm
<get-pfe-tcam-app-list-fw-inet-pm>
show pfe tcam app fw-inet-pm detail
show pfe tcam app fw-inet-pm list-related-apps
show pfe tcam app fw-inet-pm list-shared-apps
show pfe tcam app fw-inet-pm shared-usage
show pfe tcam app fw-inet-pm shared-usage detail
show pfe tcam app fw-inet-rpf
<get-pfe-tcam-app-list-fw-inet-rpf>
show pfe tcam app fw-inet-rpf detail
show pfe tcam app fw-inet-rpf list-related-apps
show pfe tcam app fw-inet-rpf list-shared-apps
show pfe tcam app fw-inet-rpf shared-usage
show pfe tcam app fw-inet-rpf shared-usage detail
show pfe tcam app fw-inet6-family-out
<get-pfe-tcam-app-list-fw-inet6-family-out>
```

```
show pfe tcam app fw-inet6-family-out detail
show pfe tcam app fw-inet6-family-out list-related-apps
show pfe tcam app fw-inet6-family-out list-shared-apps
show pfe tcam app fw-inet6-family-out shared-usage
show pfe tcam app fw-inet6-family-out shared-usage detail
show pfe tcam app fw-inet6-fty
<get-pfe-tcam-app-list-fw-inet6-fty>
show pfe tcam app fw-inet6-fty detail
show pfe tcam app fw-inet6-fty list-related-apps
show pfe tcam app fw-inet6-fty list-shared-apps
show pfe tcam app fw-inet6-fty shared-usage
show pfe tcam app fw-inet6-fty shared-usage detail
show pfe tcam app fw-inet6-in
<get-pfe-tcam-app-list-fw-inet6-in>
  show pfe tcam app fw-inet6-in detail
show pfe tcam app fw-inet6-in list-related-apps
show pfe tcam app fw-inet6-in list-shared-apps
show pfe tcam app fw-inet6-in shared-usage
  show pfe tcam app fw-inet6-in shared-usage detail
show pfe tcam app fw-inet6-rpf
<get-pfe-tcam-app-list-fw-inet6-rpf>
show pfe tcam app fw-inet6-rpf detail
show pfe tcam app fw-inet6-rpf list-related-apps
show pfe tcam app fw-inet6-rpf list-shared-apps
show pfe tcam app fw-inet6-rpf shared-usage
show pfe tcam app fw-inet6-rpf shared-usage detail
show pfe tcam app fw-l2-in
<get-pfe-tcam-app-list-fw-l2-in>
show pfe tcam app fw-l2-in detail
show pfe tcam app fw-l2-in list-related-apps
show pfe tcam app fw-l2-in list-shared-apps
show pfe tcam app fw-l2-in shared-usage
show pfe tcam app fw-l2-in shared-usage detail
show pfe tcam app fw-mps-in
<get-pfe-tcam-app-list-fw-mps-in>
show pfe tcam app fw-mps-in detail
show pfe tcam app fw-mps-in list-related-apps
show pfe tcam app fw-mps-in list-shared-apps
show pfe tcam app fw-mps-in shared-usage
show pfe tcam app fw-mps-in shared-usage detail
show pfe tcam app fw-semantics
<get-pfe-tcam-app-list-fw-semantics>
show pfe tcam app fw-semantics detail
show pfe tcam app fw-semantics list-related-apps
show pfe tcam app fw-semantics list-shared-apps
show pfe tcam app fw-semantics shared-usage
show pfe tcam app fw-semantics shared-usage detail
show pfe tcam app fw-vpls-in
<get-pfe-tcam-app-list-fw-vpls-in>
show pfe tcam app fw-vpls-in detail
  show pfe tcam app fw-vpls-in list-related-apps
show pfe tcam app fw-vpls-in list-shared-apps
show pfe tcam app fw-vpls-in shared-usage
  show pfe tcam app fw-vpls-in shared-usage detail
show pfe tcam app gr-ifl-stats-egr
<get-pfe-tcam-app-list-gr-ifl-statistics-egr>
show pfe tcam app gr-ifl-stats-egr detail
show pfe tcam app gr-ifl-stats-egr list-related-apps
show pfe tcam app gr-ifl-stats-egr list-shared-apps
show pfe tcam app gr-ifl-stats-egr shared-usage
```

```

show pfe tcam app gr-ifl-stats-egr shared-usage detail
show pfe tcam app gr-ifl-stats-ing
<get-pfe-tcam-app-list-gr-ifl-statistics-ing>
show pfe tcam app gr-ifl-stats-ing detail
show pfe tcam app gr-ifl-stats-ing list-related-apps
show pfe tcam app gr-ifl-stats-ing list-shared-apps
show pfe tcam app gr-ifl-stats-ing shared-usage
show pfe tcam app gr-ifl-stats-ing shared-usage detail
show pfe tcam app gr-ifl-stats-preing
<get-pfe-tcam-app-list-gr-ifl-statistics-preing>
show pfe tcam app gr-ifl-stats-preing detail
show pfe tcam app gr-ifl-stats-preing list-related-apps
show pfe tcam app gr-ifl-stats-preing list-shared-apps
show pfe tcam app gr-ifl-stats-preing shared-usage
show pfe tcam app gr-ifl-stats-preing shared-usage detail
show pfe tcam app ifd-src-mac-fil
<get-pfe-tcam-app-list-ifd-src-mac-fil>
show pfe tcam app ifd-src-mac-fil detail
show pfe tcam app ifd-src-mac-fil list-related-apps
show pfe tcam app ifd-src-mac-fil list-shared-apps
show pfe tcam app ifd-src-mac-fil shared-usage
show pfe tcam app ifd-src-mac-fil shared-usage detail
show pfe tcam app ifl-statistics-in
<get-pfe-tcam-app-list-ifl-statistics-in>
show pfe tcam app ifl-statistics-in detail
show pfe tcam app ifl-statistics-in list-related-apps
show pfe tcam app ifl-statistics-in list-shared-apps
show pfe tcam app ifl-statistics-in shared-usage
show pfe tcam app ifl-statistics-in shared-usage detail
show pfe tcam app ifl-statistics-out
<get-pfe-tcam-app-list-ifl-statistics-out>
show pfe tcam app ifl-statistics-out detail
show pfe tcam app ifl-statistics-out list-related-apps
show pfe tcam app ifl-statistics-out list-shared-apps
show pfe tcam app ifl-statistics-out shared-usage
show pfe tcam app ifl-statistics-out shared-usage detail
show pfe tcam app ing-out-iff
<get-pfe-tcam-app-list-ing-out-iff>
show pfe tcam app ing-out-iff detail
show pfe tcam app ing-out-iff list-related-apps
show pfe tcam app ing-out-iff list-shared-apps
show pfe tcam app ing-out-iff shared-usage
show pfe tcam app ing-out-iff shared-usage detail
show pfe tcam app ip-mac-val
<get-pfe-tcam-app-list-ip-mac-val>
show pfe tcam app ip-mac-val detail
show pfe tcam app ip-mac-val list-related-apps
show pfe tcam app ip-mac-val list-shared-apps
show pfe tcam app ip-mac-val shared-usage
show pfe tcam app ip-mac-val shared-usage detail
show pfe tcam app ip-mac-val-bcast
<get-pfe-tcam-app-list-ip-mac-val-bcast>
show pfe tcam app ip-mac-val-bcast detail
show pfe tcam app ip-mac-val-bcast list-related-apps
show pfe tcam app ip-mac-val-bcast list-shared-apps
show pfe tcam app ip-mac-val-bcast shared-usage
show pfe tcam app ip-mac-val-bcast shared-usage detail
show pfe tcam app ipsec-reverse-fil
<get-pfe-tcam-app-list-ipsec-reverse-fil>
show pfe tcam app ipsec-reverse-fil detail

```

```
show pfe tcam app ipsec-reverse-fil list-related-apps
show pfe tcam app ipsec-reverse-fil list-shared-apps
show pfe tcam app ipsec-reverse-fil shared-usage
show pfe tcam app ipsec-reverse-fil shared-usage detail
show pfe tcam app irb-cos-rw
<get-pfe-tcam-app-list-irb-cos-rw>
show pfe tcam app irb-cos-rw detail
show pfe tcam app irb-cos-rw list-related-apps
show pfe tcam app irb-cos-rw list-shared-apps
show pfe tcam app irb-cos-rw shared-usage
show pfe tcam app irb-cos-rw shared-usage detail
show pfe tcam app irb-fixed-cos
<get-pfe-tcam-app-list-irb-fixed-cos>
show pfe tcam app irb-fixed-cos detail
show pfe tcam app irb-fixed-cos list-related-apps
show pfe tcam app irb-fixed-cos list-shared-apps
show pfe tcam app irb-fixed-cos shared-usage
show pfe tcam app irb-fixed-cos shared-usage detail
show pfe tcam app irb-inet6-fil
<get-pfe-tcam-app-list-irb-inet6-fil>
show pfe tcam app irb-inet6-fil detail
show pfe tcam app irb-inet6-fil list-related-apps
show pfe tcam app irb-inet6-fil list-shared-apps
show pfe tcam app irb-inet6-fil shared-usage
show pfe tcam app irb-inet6-fil shared-usage detail
show pfe tcam app lfm-802.3ah-in
<get-pfe-tcam-app-list-lfm-802.3ah-in>
show pfe tcam app lfm-802.3ah-in detail
show pfe tcam app lfm-802.3ah-in list-related-apps
show pfe tcam app lfm-802.3ah-in list-shared-apps
show pfe tcam app lfm-802.3ah-in shared-usage
show pfe tcam app lfm-802.3ah-in shared-usage detail
show pfe tcam app lfm-802.3ah-out
<get-pfe-tcam-app-list-lfm-802.3ah-out>
show pfe tcam app lfm-802.3ah-out detail
show pfe tcam app lfm-802.3ah-out list-related-apps
show pfe tcam app lfm-802.3ah-out list-shared-apps
show pfe tcam app lfm-802.3ah-out shared-usage
show pfe tcam app lfm-802.3ah-out shared-usage detail
show pfe tcam app lo0-inet-fil
<get-pfe-tcam-app-list-lo0-inet-fil>
show pfe tcam app lo0-inet-fil detail
show pfe tcam app lo0-inet-fil list-related-apps
show pfe tcam app lo0-inet-fil list-shared-apps
show pfe tcam app lo0-inet-fil shared-usage
show pfe tcam app lo0-inet-fil shared-usage detail
show pfe tcam app lo0-inet6-fil
<get-pfe-tcam-app-list-lo0-inet6-fil>
show pfe tcam app lo0-inet6-fil detail
show pfe tcam app lo0-inet6-fil list-related-apps
show pfe tcam app lo0-inet6-fil list-shared-apps
show pfe tcam app lo0-inet6-fil shared-usage
show pfe tcam app lo0-inet6-fil shared-usage detail
show pfe tcam app mac-drop-cnt
<get-pfe-tcam-app-list-mac-drop-cnt>
show pfe tcam app mac-drop-cnt detail
show pfe tcam app mac-drop-cnt list-related-apps
show pfe tcam app mac-drop-cnt list-shared-apps
show pfe tcam app mac-drop-cnt shared-usage
show pfe tcam app mac-drop-cnt shared-usage detail
```

```

show pfe tcam app mrouter-port-in
<get-pfe-tcam-app-list-mrouter-port-in>
show pfe tcam app mrouter-port-in detail
show pfe tcam app mrouter-port-in list-related-apps
show pfe tcam app mrouter-port-in list-shared-apps
show pfe tcam app mrouter-port-in shared-usage
show pfe tcam app mrouter-port-in shared-usage detail
show pfe tcam app napt-reverse-fil
<get-pfe-tcam-app-list-napt-reverse-fil>
show pfe tcam app napt-reverse-fil detail
show pfe tcam app napt-reverse-fil list-related-apps
show pfe tcam app napt-reverse-fil list-shared-apps
show pfe tcam app napt-reverse-fil shared-usage
show pfe tcam app napt-reverse-fil shared-usage detail
show pfe tcam app no-local-switching
<get-pfe-tcam-app-list-no-local-switching>
show pfe tcam app no-local-switching detail
show pfe tcam app no-local-switching list-related-apps
show pfe tcam app no-local-switching list-shared-apps
show pfe tcam app no-local-switching shared-usage
show pfe tcam app no-local-switching shared-usage detail
show pfe tcam app ptpoe-cos-rw
<get-pfe-tcam-app-list-ptpoe-cos-rw>
show pfe tcam app ptpoe-cos-rw detail
show pfe tcam app ptpoe-cos-rw list-related-apps
show pfe tcam app ptpoe-cos-rw list-shared-apps
show pfe tcam app ptpoe-cos-rw shared-usage
show pfe tcam app ptpoe-cos-rw shared-usage detail
show pfe tcam app rfc2544-layer2-in
<get-pfe-tcam-app-list-rfc2544-layer2-in>
  show pfe tcam app rfc2544-layer2-in detail
show pfe tcam app rfc2544-layer2-in list-related-apps
  show pfe tcam app rfc2544-layer2-in list-shared-apps
show pfe tcam app rfc2544-layer2-in shared-usage
show pfe tcam app rfc2544-layer2-in shared-usage detail
show pfe tcam app rfc2544-layer2-out
<get-pfe-tcam-app-list-rfc2544-layer2-out>
show pfe tcam app vpls-mesh-group-mcast
<get-upper-level-xml-name-vpls-mesh-group-mcast>
show pfe tcam app vpls-mesh-group-mcast detail
show pfe tcam app vpls-mesh-group-mcast list-related-apps
show pfe tcam app vpls-mesh-group-mcast list-shared-apps
show pfe tcam app vpls-mesh-group-mcast shared-usage
show pfe tcam app vpls-mesh-group-mcast shared-usage detail
show pfe tcam app vpls-mesh-group-ucast
<get-upper-level-xml-name-vpls-mesh-group-ucast>
show pfe tcam app vpls-mesh-group-ucast detail
show pfe tcam app vpls-mesh-group-ucast list-related-apps
show pfe tcam app vpls-mesh-group-ucast list-shared-apps
show pfe tcam app vpls-mesh-group-ucast shared-usage
show pfe tcam app vpls-mesh-group-ucast shared-usage detail
show pfe tcam app cfm-filter detail
show pfe tcam errors app fw-inet-rpf
<get-pfe-tcam-errors-app-fw-inet-rpf>
show pfe tcam errors app fw-inet-rpf detail
show pfe tcam errors app fw-inet-rpf list-related-apps
show pfe tcam errors app fw-inet-rpf list-shared-apps
show pfe tcam errors app fw-inet-rpf shared-usage
show pfe tcam errors app fw-inet-rpf shared-usage detail
show pfe tcam errors app fw-inet6-rpf

```

```
<get-pfe-tcam-errors-app-fw-inet6-rpf>
show pfe tcam errors app fw-inet6-rpf detail
show pfe tcam errors app fw-inet6-rpf list-related-apps
show pfe tcam errors app fw-inet6-rpf list-shared-apps
show pfe tcam errors app fw-inet6-rpf shared-usage
show pfe tcam errors app fw-inet6-rpf shared-usage detail
show pfe tcam errors app gr-ifl-stats-egr
<get-pfe-tcam-errors-app-gr-ifl-statistics-egr>
show pfe tcam errors app gr-ifl-stats-egr detail
show pfe tcam errors app gr-ifl-stats-egr list-related-apps
show pfe tcam errors app gr-ifl-stats-egr list-shared-apps
show pfe tcam errors app gr-ifl-stats-egr shared-usage
show pfe tcam errors app gr-ifl-stats-egr shared-usage detail
show pfe tcam errors app gr-ifl-stats-ing
<get-pfe-tcam-errors-app-gr-ifl-statistics-ing>
show pfe tcam errors app gr-ifl-stats-ing detail
show pfe tcam errors app gr-ifl-stats-ing list-related-apps
show pfe tcam errors app gr-ifl-stats-ing list-shared-apps
show pfe tcam errors app gr-ifl-stats-ing shared-usage
show pfe tcam errors app gr-ifl-stats-ing shared-usage detail
show pfe tcam errors app gr-ifl-stats-preing
<get-pfe-tcam-errors-app-gr-ifl-statistics-preing>
show pfe tcam errors app gr-ifl-stats-preing detail
show pfe tcam errors app gr-ifl-stats-preing list-related-apps
show pfe tcam errors app gr-ifl-stats-preing list-shared-apps
show pfe tcam errors app gr-ifl-stats-preing shared-usage
show pfe tcam errors app gr-ifl-stats-preing shared-usage detail
show pfe tcam errors app ing-out-iff
<get-pfe-tcam-errors-app-ing-out-iff>
show pfe tcam errors app ing-out-iff detail
show pfe tcam errors app ing-out-iff list-related-apps
show pfe tcam errors app ing-out-iff list-shared-apps
show pfe tcam errors app ing-out-iff shared-usage
show pfe tcam errors app ing-out-iff shared-usage detail
show pfe tcam errors app vpls-mesh-group-mcast
<get-upper-level-xml-name-vpls-mesh-group-mcast>
show pfe tcam errors app vpls-mesh-group-mcast detail
show pfe tcam errors app vpls-mesh-group-mcast list-related-apps
show pfe tcam errors app vpls-mesh-group-mcast list-shared-apps
show pfe tcam errors app vpls-mesh-group-mcast shared-usage
show pfe tcam errors app vpls-mesh-group-mcast shared-usage detail
show pfe tcam errors app vpls-mesh-group-ucast
<get-upper-level-xml-name-vpls-mesh-group-ucast>
show pfe tcam errors app vpls-mesh-group-ucast detail
show pfe tcam errors app vpls-mesh-group-ucast list-related-apps
show pfe tcam errors app vpls-mesh-group-ucast list-shared-apps
show pfe tcam errors app vpls-mesh-group-ucast shared-usage
show pfe tcam errors app vpls-mesh-group-ucast shared-usage detail
show pfe tcam errors tcam-stage ingress app fw-inet-rpf
<get-pfe-tcam-errors-ingress-tcam-stage-fw-inet-rpf>
show pfe tcam errors tcam-stage ingress app fw-inet-rpf detail
show pfe tcam errors tcam-stage ingress app fw-inet-rpf list-related-apps
show pfe tcam errors tcam-stage ingress app fw-inet-rpf list-shared-apps
show pfe tcam errors tcam-stage ingress app fw-inet-rpf shared-usage
show pfe tcam errors tcam-stage ingress app fw-inet-rpf shared-usage detail
show pfe tcam errors tcam-stage ingress app fw-inet6-rpf
<get-pfe-tcam-errors-ingress-tcam-stage-fw-inet6-rpf>
show pfe tcam errors tcam-stage ingress app fw-inet6-rpf detail
show pfe tcam errors tcam-stage ingress app fw-inet6-rpf list-related-apps
show pfe tcam errors tcam-stage ingress app fw-inet6-rpf list-shared-apps
```



```

show pfe tcam errors tcam-stage ingress app fw-inet6-rpf shared-usage
show pfe tcam errors tcam-stage ingress app fw-inet6-rpf shared-usage detail
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-egr
<get-pfe-tcam-errors-ingress-tcam-stage-gr-ifl-statistics-egr>
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-egr detail
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-egr list-related-apps
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-egr list-shared-apps
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-egr shared-usage
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-egr shared-usage
detail
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-ing
<get-pfe-tcam-errors-ingress-tcam-stage-gr-ifl-statistics-ing>
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-ing detail
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-ing list-related-apps
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-ing list-shared-apps
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-ing shared-usage
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-ing shared-usage
detail
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-preing
<get-pfe-tcam-errors-ingress-tcam-stage-gr-ifl-statistics-preing>
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-preing detail
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-preing
list-related-apps
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-preing list-shared-apps
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-preing shared-usage
show pfe tcam errors tcam-stage ingress app gr-ifl-stats-preing shared-usage
detail
show pfe tcam errors tcam-stage pre-ingress app ing-out-iff
<get-pfe-tcam-errors-pre-ingress-app-ing-out-iff>
show pfe tcam errors tcam-stage pre-ingress app ing-out-iff detail
show pfe tcam errors tcam-stage pre-ingress app ing-out-iff list-related-apps
show pfe tcam errors tcam-stage pre-ingress app ing-out-iff list-shared-apps
show pfe tcam errors tcam-stage pre-ingress app ing-out-iff shared-usage
show pfe tcam errors tcam-stage pre-ingress app ing-out-iff shared-usage detail
show pfe tcam errors tcam-stage pre-ingress app vpls-mesh-group-mcast
<get-upper-level-xml-name-vpls-mesh-group-mcast>
show pfe tcam errors tcam-stage pre-ingress app vpls-mesh-group-mcast detail
show pfe tcam errors tcam-stage pre-ingress app vpls-mesh-group-mcast
list-related-apps
show pfe tcam errors tcam-stage pre-ingress app vpls-mesh-group-mcast
list-shared-apps
show pfe tcam errors tcam-stage pre-ingress app vpls-mesh-group-mcast
shared-usage
show pfe tcam errors tcam-stage pre-ingress app vpls-mesh-group-mcast
shared-usage detail
show pfe tcam errors tcam-stage pre-ingress app vpls-mesh-group-ucast
<get-upper-level-xml-name-vpls-mesh-group-ucast>
show pfe tcam errors tcam-stage pre-ingress app vpls-mesh-group-ucast detail
show pfe tcam errors tcam-stage pre-ingress app vpls-mesh-group-ucast
list-related-apps
show pfe tcam errors tcam-stage pre-ingress app vpls-mesh-group-ucast
list-shared-apps
show pfe tcam errors tcam-stage pre-ingress app vpls-mesh-group-ucast
shared-usage
show pfe tcam errors tcam-stage pre-ingress app vpls-mesh-group-ucast
shared-usage detail
show pfe tcam usage app fw-inet-rpf
<get-pfe-tcam-usage-app-fw-inet-rpf>
show pfe tcam usage app fw-inet-rpf detail
show pfe tcam usage app fw-inet-rpf list-related-apps

```

```
show pfe tcam usage app fw-inet-rpf list-shared-apps
show pfe tcam usage app fw-inet-rpf shared-usage
show pfe tcam usage app fw-inet-rpf shared-usage detail
show pfe tcam usage app fw-inet6-rpf
<get-pfe-tcam-usage-app-fw-inet6-rpf>
show pfe tcam usage app fw-inet6-rpf detail
show pfe tcam usage app fw-inet6-rpf list-related-apps
show pfe tcam usage app fw-inet6-rpf list-shared-apps
show pfe tcam usage app fw-inet6-rpf shared-usage
show pfe tcam usage app fw-inet6-rpf shared-usage detail
show pfe tcam usage app gr-ifl-stats-egr
<get-pfe-tcam-usage-app-gr-ifl-statistics-egr>
show pfe tcam usage app gr-ifl-stats-egr detail
show pfe tcam usage app gr-ifl-stats-egr list-related-apps
show pfe tcam usage app gr-ifl-stats-egr list-shared-apps
show pfe tcam usage app gr-ifl-stats-egr shared-usage
show pfe tcam usage app gr-ifl-stats-egr shared-usage detail
show pfe tcam usage app gr-ifl-stats-ing
<get-pfe-tcam-usage-app-gr-ifl-statistics-ing>
show pfe tcam usage app gr-ifl-stats-ing detail
show pfe tcam usage app gr-ifl-stats-ing list-related-apps
show pfe tcam usage app gr-ifl-stats-ing list-shared-apps
show pfe tcam usage app gr-ifl-stats-ing shared-usage
show pfe tcam usage app gr-ifl-stats-ing shared-usage detail
show pfe tcam usage app gr-ifl-stats-preing
<get-pfe-tcam-usage-app-gr-ifl-statistics-preing>
show pfe tcam usage app gr-ifl-stats-preing detail
show pfe tcam usage app gr-ifl-stats-preing list-related-apps
show pfe tcam usage app gr-ifl-stats-preing list-shared-apps
show pfe tcam usage app gr-ifl-stats-preing shared-usage
show pfe tcam usage app gr-ifl-stats-preing shared-usage detail
show pfe tcam usage app ing-out-iff
<get-pfe-tcam-usage-app-ing-out-iff>
show pfe tcam usage app ing-out-iff detail
show pfe tcam usage app ing-out-iff list-related-apps
show pfe tcam usage app ing-out-iff list-shared-apps
show pfe tcam usage app ing-out-iff shared-usage
show pfe tcam usage app ing-out-iff shared-usage detail
show pfe tcam usage app vpls-mesh-group-mcast
<get-upper-level-xml-name-vpls-mesh-group-mcast>
show pfe tcam usage app vpls-mesh-group-mcast detail
show pfe tcam usage app vpls-mesh-group-mcast list-related-apps
show pfe tcam usage app vpls-mesh-group-mcast list-shared-apps
show pfe tcam usage app vpls-mesh-group-mcast shared-usage
show pfe tcam usage app vpls-mesh-group-mcast shared-usage detail
show pfe tcam usage app vpls-mesh-group-ucast
<get-upper-level-xml-name-vpls-mesh-group-ucast>
show pfe tcam usage app vpls-mesh-group-ucast detail
show pfe tcam usage app vpls-mesh-group-ucast list-related-apps
show pfe tcam usage app vpls-mesh-group-ucast list-shared-apps
show pfe tcam usage app vpls-mesh-group-ucast shared-usage
show pfe tcam usage app vpls-mesh-group-ucast shared-usage detail
show pfe tcam usage tcam-stage egress app rfc2544-layer2-out shared-usage
detail
show pfe tcam usage tcam-stage egress detail
get-pfe-tcam-usage-egress-tcam-stage-detail
show pfe tcam usage tcam-stage ingress
<get-pfe-tcam-usage-ingress-tcam-stage>
show pfe tcam usage tcam-stage ingress app
<get-pfe-tcam-usage-ingress-app>
```

```

show pfe tcam usage tcam-stage ingress app cfm-bd-filter
<get-pfe-tcam-usage-ingress-app-cfm-bd-filter>
show pfe tcam usage tcam-stage ingress app cfm-bd-filter detail
show pfe tcam usage tcam-stage ingress app cfm-bd-filter list-related-apps
show pfe tcam usage tcam-stage ingress app cfm-bd-filter list-shared-apps
show pfe tcam usage tcam-stage ingress app cfm-bd-filter shared-usage
show pfe tcam usage tcam-stage ingress app cfm-bd-filter shared-usage detail
show pfe tcam usage tcam-stage ingress app cfm-filter
<get-pfe-tcam-usage-ingress-app-cfm-filter>
show pfe tcam usage tcam-stage ingress app cfm-filter detail
show pfe tcam usage tcam-stage ingress app cfm-filter list-related-apps
show pfe tcam usage tcam-stage ingress app cfm-filter list-shared-apps
show pfe tcam usage tcam-stage ingress app cfm-filter shared-usage
show pfe tcam usage tcam-stage ingress app cfm-filter shared-usage detail
show pfe tcam usage tcam-stage ingress app cfm-vpls-filter
<get-pfe-tcam-usage-ingress-app-cfm-vpls-filter>
show pfe tcam usage tcam-stage ingress app cfm-vpls-filter detail
show pfe tcam usage tcam-stage ingress app cfm-vpls-filter list-related-apps
show pfe tcam usage tcam-stage ingress app cfm-vpls-filter list-shared-apps
show pfe tcam usage tcam-stage ingress app cfm-vpls-filter shared-usage
show pfe tcam usage tcam-stage ingress app cfm-vpls-filter shared-usage detail
show pfe tcam usage tcam-stage ingress app cfm-vpls-ifl-filter
<get-pfe-tcam-usage-ingress-app-cfm-vpls-ifl-filter>
show pfe tcam usage tcam-stage ingress app cfm-vpls-ifl-filter detail
show pfe tcam usage tcam-stage ingress app cfm-vpls-ifl-filter list-related-apps
show pfe tcam usage tcam-stage ingress app cfm-vpls-ifl-filter list-shared-apps
show pfe tcam usage tcam-stage ingress app cfm-vpls-ifl-filter shared-usage
show pfe tcam usage tcam-stage ingress app cfm-vpls-ifl-filter shared-usage
detail
show pfe tcam usage tcam-stage ingress app fw-ccc-in
<get-pfe-tcam-usage-ingress-app-fw-ccc-in>
show pfe tcam usage tcam-stage ingress app fw-ccc-in detail
show pfe tcam usage tcam-stage ingress app fw-ccc-in list-related-apps
show pfe tcam usage tcam-stage ingress app fw-ccc-in list-shared-apps
show pfe tcam usage tcam-stage ingress app fw-ccc-in shared-usage
show pfe tcam usage tcam-stage ingress app fw-ccc-in shared-usage detail
show pfe tcam usage tcam-stage ingress app fw-ifl-in
<get-pfe-tcam-usage-ingress-app-fw-ifl-in>
show pfe tcam usage tcam-stage ingress app fw-ifl-in detail
show pfe tcam usage tcam-stage ingress app fw-ifl-in list-related-apps
show pfe tcam usage tcam-stage ingress app fw-ifl-in list-shared-apps
show pfe tcam usage tcam-stage ingress app fw-ifl-in shared-usage
show pfe tcam usage tcam-stage ingress app fw-ifl-in shared-usage detail
show pfe tcam usage tcam-stage ingress app fw-inet-ftf
<get-pfe-tcam-usage-ingress-app-fw-inet-ftf>
show pfe tcam usage tcam-stage ingress app fw-inet-ftf detail
show pfe tcam usage tcam-stage ingress app fw-inet-ftf list-related-apps
show pfe tcam usage tcam-stage ingress app fw-inet-ftf list-shared-apps
show pfe tcam usage tcam-stage ingress app fw-inet-ftf shared-usage
show pfe tcam usage tcam-stage ingress app fw-inet-ftf shared-usage detail
show pfe tcam usage tcam-stage ingress app fw-inet-in
<get-pfe-tcam-usage-ingress-app-fw-inet-in>
show pfe tcam usage tcam-stage ingress app fw-inet-in detail
show pfe tcam usage tcam-stage ingress app fw-inet-in list-related-apps
show pfe tcam usage tcam-stage ingress app fw-inet-in list-shared-apps
show pfe tcam usage tcam-stage ingress app fw-inet-in shared-usage
show pfe tcam usage tcam-stage ingress app fw-inet-in shared-usage detail
show pfe tcam usage tcam-stage ingress app fw-inet-pm
<get-pfe-tcam-usage-ingress-app-fw-inet-pm>
show pfe tcam usage tcam-stage ingress app fw-inet-pm detail

```

```
show pfe tcam usage tcam-stage ingress app fw-inet-pm list-related-apps
show pfe tcam usage tcam-stage ingress app fw-inet-pm list-shared-apps
show pfe tcam usage tcam-stage ingress app fw-inet-pm shared-usage
show pfe tcam usage tcam-stage ingress app fw-inet-pm shared-usage detail
show pfe tcam usage tcam-stage ingress app fw-inet-rpf
<get-pfe-tcam-usage-ingress-app-fw-inet-rpf>
show pfe tcam usage tcam-stage ingress app fw-inet-rpf detail
show pfe tcam usage tcam-stage ingress app fw-inet-rpf list-related-apps
show pfe tcam usage tcam-stage ingress app fw-inet-rpf list-shared-apps
show pfe tcam usage tcam-stage ingress app fw-inet-rpf shared-usage
show pfe tcam usage tcam-stage ingress app fw-inet-rpf shared-usage detail
show pfe tcam usage tcam-stage ingress app fw-inet6-ftf
<get-pfe-tcam-usage-ingress-app-fw-inet6-ftf>
show pfe tcam usage tcam-stage ingress app fw-inet6-ftf detail
show pfe tcam usage tcam-stage ingress app fw-inet6-ftf list-related-apps
show pfe tcam usage tcam-stage ingress app fw-inet6-ftf list-shared-apps
show pfe tcam usage tcam-stage ingress app fw-inet6-ftf shared-usage
show pfe tcam usage tcam-stage ingress app fw-inet6-ftf shared-usage detail
show pfe tcam usage tcam-stage ingress app fw-inet6-in
<get-pfe-tcam-usage-ingress-app-fw-inet6-in>
show pfe tcam usage tcam-stage ingress app fw-inet6-in detail
show pfe tcam usage tcam-stage ingress app fw-inet6-in list-related-apps
show pfe tcam usage tcam-stage ingress app fw-inet6-in list-shared-apps
show pfe tcam usage tcam-stage ingress app fw-inet6-in shared-usage
show pfe tcam usage tcam-stage ingress app fw-inet6-in shared-usage detail
show pfe tcam usage tcam-stage ingress app fw-inet6-rpf
<get-pfe-tcam-usage-ingress-app-fw-inet6-rpf>
show pfe tcam usage tcam-stage ingress app fw-inet6-rpf detail
show pfe tcam usage tcam-stage ingress app fw-inet6-rpf list-related-apps
show pfe tcam usage tcam-stage ingress app fw-inet6-rpf list-shared-apps
show pfe tcam usage tcam-stage ingress app fw-inet6-rpf shared-usage
show pfe tcam usage tcam-stage ingress app fw-inet6-rpf shared-usage detail
show pfe tcam usage tcam-stage ingress app fw-l2-in
<get-pfe-tcam-usage-ingress-app-fw-l2-in>
show pfe tcam usage tcam-stage ingress app fw-l2-in detail
show pfe tcam usage tcam-stage ingress app fw-l2-in list-related-apps
show pfe tcam usage tcam-stage ingress app fw-l2-in list-shared-apps
show pfe tcam usage tcam-stage ingress app fw-l2-in shared-usage
show pfe tcam usage tcam-stage ingress app fw-l2-in shared-usage detail
show pfe tcam usage tcam-stage ingress app fw-mpls-in
<get-pfe-tcam-usage-ingress-app-fw-mpls-in>
show pfe tcam usage tcam-stage ingress app fw-mpls-in detail
show pfe tcam usage tcam-stage ingress app fw-mpls-in list-related-apps
show pfe tcam usage tcam-stage ingress app fw-mpls-in list-shared-apps
show pfe tcam usage tcam-stage ingress app fw-mpls-in shared-usage
show pfe tcam usage tcam-stage ingress app fw-mpls-in shared-usage detail
show pfe tcam usage tcam-stage ingress app fw-vpls-in
<get-pfe-tcam-usage-ingress-app-fw-vpls-in>
show pfe tcam usage tcam-stage ingress app fw-vpls-in detail
show pfe tcam usage tcam-stage ingress app fw-vpls-in list-related-apps
show pfe tcam usage tcam-stage ingress app fw-vpls-in list-shared-apps
show pfe tcam usage tcam-stage ingress app fw-vpls-in shared-usage
show pfe tcam usage tcam-stage ingress app fw-vpls-in shared-usage detail
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-egr
<get-pfe-tcam-usage-ingress-app-gr-ifl-statistics-egr>
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-egr detail
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-egr list-related-apps
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-egr list-shared-apps
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-egr shared-usage
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-egr shared-usage detail
```

```

show pfe tcam usage tcam-stage ingress app gr-ifl-stats-ing
<get-pfe-tcam-usage-ingress-app-gr-ifl-statistics-ing>
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-ing detail
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-ing list-related-apps
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-ing list-shared-apps
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-ing shared-usage
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-ing shared-usage detail
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-preing
<get-pfe-tcam-usage-ingress-app-gr-ifl-statistics-preing>
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-preing detail
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-preing list-related-apps
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-preing list-shared-apps
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-preing shared-usage
show pfe tcam usage tcam-stage ingress app gr-ifl-stats-preing shared-usage
detail
show pfe tcam usage tcam-stage ingress app ifl-statistics-in
<get-pfe-tcam-usage-ingress-app-ifl-statistics-in>
show pfe tcam usage tcam-stage ingress app ifl-statistics-in detail
show pfe tcam usage tcam-stage ingress app ifl-statistics-in list-related-apps
show pfe tcam usage tcam-stage ingress app ifl-statistics-in list-shared-apps
show pfe tcam usage tcam-stage ingress app ifl-statistics-in shared-usage
show pfe tcam usage tcam-stage ingress app ifl-statistics-in shared-usage
detail
show pfe tcam usage tcam-stage ingress app ipsec-reverse-fil
<get-pfe-tcam-usage-ingress-app-ipsec-reverse-fil>
show pfe tcam usage tcam-stage ingress app ipsec-reverse-fil detail
show pfe tcam usage tcam-stage ingress app ipsec-reverse-fil list-related-apps
show pfe tcam usage tcam-stage ingress app ipsec-reverse-fil list-shared-apps
show pfe tcam usage tcam-stage ingress app ipsec-reverse-fil shared-usage
show pfe tcam usage tcam-stage ingress app ipsec-reverse-fil shared-usage
detail
show pfe tcam usage tcam-stage ingress app irb-fixed-cos
<get-pfe-tcam-usage-ingress-app-irb-fixed-cos>
show pfe tcam usage tcam-stage ingress app irb-fixed-cos detail
show pfe tcam usage tcam-stage ingress app irb-fixed-cos list-related-apps
show pfe tcam usage tcam-stage ingress app irb-fixed-cos list-shared-apps
show pfe tcam usage tcam-stage ingress app irb-fixed-cos shared-usage
show pfe tcam usage tcam-stage ingress app irb-fixed-cos shared-usage detail
show pfe tcam usage tcam-stage ingress app irb-inet6-fil
<get-pfe-tcam-usage-ingress-app-irb-inet6-fil>
show pfe tcam usage tcam-stage ingress app irb-inet6-fil detail
show pfe tcam usage tcam-stage ingress app irb-inet6-fil list-related-apps
show pfe tcam usage tcam-stage ingress app irb-inet6-fil list-shared-apps
show pfe tcam usage tcam-stage ingress app irb-inet6-fil shared-usage
show pfe tcam usage tcam-stage ingress app irb-inet6-fil shared-usage detail
show pfe tcam usage tcam-stage ingress app lfm-802.3ah-in
<get-pfe-tcam-usage-ingress-app-lfm-802.3ah-in>
show pfe tcam usage tcam-stage ingress app lfm-802.3ah-in detail
show pfe tcam usage tcam-stage ingress app lfm-802.3ah-in list-related-apps
show pfe tcam usage tcam-stage ingress app lfm-802.3ah-in list-shared-apps
show pfe tcam usage tcam-stage ingress app lfm-802.3ah-in shared-usage
show pfe tcam usage tcam-stage ingress app lfm-802.3ah-in shared-usage detail
show pfe tcam usage tcam-stage ingress app lo0-inet-fil
<get-pfe-tcam-usage-ingress-app-lo0-inet-fil>
show pfe tcam usage tcam-stage ingress app lo0-inet-fil detail
show pfe tcam usage tcam-stage ingress app lo0-inet-fil list-related-apps
show pfe tcam usage tcam-stage ingress app lo0-inet-fil list-shared-apps
show pfe tcam usage tcam-stage ingress app lo0-inet-fil shared-usage
show pfe tcam usage tcam-stage ingress app lo0-inet-fil shared-usage detail
show pfe tcam usage tcam-stage ingress app lo0-inet6-fil

```

```
<get-pfe-tcam-usage-ingress-app-lo0-inet6-fil>
show pfe tcam usage tcam-stage ingress app lo0-inet6-fil detail
show pfe tcam usage tcam-stage ingress app lo0-inet6-fil list-related-apps
show pfe tcam usage tcam-stage ingress app lo0-inet6-fil list-shared-apps
show pfe tcam usage tcam-stage ingress app lo0-inet6-fil list-shared-apps
show pfe tcam usage tcam-stage ingress app lo0-inet6-fil shared-usage
show pfe tcam usage tcam-stage ingress app lo0-inet6-fil shared-usage detail
show pfe tcam usage tcam-stage ingress app mac-drop-cnt
<get-pfe-tcam-usage-ingress-app-mac-drop-cnt>
show pfe tcam usage tcam-stage ingress app mac-drop-cnt detail
show pfe tcam usage tcam-stage ingress app mac-drop-cnt list-related-apps
show pfe tcam usage tcam-stage ingress app mac-drop-cnt list-shared-apps
show pfe tcam usage tcam-stage ingress app mac-drop-cnt shared-usage
show pfe tcam usage tcam-stage ingress app mac-drop-cnt shared-usage detail
<get-pfe-tcam-usage-ingress-app-mrouter-port-in>
show pfe tcam usage tcam-stage ingress app mrouter-port-in detail
show pfe tcam usage tcam-stage ingress app mrouter-port-in list-related-apps
show pfe tcam usage tcam-stage ingress app mrouter-port-in list-shared-apps
show pfe tcam usage tcam-stage ingress app mrouter-port-in shared-usage
show pfe tcam usage tcam-stage ingress app mrouter-port-in shared-usage detail
show pfe tcam usage tcam-stage ingress app napt-reverse-fil
<get-pfe-tcam-usage-ingress-app-napt-reverse-fil>
show pfe tcam usage tcam-stage ingress app napt-reverse-fil detail
show pfe tcam usage tcam-stage ingress app napt-reverse-fil list-related-apps
show pfe tcam usage tcam-stage ingress app napt-reverse-fil list-shared-apps
show pfe tcam usage tcam-stage ingress app napt-reverse-fil shared-usage
show pfe tcam usage tcam-stage ingress app napt-reverse-fil shared-usage detail
show pfe tcam usage tcam-stage ingress app no-local-switching
<get-pfe-tcam-usage-ingress-app-no-local-switching>
show pfe tcam usage tcam-stage ingress app no-local-switching detail
show pfe tcam usage tcam-stage ingress app no-local-switching list-related-apps
show pfe tcam usage tcam-stage ingress app no-local-switching list-shared-apps
show pfe tcam usage tcam-stage ingress app no-local-switching shared-usage
show pfe tcam usage tcam-stage ingress app no-local-switching shared-usage
detail
show pfe tcam usage tcam-stage ingress detail
<get-pfe-tcam-usage-ingress-tcam-stage-detail>
show pfe tcam usage tcam-stage pre-ingress
<get-pfe-tcam-usage-pre-ingress-tcam-stage>
show pfe tcam usage tcam-stage pre-ingress app
<get-pfe-tcam-usage-pre-ingress-app>
show pfe tcam usage tcam-stage pre-ingress app cos-fc
<get-pfe-tcam-usage-pre-ingress-app-cos-fc>
show pfe tcam usage tcam-stage pre-ingress app cos-fc detail
show pfe tcam usage tcam-stage pre-ingress app cos-fc list-related-apps
show pfe tcam usage tcam-stage pre-ingress app cos-fc list-shared-apps
show pfe tcam usage tcam-stage pre-ingress app cos-fc shared-usage
show pfe tcam usage tcam-stage pre-ingress app cos-fc shared-usage detail
show pfe tcam usage tcam-stage pre-ingress app fw-fbf
<get-pfe-tcam-usage-pre-ingress-app-fw-fbf>
show pfe tcam usage tcam-stage pre-ingress app fw-fbf detail
show pfe tcam usage tcam-stage pre-ingress app fw-fbf list-related-apps
show pfe tcam usage tcam-stage pre-ingress app fw-fbf list-shared-apps
show pfe tcam usage tcam-stage pre-ingress app fw-fbf shared-usage
show pfe tcam usage tcam-stage pre-ingress app fw-fbf shared-usage detail
show pfe tcam usage tcam-stage pre-ingress app fw-fbf-inet6
<get-pfe-tcam-usage-pre-ingress-app-fw-fbf-inet6>
show pfe tcam usage tcam-stage pre-ingress app fw-fbf-inet6 detail
show pfe tcam usage tcam-stage pre-ingress app fw-fbf-inet6 list-related-apps
show pfe tcam usage tcam-stage pre-ingress app fw-fbf-inet6 list-shared-apps
```

```

show pfe tcam usage tcam-stage pre-ingress app fw-fbf-inet6 shared-usage
show pfe tcam usage tcam-stage pre-ingress app fw-fbf-inet6 shared-usage detail
show pfe tcam usage tcam-stage pre-ingress app fw-semantics
<get-pfe-tcam-usage-pre-ingress-app-fw-semantics>
show pfe tcam usage tcam-stage pre-ingress app fw-semantics detail
show pfe tcam usage tcam-stage pre-ingress app fw-semantics list-related-apps
show pfe tcam usage tcam-stage pre-ingress app fw-semantics list-shared-apps
show pfe tcam usage tcam-stage pre-ingress app fw-semantics shared-usage
show pfe tcam usage tcam-stage pre-ingress app fw-semantics shared-usage detail
show pfe tcam usage tcam-stage pre-ingress app ifd-src-mac-fil
<get-pfe-tcam-usage-pre-ingress-app-ifd-src-mac-fil>
show pfe tcam usage tcam-stage pre-ingress app ifd-src-mac-fil detail
show pfe tcam usage tcam-stage pre-ingress app ifd-src-mac-fil list-shared-apps
show pfe tcam usage tcam-stage pre-ingress app ifd-src-mac-fil shared-usage
show pfe tcam usage tcam-stage pre-ingress app ifd-src-mac-fil shared-usage
detail
show pfe tcam usage tcam-stage pre-ingress app ing-out-iff
<get-pfe-tcam-usage-pre-ingress-app-ing-out-iff>
show pfe tcam usage tcam-stage pre-ingress app ing-out-iff detail
show pfe tcam usage tcam-stage pre-ingress app ing-out-iff list-related-apps
show pfe tcam usage tcam-stage pre-ingress app ing-out-iff list-shared-apps
show pfe tcam usage tcam-stage pre-ingress app ing-out-iff shared-usage
show pfe tcam usage tcam-stage pre-ingress app ing-out-iff shared-usage detail
show pfe tcam usage tcam-stage pre-ingress app ip-mac-val
<get-pfe-tcam-usage-pre-ingress-app-ip-mac-val>
show pfe tcam usage tcam-stage pre-ingress app ip-mac-val detail
show pfe tcam usage tcam-stage pre-ingress app ip-mac-val list-related-apps
show pfe tcam usage tcam-stage pre-ingress app ip-mac-val list-shared-apps
show pfe tcam usage tcam-stage pre-ingress app ip-mac-val shared-usage
show pfe tcam usage tcam-stage pre-ingress app ip-mac-val shared-usage detail
show pfe tcam usage tcam-stage pre-ingress app ip-mac-val-bcast
<get-pfe-tcam-usage-pre-ingress-app-ip-mac-val-bcast>
show pfe tcam usage tcam-stage pre-ingress app ip-mac-val-bcast detail
show pfe tcam usage tcam-stage pre-ingress app ip-mac-val-bcast
list-related-apps
show pfe tcam usage tcam-stage pre-ingress app ip-mac-val-bcast list-shared-apps
show pfe tcam usage tcam-stage pre-ingress app ip-mac-val-bcast shared-usage
show pfe tcam usage tcam-stage pre-ingress app ip-mac-val-bcast shared-usage
detail
show pfe tcam usage tcam-stage pre-ingress app rfc2544-layer2-in
<get-pfe-tcam-usage-pre-ingress-app-rfc2544-layer2-in>
show pfe tcam usage tcam-stage pre-ingress app rfc2544-layer2-in detail
show pfe tcam usage tcam-stage pre-ingress app rfc2544-layer2-in
list-related-apps
show pfe tcam usage tcam-stage pre-ingress app rfc2544-layer2-in
list-shared-apps
show pfe tcam usage tcam-stage pre-ingress app rfc2544-layer2-in shared-usage
show pfe tcam usage tcam-stage pre-ingress app rfc2544-layer2-in shared-usage
detail
show pfe tcam usage tcam-stage pre-ingress app vpls-mesh-group-mcast
<get-upper-level-xml-name-vpls-mesh-group-mcast>
show pfe tcam usage tcam-stage pre-ingress app vpls-mesh-group-mcast detail
show pfe tcam usage tcam-stage pre-ingress app vpls-mesh-group-mcast
list-related-apps
show pfe tcam usage tcam-stage pre-ingress app vpls-mesh-group-mcast
list-shared-apps
show pfe tcam usage tcam-stage pre-ingress app vpls-mesh-group-mcast
shared-usage
show pfe tcam usage tcam-stage pre-ingress app vpls-mesh-group-mcast
shared-usage detail

```

```
show pfe tcam usage tcam-stage pre-ingress app vpls-mesh-group-ucast
<get-upper-level-xml-name-vpls-mesh-group-ucast>
show pfe tcam usage tcam-stage pre-ingress app vpls-mesh-group-ucast detail
show pfe tcam usage tcam-stage pre-ingress app vpls-mesh-group-ucast
list-related-apps
show pfe tcam usage tcam-stage pre-ingress app vpls-mesh-group-ucast
list-shared-apps
show pfe tcam usage tcam-stage pre-ingress app vpls-mesh-group-ucast
shared-usage
show pfe tcam usage tcam-stage pre-ingress app vpls-mesh-group-ucast
shared-usage detail
show pfe tcam usage tcam-stage pre-ingress detail
<get-pfe-tcam-usage-pre-ingress-tcam-stage-detail>
show pfe terse
  <get-pfe-information>

show pfe version brief
show pfe version detail
show pgm
show pgm negative-acknowledgments
  <get-pgm-nak>

show pgm source-path-messages
  <get-pgm-source-path-messages>

show pgm statistics
  <get-pgm-statistics>

show pim
show pim bidirectional
show pim bidirectional df-election
<get-pim-bidir-df-election-information>
show pim bidirectional df-election interface
<get-pim-bidir-df-election-interface-information>
show pim bootstrap
  <get-pim-bootstrap-information>

show pim interfaces
  <get-pim-interfaces-information>

show pim join
  <get-pim-join-information>

show pim mdt
  <get-pim-mdt-information>

show pim mdt data-mdt-joins
  <get-pim-data-mdt-join-information>
show pim mvpn
  <get-pim-mvpn-information>

show pim neighbors
  <get-pim-neighbors-information>

show pim rps
  <get-pim-rps-information>
show pim snooping
show pim snooping interfaces
show pim snooping join
show pim snooping neighbors
```



```
show pim snooping statistics
show pim source
    <get-pim-source-information>

show pim statistics
    <get-pim-statistics-information>

show policy
show policy conditions
show policy damping
show ppp
show ppp address-pool
    <get-ppp-address-pool-information>

show ppp interface
    <get-ppp-interface-information>

show ppp statistics
    <get-ppp-statistics-information>

show ppp summary
    <get-ppp-summary-information>

show pppoe
show pppoe interfaces
    <get-pppoe-interface-information>
show pppoe lockout
    <get-pppoe-lockout-information>
show pppoe lockout atm-identifier
    <get-pppoe-lockout-atm-information>
show pppoe lockout vlan-identifier
    <get-pppoe-lockout-vlan-information>

show pppoe service-name-tables
    <get-pppoe-service-name-table-information>

show pppoe statistics
    <get-pppoe-statistics-information>

show pppoe underlying-interfaces
    <get-pppoe-underlying-interface-information>

show pppoe version
    <get-pppoe-version>
show programmable-rpd
show programmable-rpd clients
    <get-programmable-rpd-client-information>

show protection-group
show protection-group ethernet-aps
    <show-protection-group-ethernet-aps>
show protection-group ethernet-ring
show protection-group ethernet-ring aps
    <get-raps-pdu-information>
show protection-group ethernet-ring data-channel
    <get-ring-data-channel-information>
show protection-group ethernet-ring interface
    <get-ring-interface-information>
show protection-group ethernet-ring node-state
    <get-raps-state-machine-information>
```

```
show protection-group ethernet-ring node-state
show protection-group ethernet-ring statistics
  <get-ring-tatistics>
show protection-group ethernet-ring vlan
  <get-ring-vlan-information>
show ptp
show ptp clock
  <get-ptp-clock>
show ptp global-information
  <get-ptp-global-information>
show ptp hybrid
show ptp hybrid config
  <get-ptp-hybrid-mapping>
show ptp hybrid status
  <get-ptp-hybrid-status>
show ptp last-tod-update
  <get-last-tod-update>
show ptp lock-status
  <get-ptp-lock-status>
show ptp master
  <get-ptp-master>
show ptp path-trace
  <get-ptp-path-trace>
show ptp port
  <get-ptp-port>
show ptp quality-level-mapping
  <get-ptp-quality-level-mapping>
show ptp slave
  <get-ptp-slave>
show ptp stateful
  <get-ptp-stateful>
show ptp statistics
  <get-ptp-statistics>
show r2cp
show r2cp interfaces
  <get-r2cp-interface-information>
show r2cp radio
  <get-r2cp-radio-information>
show r2cp sessions
  <get-r2cp-session-information>
show r2cp statistics
  <get-r2cp-statistics>
show redundant-power-system
show redundant-power-system led
show redundant-power-system multi-backup
  <get-rps-scale-information>
show redundant-power-system network
  <get-rps-network-information>
show redundant-power-system power-supply
show redundant-power-system status
show redundant-power-system upgrade
  <get-rps-upgrade-information>
show redundant-power-system version
show rip
show rip general-statistics
  <get-rip-general-statistics-information>

show rip neighbor
  <get-rip-neighbor-information>
```

```
show rip statistics
  <get-rip-statistics-information>
show rip statistics peer
  <get-rip-peer-information>
show ripng
show ripng general-statistics
  <get-ripng-general-statistics-information>

show ripng neighbor
  <get-ripng-neighbor-information>
show ripng statistics
  <get-ripng-statistics-information>
show route
  <get-route-information>

show route cumulative
  <get-route-cumulative>

show route export
  <get-rteexport-table-information>

show route export instance
  <get-rteexport-instance-information>

show route localization
  <get-fib-localization-information>
show route export vrf-target
  <get-rteexport-target-information>

show route flow
show route flow validation
  <get-rtflow-dep-information>

show route forwarding-table
  <get-forwarding-table-information>

show route instance
  <get-instance-information>

show route instance operational
  <get-operational-routing-instance-information>

show route martians
  <get-route-martians>
show route resolution
  <get-route-resolution-information>
show route resolution summary
  <get-route-resolution-summary>
show route resolution unresolved
show route rib-groups
  <get-route-rib-groups>
show route snooping
  <get-route-snooping-information>
show route snooping summary
  <get-route-snooping-summary>
show route summary
  <get-route-summary-information>

show rsvp
show rsvp interface
```

```
<get-rsvp-interface-information>

show rsvp neighbor
  <get-rsvp-neighbor-information>

show rsvp route-session-id
  <get-rsvp-route-session-id-information>

show rsvp session
  <get-rsvp-session-information>

show rsvp statistics
  <get-rsvp-statistics-information>

show rsvp version
  <get-rsvp-version-information>

show sap
show sap listen
  <get-sap-listen-information>
show security group-vpn member kek
show security group-vpn member kek security-associations
  <get-gvpn-kek-security-associations-information>

show services
show services accounting
  <get-service-accounting-information>

show services accounting aggregation
  <get-service-accounting-aggregation-information>

show services accounting aggregation as
  <get-service-accounting-aggregation-as-information>

show services accounting aggregation destination-prefix
  <get-service-accounting-aggregation-destination-prefix-information>

show services accounting aggregation protocol-port
  <get-service-accounting-aggregation-protocol-port-information>

show services accounting aggregation source-destination-prefix
  <get-service-accounting-aggregation-source-destination-prefix-information>

show services accounting aggregation source-prefix
  <get-service-accounting-aggregation-source-prefix-information>

show services accounting aggregation template
  <get-service-accounting-aggregation-template-information>

show services accounting errors
  <get-service-accounting-errors-information>

show services accounting flow
  <get-service-accounting-flow-information>

show services accounting flow-detail
  <get-service-accounting-flow-detail>

show services accounting memory
  <get-service-accounting-memory-information>
```

```

show services accounting packet-size-distribution
    <get-packet-distribution-information>

show services accounting status
    <get-service-accounting-status-information>

show services accounting usage
    <get-service-accounting-usage-information>

show services alg
show services alg conversations
    <get-service-msp-alg-conversation-information>
show services alg sip-globals
    <get-service-msp-alg-sip-globals-information>
show services alg statistics
show services application-aware-access-list
show services application-aware-access-list flows
show services application-aware-access-list flows interface
    <get-application-aware-access-list-flows-interface>
show services application-aware-access-list flows subscriber
    <get-application-aware-access-list-flows-subscriber>
show services application-aware-access-list statistics
show services application-aware-access-list statistics interface
    <get-application-aware-access-list-statistics-interface>
show services application-aware-access-list statistics subscriber
    <get-application-aware-access-list-statistics-subscriber>
show services application-identification
show services application-identification application
show services application-identification application detail
    <get-appid-application-signature-detail>
show services application-identification application summary
    <get-appid-application-signature-summary>
show services application-identification application-system-cache
    <get-appid-application-system-cache>

show services application-identification counter
    <get-appid-counter>
show services application-identification counter ssl-encrypted-sessions
    <get-appid-counter-encrypted>
show services application-identification group
show services application-identification group detail
    <get-appid-application-group-detail>
show services application-identification group summary
    <get-appid-application-group-summary>
show services application-identification statistics
show services application-identification statistics application-groups
    <get-appid-application-group-statistics>
show services application-identification statistics applications
    <get-appid-application-statistics>
show services application-identification status
    <get-appid-status-information>
show services application-identification version
    <get-appid-package-version>

show services border-signaling-gateway
show services border-signaling-gateway accounting
show services border-signaling-gateway accounting statistics
    <get-service-border-signaling-gateway-charging-statistics>

```

```
show services border-signaling-gateway accounting status
  <get-service-border-signaling-gateway-charging-status>
show services border-signaling-gateway admission-control
  <get-service-border-signaling-gateway-statistics-admission-control>

show services border-signaling-gateway by-call-context-id
  <get-service-bsg-information-by-call-context-id>

show services border-signaling-gateway by-contact
  <get-service-border-signaling-gateway-information-by-contact>

show services border-signaling-gateway by-request-uri
  <get-service-border-signaling-gateway-information-by-request-uri>

show services border-signaling-gateway calls
  <get-service-border-signaling-gateway-statistics-calls>

show services border-signaling-gateway calls-duration
  <get-service-border-signaling-gateway-calls-duration>

show services border-signaling-gateway calls-failed

how services border-signaling-gateway charging
show services border-signaling-gateway charging statistics
  <get-service-border-signaling-gateway-charging-statistics>
show services border-signaling-gateway charging status
  <get-service-border-signaling-gateway-charging-status>
show services border-signaling-gateway denied-messages
  <get-service-bsg-denied-messages>

show services border-signaling-gateway embedded-spdf
  <get-service-border-signaling-gateway-embedded-spdf>

show services border-signaling-gateway embedded-spdf status
  <get-service-border-signaling-gateway-embedded-spdf-status>

show services border-signaling-gateway name-resolution-cache

show services border-signaling-gateway name-resolution-cache all
  <get-service-border-signaling-gateway-name-resolution-cache-all>

show services border-signaling-gateway name-resolution-cache by-fqdn
  <get-border-signaling-gateway-name-resolution-cache-by-fqdn>
show services border-signaling-gateway status
  <get-service-bsg-status-information>
show services captive-portal-content-delivery
show services captive-portal-content-delivery pic
  <get-cpcd-pic-information>
show services captive-portal-content-delivery profile
  <get-cpcd-profile>
show services captive-portal-content-delivery rule
  <get-cpcd-rule>
show services captive-portal-content-delivery ruleset
  <get-cpcd-rule-set>
show services captive-portal-content-delivery sset
  <get-cpcd-service-set>
show services captive-portal-content-delivery statistics
  <get-cpcd-pic-statistics>
show services captive-portal-content-delivery statistics interface
```

```
show services capture
<get-service-capture>
show services cos
show services cos statistics
  <get-service-cos-statistics-information>

show services cos statistics diffserv
  <get-service-cos-diffserv-statistics>

show services cos statistics forwarding-class
  <get-service-cos-forwarding-class-statistics>

show services crtp
  <get-service-crtp-params-information>

show services crtp extensive
  <get-service-crtp-extensive-information>

show services crtp flows
  <get-service-crtp-flow-table-information>

show services dynamic-flow-capture
show services dynamic-flow-capture content-destination
  <get-services-dynamic-flow-capture-content-destination-information>

show services dynamic-flow-capture control-source
  <get-services-dynamic-flow-capture-control-source-information>

show services dynamic-flow-capture statistics
  <get-services-dfc-statistics-information>
show extension-service
show extension-service status
  <jet-application-status>
show services fips
show system commit synchronize-server pending-jobs
  <get-pending-commit-sync-jobs>
show services fips pic
show services fips pic status
  <get-fips-pic-status-information>

show services flow-collector
  <get-services-flow-collector-information>

show services flow-collector file
  <get-services-flow-collector-file-information>

show services flow-collector input
  <get-services-flow-collector-input-information>

show services flow-table
show services flow-table statistics
  <get-flow-table-statistics-information>

show services flows
  <get-service-msp-flow-table-information>

show services ggsn
show services ggsn diagnostics
show services ggsn diagnostics pdp
  <get-pdp-diagnostics-per-apn>
```

```
show services ggsn statistics
    <get-ggsn-statistics>

show services ggsn statistics apn
    <get-ggsn-apn-statistics-information>

show services ggsn statistics charging
    <get-ggsn-charging-statistics-information>

show services ggsn statistics gtp
    <get-ggsn-gtp-statistics-information>

show services ggsn statistics gtp-prime
    <get-ggsn-gtp-prime-statistics-information>

show services ggsn statistics imsi
    <get-ggsn-imsi-user-information>

show services ggsn statistics l2tp-tunnel
    <get-ggsn-l2tp-tunnel-statistics-information>

show services ggsn statistics msisdn
show services ggsn statistics radius
    <get-ggsn-radius-statistics-information>

show services ggsn statistics sgsn
    <get-ggsn-sgsn-statistics-information>

show services ggsn status
    <get-ggsn-interface-information>

show services ggsn trace
show services ggsn trace all
    <get-ggsn-trace>

show services ggsn trace imsi
    <get-ggsn-imsi-trace>

show services ggsn trace msisdn
    <get-ggsn-msisdn-trace>
show services ha
    <get-service-ha-info>
show services hcm
show services hcm pic-statistics
    <get-service-hcm-pic-statistics-information>
show services ids
show services ids destination-table
    <get-service-ids-destination-table-information>

show services ids pair-table
    <get-service-ids-pair-table-information>

show services ids source-table
    <get-service-ids-source-table-information>

show services inline
show services inline ip-reassembly
show services inline ip-reassembly statistics
show services inline nat
```



```
show services inline nat mappings
show services inline nat mappings nptv6
<get-inline-nat-mapping-nptv6-information>
show services inline nat pool
    <get-inline-nat-pool-information>
show services inline nat statistics
    <get-inline-nat-statistics-information>
show services inline software
show services inline software statistics
<get-inline-service-sw-statistics-information>
show services inline stateful-firewall
show services inline stateful-firewall flows
<get-inline-sfw-flow-table-information>
show services inline stateful-firewall statistics
<get-inline-sfw-statistics-information>
show services ipsec-vpn
show services ipsec-vpn ike
show services ipsec-vpn ike security-associations
    <get-ike-services-security-associations-information>

show services ipsec-vpn ike statistics
<get-ike-services-statistics>
show services ipsec-vpn ipsec
show services ipsec-vpn ipsec security-associations
    <get-services-security-associations-information>

show services ipsec-vpn ipsec statistics
    <get-services-ipsec-statistics-information>

show services l2tp
show services l2tp client
<get-l2tp-client-information>
show services l2tp destination
    <get-l2tp-destination-information>
show services l2tp destination lockout
<get-services-l2tp-destination-lockout>
show services l2tp disconnect-cause-summary<
<get-l2tp-disconnect-cause-summary>
show services l2tp multilink
    <get-l2tp-multilink-information>

show services l2tp radius
show services l2tp radius accounting
show services l2tp radius accounting servers
    <get-services-l2tp-radius-accounting-servers-information>

show services l2tp radius accounting statistics
    <get-services-l2tp-radius-accounting-statistics-information>

show services l2tp radius authentication
show services l2tp radius authentication servers
    <get-services-l2tp-radius-authentication-servers-information>

show services l2tp radius authentication statistics
    <get-services-l2tp-radius-authentication-statistics-information>

show services l2tp radius servers
    <get-services-l2tp-radius-authentication-accounting-servers-information>

show services l2tp radius statistics
```

```
<get-services-l2tp-radius-authentication-accounting-statistics-information>

show services l2tp session
    <get-l2tp-session-information>
show services l2tp session-limit-group
    <get-l2tp-session-limit-group-information>

show services l2tp summary
    <get-l2tp-summary-information>

show services l2tp tunnel
    <get-l2tp-tunnel-information>
show services l2tp tunnel-group
    <get-l2tp-tunnel-group-information>

show services l2tp user
    <get-l2tp-user-information>
show services link-services
show services link-services cpu-usage
    <get-link-services-cpu-usage>

show services local-policy-decision-function
show services local-policy-decision-function flows
show services local-policy-decision-function flows interface
    <get-local-policy-decision-function-flows-interface>
show services local-policy-decision-function flows subscriber
    <get-local-policy-decision-function-flows-subscriber>
show services local-policy-decision-function statistics
show services local-policy-decision-function statistics interface
    <get-local-policy-decision-function-statistics-interface>
show services local-policy-decision-function statistics subscriber
    <get-local-policy-decision-function-statistics-subscriber>
show services logging
show services logging history
show services logging history client
show services logging logfiles
show services match-policies
    <get-services-match-policies>
show services mobile
show services mobile hcm
show services mobile hcm statistics
show services nat
show services nat ipv6-multicast-interfaces
    <get-service-nat-ipv6-multicast-information>

show services nat deterministic-nat
show services nat deterministic-nat internal-host
show services nat deterministic-nat nat-port-block
show services nat mappings
    <get-service-nat-mapping-address-pooling-paired>
show services nat mappings brief
    <get-service-nat-mapping-brief>
show services nat mappings detail
show services nat mappings endpoint-independent
    <get-service-nat-mapping-endpoint-independent>
show services nat mappings brief
    <get-service-nat-mapping-brief>
show services nat mappings detail
    <get-service-nat-mapping-detail>
show services nat mappings pcg
```

```
show services nat mappings summary
  <get-service-nat-mapping-summary>
show services nat pool
  <get-service-nat-pool-information>
show services pcp
show services pgcp
show services pgcp active-configuration
  <get-pgcpd-active-configuration>

show services pgcp active-configuration gateway
  <get-service-pgcp-active-configuration-gateway>

show services pgcp conversations
  <get-service-pgcp-conversation-information>

show services pgcp conversations gateway
  <get-service-pgcp-conversation-information-gateway>

show services pgcp flows
  <get-service-pgcp-flow-table-information>

show services pgcp flows gateway
  <get-service-pgcp-flow-table-information-gateway>

show services pgcp gate
  <get-service-pgcp-gate>

show services pgcp gate gateway
  <get-service-pgcp-gate-gateway>

show services pgcp gates
  <get-service-pgcp-gates>

show services pgcp gates gateway
  <get-service-pgcp-gates-gateway>

show services pgcp root-termination
  <get-services-pgcpd-root-termination>

show services pgcp root-termination gateway
  <get-services-pgcpd-root-termination-gateway>

show services pgcp statistics
  <get-service-pgcp-statistics>

show services pgcp statistics gateway
  <get-service-pgcp-statistics-gateway>

show services pgcp terminations
  <get-service-pgcp-terminations>

show services pgcp terminations gateway
  <get-service-pgcp-terminations-gateway>
show services redundancy-group
  <get-services-redundancy-group-information>
show services redundancy-group rg-id
  <get-services-redundancy-group-id-information>

show services rpm
show services rpm active-servers
```

```
<get-active-servers>

show services rpm history-results
  <get-history-results>

show services rpm probe-results
  <get-probe-results>

show services rpm twamp
  <twamp-information>
show services rpm twamp client
  <twamp-client-information>
show services rpm twamp client connection
  <twamp-client-connection-information>
show services rpm twamp client history-results
  <twamp-get-history-results>
show services rpm twamp client probe-results
  <twamp-get-probe-results>
show services rpm twamp client session
  <twamp-client-test-session>
show services rpm twamp server
  <twamp-server-information>
show services rpm twamp server connection
  <twamp-server-connection-information>
show services rpm twamp server session
  <twamp-server-session-information>
show services server-load-balance
show services server-load-balance external-manager
show services server-load-balance external-manager information
show services server-load-balance external-manager statistics
  <get-external-manager-statistics-information>
show services server-load-balance hash-table
  <get-hash-table-information>
show services server-load-balance health-monitor
show services server-load-balance health-monitor information
  <get-real-server-health-monitor-information>
show services server-load-balance health-monitor statistics
  <get-real-server-health-monitor-statistics-information>
show services server-load-balance real-server
show services server-load-balance real-server statistics
  <get-real-server-statistics-information>
show services server-load-balance real-server-group
show services server-load-balance real-server-group information
  <get-real-server-group-information>
show services server-load-balance real-server-group statistics
  <get-real-server-group-statistics-information>
show services server-load-balance sticky
  <get-sticky-table-information>
show services server-load-balance virtual-server
show services server-load-balance virtual-server information
  <get-virtual-server-information>
show services server-load-balance virtual-server statistics
  <get-virtual-server-statistics-information>
show services service-identification
show services service-identification header-redirect
show services service-identification header-redirect statistics
  <get-header-redirect-set-statistics-information>

show services service-identification statistics
  <get-service-identification-statistics-information>
```

```
show services service-identification uri-redirect
show services service-identification uri-redirect statistics
  <get-uri-redirect-set-statistics-information>

show services service-sets
show services service-sets cpu-usage
  <get-service-set-cpu-statistics>

show services service-sets memory-usage
  <get-service-set-memory-statistics>

show services service-sets memory-usage zone
show services service-sets plug-ins
  <get-service-set-plugin-summary>

show services service-sets statistics
show services service-sets statistics drop-flow-limit
  <get-service-set-drop-flow-statistics>
show services service-sets statistics ids
  <get-service-set-ids-drops-statistics>
show services service-sets statistics jflow-log
  <get-service-set-jflow-log-statistics>
show services service-sets statistics packet-drops
  <get-service-set-packet-drop-statistics>

show services service-sets statistics syslog
  <get-service-set-syslog-statistics>
show services service-sets statistics tcp
  <get-service-set-tcp-tracker-statistics>
show services service-sets statistics tcp-mss
  <get-service-set-tcp-mss-statistics>

show services service-sets summary
  <get-service-set-summary-information>

show services sessions
  <get-msp-session-table>
show services sessions analysis
  <show-service-msp-session-analysis-information>
show services sessions count
  <get-service-msp-sess-count-information>
show services sessions utilization
  <get-services-sessions-utilization>

show services software
  <get-service-software-table-information>

show services software flows
  <get-service-fwnat-flow-table-information>

show services software statistics
  <get-service-software-statistics-information>

show services stateful-firewall
show services stateful-firewall flow-analysis
  <get-service-flow-analysis-information>
show services stateful-firewall conversations
```

```
<get-service-sfw-conversation-information>

show services stateful-firewall flows
  <get-service-sfw-flow-table-information>
show services stateful-firewall redundancy-statistics
  <get-service-sfw-redundancy-statistics>

show services stateful-firewall sip-call
  <get-service-sfw-sip-call-information>

show services stateful-firewall sip-register
  <get-service-sfw-sip-register-information>

show services stateful-firewall statistics
  <get-service-sfw-statistics-information>

show services stateful-firewall statistics application-protocol
  <get-service-sfw-application-protocol-statistics>
show services stateful-firewall subscriber-analysis
  <get-service-sfw-subscriber-analysis-information>
show services subscriber
show services subscriber bandwidth
show services subscriber bandwidth client-id
  <get-services-subscriber-bandwidth-by-session-id>
show services subscriber bandwidth interface
  <get-services-subscriber-bandwidth-by-interface>
show services subscriber bandwidth ip-address
  <get-services-subscriber-bandwidth-by-ip-address>
show services subscriber bandwidth service-interface
  <get-services-subscriber-bandwidth-by-service-interface>
show services subscriber dynamic-policies
  <get-services-subscriber-dynamic-policies>
show services subscriber flows
  <get-services-subscriber-flows>
show services subscriber sessions
  <get-services-subscriber-session>
show services subscriber statistics
  <get-services-subscriber-statistics>
show services traffic-detection-function
show services traffic-detection-function hcm
show services traffic-detection-function hcm statistics
  <get-service-tdf-hcm-sessions-stats>
show services traffic-detection-function sessions
  <get-service-tdf-sessions-information>
show services traffic-load-balance
show services traffic-load-balance statistics
  <get-traffic-load-balance-statistics>
show services unified-access-control
show services unified-access-control authentication-table
  <get-uac-auth-table>
show services unified-access-control counters
  <get-uac-counters>
show services unified-access-control policies
  <get-uac-policies>
show services unified-access-control roles
  <get-uac-role-entries>
show services unified-access-control status
  <get-uac-status>
show services video-monitoring
  <get-service-video-monitoring-information>
```

```
show services video-monitoring mdi
<get-service-video-monitoring-mdi-information>
show services video-monitoring mdi alarms
<get-services-video-monitoring-mdi-alarms-information>
show services video-monitoring mdi alarms errors
<get-services-video-monitoring-mdi-alarms-errors-information>
show services video-monitoring mdi alarms stats
<get-services-video-monitoring-mdi-alarms-stats-information>
show services video-monitoring mdi errors
<get-service-video-monitoring-mdi-errors-information>
show services video-monitoring mdi flow
<get-service-video-monitoring-mdi-flows-information>
show services video-monitoring mdi stats
<get-service-video-monitoring-mdi-stats-information>
show shmlog
show shmlog argument-mappings
<get-shmlog-argument-mappings>
show shmlog configuration
<show-shmlog-configuration>
show shmlog entries
<show-shmlog-entries>
show shmlog logs-summary
<show-shmlog-logsummary>
show shmlog statistics
<show-shmlog-statistics>
show snmp
show snmp health-monitor
<get-health-monitor-information>

show snmp health-monitor alarms
<get-health-monitor-alarm-information>

show snmp health-monitor logs
<get-health-monitor-log-information>
show snmp health-monitor routing-engine
show snmp health-monitor routing-engine history
<get-health-monitor-routing-engine-history>
show snmp health-monitor routing-engine history cpu
<get-routing-engine-cpu-history>
show snmp health-monitor routing-engine history memory
<get-routing-engine-memory-history>
show snmp health-monitor routing-engine history open-files-count
<get-routing-engine-fd-history>
show snmp health-monitor routing-engine history process-count
<get-routing-engine-pcount-history>
show snmp health-monitor routing-engine history storage
<get-routing-engine-storage-history>
show snmp health-monitor routing-engine history temperature
<get-routing-engine-temperature-history>
show snmp health-monitor routing-engine status
<get-health-monitor-routing-engine-information>
show snmp health-monitor routing-engine status detail

show snmp inform-statistics
<get-snmp-inform-statistics>

show snmp mib
show snmp mib get
<get-snmp-object>
```

```
show snmp mib get-next
    <get-next-snmp-object>

show snmp mib walk
    <get-walk-snmp-object>

show snmp proxy
show snmp rmon
    <get-rmon-information>

show snmp rmon alarms
    <get-rmon-alarm-information>

show snmp rmon events
    <get-rmon-event-information>

show snmp rmon history
    <get-rmon-history-information>

show snmp rmon logs
    <get-rmon-log-information>

show snmp statistics
    <get-snmp-information>

show snmp v3
    <get-snmp-v3-information>

show snmp v3 access
    <get-snmp-v3-access-information>

show snmp v3 community
    <get-snmp-v3-community-information>

show snmp v3 general
    <get-snmp-v3-general-information>

show snmp v3 groups
    <get-snmp-v3-group-information>

show snmp v3 notify
    <get-snmp-v3-notify-information>

show snmp v3 notify filter
    <get-snmp-v3-notify-filter-information>

show snmp v3 target
    <get-snmp-v3-target-information>

show snmp v3 target address
    <get-snmp-v3-target-address-information>

show snmp v3 target parameters
    <get-snmp-v3-target-parameters-information>

show snmp v3 users
    <get-snmp-v3-usm-user-information>

show spanning-tree
show spanning-tree bridge
```



```
<get-stp-bridge-information>
show spanning-tree interface
  <get-stp-interface-information>
show spanning-tree mstp
show spanning-tree mstp configuration
  <get-mstp-configuration-information>
show spanning-tree statistics
  <get-stp-interface-statistics>
show spanning-tree statistics bridge
show spanning-tree statistics interface
show spanning-tree statistics routing-instance
  <get-stp-routing-instance-statistics>
show spanning-tree stp-buffer
show spanning-tree stp-buffer see-all
show ssl-certificates
<get-ssl-certificate-information>
show static-subscribers
show static-subscribers sessions
<show subscribers
  <get-subscribers>
show subscribers summary
  <get-subscribers-summary>
<get-syslog-filenames>

show synchronous-ethernet
show synchronous-ethernet esmc
show synchronous-ethernet esmc statistics
show synchronous-ethernet esmc transmit
show synchronous-ethernet global-information
show system
show system alarms
  <get-system-alarm-information>

show system auto-snapshot
show system boot-messages
show system buffers
show system certificate
show system commit
  <get-commit-information>
show system commit revision
  <get-commit-revision-information>
show system commit server
  <get-commit-server-information>
show system commit ephemeral
  <get-ephemeral-commit-information>
show system commit server queue
  <get-commit-server-queue-information>
show system commit synchronize-server
show system configuration
show system configuration archival
  <get-system-archival>

show system configuration rescue
  <get-rescue-information>

show system connections
show system core-dumps
  <get-system-core-dumps>
show system core-dumps core-file-info
  <get-core-file-information>
```

```
show system core-dumps kernel-crashinfo
show system core-dumps satellite
<get-core-file-satellite>
show system core-dumps transfer-status
show system diagnostics
show system diagnostics inventory
show system diagnostics usage
show system directory-usage
    <get-directory-usage-information>

show system firmware
    <get-system-firmware-information>
show system khms-stats

show system license
    <get-license-summary-information>

show system license installed
    <get-license-information>
show system license key-content
show system license keys
    <get-license-key-information>

show system license usage
    <get-license-usage-summary>
show system login
show system login lockout
    <get-system-login-lockout-information>
show system memory
<show system processes
show system processes brief
show system processes esc-node
show system processes extensive
show system processes health
    <get-process-health-information>

show system processes providers
show system processes host-processes detail
show system processes providers
show system processes resource-limits
<get-system-process-resource-limits>
show system processes summary
show system queues
show system reboot
show system resource-cleanup
show system resource-cleanup processes
    <get-system-resource-cleanup-processes-information>
<get-resource-monitor-fpc-information>
<get-resource-monitor-fpc-slot-information>

show system rollback
    <get-rollback-information>

show system services
show system services dhcp
show system services dhcp binding
    <get-dhcp-binding-information>
```

```
show system services dhcp conflict
    <get-dhcp-conflict-information>

show system services dhcp global
    <get-dhcp-global-information>

show system services dhcp pool
    <get-dhcp-pool-information>

show system services dhcp statistics
    <get-dhcp-statistics-information>

show system services reverse
    <get-system-services-reverse-information>

show system services service-deployment
    <get-service-deployment-service-information>

show system snapshot
    <get-snapshot-information>

show system software
show system software backup
    <get-package-backup-information>
    <get-software-installation-status>
show system software recovery-package
show system software rollback
    <show-package-rollback>

show system statistics
    <get-statistics-information>

show system statistics bridge
    <get-system-bridge-statistics>
show system statistics extended
show system statistics vpls
show system storage
    <get-system-storage>
show system storage partitions
    <get-system-storage-partitions>
show system storage satellite
    <get-system-storage-satellite>
show system subscriber-management
show system subscriber-management arp
    <get-subscriber-management-arp>
show system subscriber-management arp address
    <get-subscriber-management-arp-address>
show system subscriber-management arp interface
    <get-subscriber-management-arp-interface>
show system subscriber-management ipv6-neighbors
    <get-subscriber-management-ipv6-neighbors>
show system subscriber-management ipv6-neighbors address
    <get-subscriber-management-ipv6-neighbor-address>
show system subscriber-management ipv6-neighbors interface
    <get-subscriber-management-ipv6-neighbor-interface>.
show system subscriber-management route
    <get-subscriber-management-route>
show system subscriber-management route next-hop
    <get-subscriber-management-route-nh>
show system subscriber-management route prefix
```

```
show system subscriber-management route summary
<get-subscriber-management-route-summary>
show system subscriber-management statistics
<get-subscriber-management-statistics>
show system subscriber-management summary
show system switchover
    <get-switchover-information>

show system uptime
    <get-system-uptime-information>

show system users
    <get-system-users-information>

show system virtual-memory
show system yang
show system yang package
<get-system-yang-packages>
show task
show task io
show task logical-system-mux
<get-lrmuxd-task-information>
show task logical-system-mux io
<get-lrmuxd-tasks-io-statistics>
show task logical-system-mux memory
<get-lrmuxd-task-memory>
show task memory
show task replication
<get-routing-task-replication-state>
show task snooping
show task snooping io
show task snooping memory
<get-snooping-task-memory-information>
show ted
show ted database
    <get-ted-database-information>

show ted link
    <get-ted-link-information>

show ted protocol
    <get-ted-protocol-information>
show unified-edge
show unified-edge gateways
show unified-edge ggsn-pgw
show unified-edge ggsn-pgw aaa
show unified-edge ggsn-pgw aaa network-element
show unified-edge ggsn-pgw aaa network-element status
show unified-edge ggsn-pgw aaa network-element-group
show unified-edge ggsn-pgw aaa network-element-group status
show unified-edge ggsn-pgw aaa radius
show unified-edge ggsn-pgw aaa radius statistics
show unified-edge ggsn-pgw aaa statistics
show unified-edge ggsn-pgw address-assignment
show unified-edge ggsn-pgw address-assignment group
show unified-edge ggsn-pgw address-assignment pool
show unified-edge ggsn-pgw address-assignment service-mode
show unified-edge ggsn-pgw address-assignment statistics
show unified-edge ggsn-pgw apn
show unified-edge ggsn-pgw apn service-mode
```

```
show unified-edge ggsn-pgw apn statistics
show unified-edge ggsn-pgw call-rate
show unified-edge ggsn-pgw call-rate statistics
show unified-edge ggsn-pgw charging
show unified-edge ggsn-pgw charging global
show unified-edge ggsn-pgw charging global statistics
show unified-edge ggsn-pgw charging local-persistent-storage
show unified-edge ggsn-pgw charging local-persistent-storage statistics
show unified-edge ggsn-pgw charging path
show unified-edge ggsn-pgw charging path statistics
show unified-edge ggsn-pgw charging path status
show unified-edge ggsn-pgw charging service-mode
show unified-edge ggsn-pgw charging transfer
show unified-edge ggsn-pgw charging transfer statistics
show unified-edge ggsn-pgw charging transfer status
show unified-edge ggsn-pgw charging trigger-profile
show unified-edge ggsn-pgw gtp
show unified-edge ggsn-pgw gtp peer
show unified-edge ggsn-pgw gtp peer count
show unified-edge ggsn-pgw gtp peer history
show unified-edge ggsn-pgw gtp peer statistics
show unified-edge ggsn-pgw gtp statistics
show unified-edge ggsn-pgw ip-reassembly
show unified-edge ggsn-pgw ip-reassembly statistics
show unified-edge ggsn-pgw resource-manager
show unified-edge ggsn-pgw resource-manager clients
show unified-edge ggsn-pgw service-mode
show unified-edge ggsn-pgw statistics
show unified-edge ggsn-pgw statistics traffic-class
show unified-edge ggsn-pgw status
show unified-edge ggsn-pgw status gtp-peer
show unified-edge ggsn-pgw status preemption-list
show unified-edge ggsn-pgw status session-state
show unified-edge ggsn-pgw subscribers
show unified-edge ggsn-pgw subscribers charging
show unified-edge ggsn-pgw subscribers traffic-class
show unified-edge ggsn-pgw system
show unified-edge ggsn-pgw system interfaces
show unified-edge ggsn-pgw system interfaces service-mode
show unified-edge sgw
show unified-edge sgw call-rate
show unified-edge sgw call-rate statistics
show unified-edge sgw charging
show unified-edge sgw charging global
show unified-edge sgw charging global statistics
show unified-edge sgw charging local-persistent-storage
show unified-edge sgw charging local-persistent-storage statistics
show unified-edge sgw charging path
show unified-edge sgw charging path statistics
show unified-edge sgw charging path status
show unified-edge sgw charging service-mode
show unified-edge sgw charging transfer
show unified-edge sgw charging transfer statistics
show unified-edge sgw charging transfer status
show unified-edge sgw charging trigger-profile
show unified-edge sgw gtp
show unified-edge sgw gtp peer
show unified-edge sgw gtp peer count
show unified-edge sgw gtp peer history
show unified-edge sgw gtp peer statistics
```

```
show unified-edge sgw gtp statistics
show unified-edge sgw idle-mode-buffering
show unified-edge sgw idle-mode-buffering statistics
show unified-edge sgw ip-reassembly
show unified-edge sgw ip-reassembly statistics
show unified-edge sgw resource-manager
show unified-edge sgw resource-manager clients
show unified-edge sgw service-mode
show unified-edge sgw statistics
show unified-edge sgw status
show unified-edge sgw status gtp-peer
show unified-edge sgw status preemption-list
show unified-edge sgw status session-state
show unified-edge sgw subscribers
show unified-edge sgw subscribers charging
show unified-edge sgw system
show unified-edge sgw system interfaces
show unified-edge sgw system interfaces service-mode
<get-mobile-serving-gateway-interface-service-mode>
show unified-edge tdf
show unified-edge tdf aaa
show unified-edge tdf aaa radius
show unified-edge tdf aaa radius client
show unified-edge tdf aaa radius client statistics
<radius-client-statistics>
show unified-edge tdf aaa radius client status
show unified-edge tdf aaa radius network-element
show unified-edge tdf aaa radius network-element statistics
<get-aaa-radius-element-statistics>
show unified-edge tdf aaa radius network-element status>
<get-aaa-radius-element-status>
show unified-edge tdf aaa radius server
show unified-edge tdf aaa radius server statistics
radius-server-statistics
show unified-edge tdf aaa radius server status
<get-aaa-radius-server-status>
show unified-edge tdf aaa radius snoop-segment
show unified-edge tdf aaa radius snoop-segment statistics
<radius-snoop-segment-statistics>
show unified-edge tdf aaa statistics
<get-tdf-gateway-aaa-statistics>
show unified-edge tdf address-assignment
show unified-edge tdf address-assignment pool
<get-tdf-gateway-sm-ippool-pool-information>
<get-tdf-address-assign-service-mode>
show unified-edge tdf address-assignment statistics
<get-tdf-gateway-sm-ippool-statistics>
show unified-edge tdf call-admission-control
show unified-edge tdf call-admission-control statistics
<get-tdf-cac-statistics>
show unified-edge tdf call-rate
show unified-edge tdf call-rate statistics
<get-tdf-call-rate-statistics>
show unified-edge tdf diameter
show unified-edge tdf diameter network-element
show unified-edge tdf diameter network-element statistics
<get-diameter-network-element-statistics>
show unified-edge tdf diameter network-element status
<get-diameter-network-element-status>
```

```
show unified-edge tdf diameter pcc-gx
show unified-edge tdf diameter pcc-gx statistics
<get-diameter-statistics-gx>
show unified-edge tdf diameter peer
show unified-edge tdf diameter peer statistics
<get-gateway-diameter-peer-statistics>
show unified-edge tdf diameter peer status
<get-diameter-peer-status>
show unified-edge tdf domain
show unified-edge tdf domain service-mode
<get-mobile-gateways-domain-service-mode>
show unified-edge tdf domain statistics
<get-mobile-gateways-domain-statistics>
show unified-edge tdf resource-manager
show unified-edge tdf resource-manager clients
<get-mobile-gateway-tdf-client-status-information>
show unified-edge tdf service-mode
<get-tdf-gateway-service-mode>
show unified-edge tdf statistics
<get-tdf-statistics>
show unified-edge tdf status
<get-tdf-gateway-status>
show unified-edge tdf status subscriber-state
<get-tdf-gateways-status-state>
show unified-edge tdf subscribers
<get-tdf-gateway-subscribers>
show unified-edge tdf subscribers data-plane
<get-tdf-gateway-subscriber-dataplane-statistics>
show unified-edge tdf subscribers stuck
<get-tdf-gateway-stuck-subscribers>
show unified-edge tdf system
show unified-edge tdf system interfaces
<get-tdf-interfaces-information>
show unified-edge tdf system interfaces service-mode
<get-mobile-tdf-interface-service-mode>
show version
    <get-software-information>

show virtual-chassis
show virtual-chassis active-topology
<get-virtual-chassis-active-topology>
show virtual-chassis device-topology
<get-virtual-chassis-device-topology>
show virtual-chassis fast-failover
<get-virtual-chassis-fast-failover>
show virtual-chassis heartbeat
<get-virtual-chassis-heartbeat-information>
show virtual-chassis login
<get-virtual-chassis-login>
show virtual-chassis mode
<get-virtual-chassis-mode-information>
show virtual-chassis protocol
show virtual-chassis protocol adjacency
<get-virtual-chassis-adjacency-information>
show virtual-chassis protocol database
<get-virtual-chassis-database-information>
show virtual-chassis protocol interface
<get-virtual-chassis-interface-information>
show virtual-chassis protocol route
<get-virtual-chassis-route-information>
```

```
show virtual-chassis protocol statistics
<get-virtual-chassis-statistics-information>
show virtual-chassis status
<get-virtual-chassis-information>
show virtual-chassis vc-path
<get-virtual-chassis-packet-path>
show virtual-chassis vc-port
<get-virtual-chassis-port-information>
show virtual-chassis vc-port diagnostics
show virtual-chassis vc-port diagnostics optics
<get-virtual-chassis-optics-diagnostics>
show virtual-chassis vc-port lag-hash
<get-virtual-chassis-port-lag-hash-information>
show virtual-chassis vc-port statistics
<get-virtual-chassis-port-statistics>
show vlans
<get-vlan-information>
show vlans operational
<get-operational-vlan-instance-information>
show vlans satellite
<get-satellite-control-bridge-domain>
show vmhost
show vmhost bridge
<get-vmhost-bridge-information>
show vmhost crash
<get-vmhost-crash-information>
show vmhost hardware
<get-vmhost-hardware>
show vmhost information
<get-vmhost-information>
show vmhost logs
<get-vmhost-logs-information>
show vmhost management-if
<get-vmhost-management-if-info>
show vmhost netstat
<get-vmhost-netstat>
show vmhost processes
<get-vmhost-processes-information>
show vmhost resource-usage
<get-vmhost-resource-usage-information>
show vmhost snapshot
<get-vmhost-snapshot-information>
show vmhost status
<get-vmhost-status>
show vmhost uptime
<get-vmhost-uptime>
show vmhost version
<get-vmhost-version-information>

show vpls
show vpls connections
    <get-vpls-connection-information>

show vpls flood
show vpls flood event-queue
    <get-vpls-event-queue-information>

show vpls flood route
show vpls flood route all-ce-flood
    <get-vpls-all-ce-flood-route-information>
```



```
show vpls flood route all-flood
  <get-vpls-all-flood-route-information>

show vpls flood route alt-root-flood
  <get-vpls-alt-root-flood-route-information>

show vpls flood route ce-flood
  <get-vpls-ce-flood-route-information>

show vpls flood route mlp-flood
  <get-vpls-mlp-flood-route-information>

show vpls flood route re-flood
  <get-vpls-re-flood-route-information>

show vpls mac-table
  <get-vpls-mac-table>

show vpls mac-table interface
  <get-vpls-interface-mac-table>

show vpls statistics
  <get-vpls-statistics-information>

show vrrp
show vrrp interface
show vrrp track
test interface
test interface fd1-line-loop
test interface fd1-line-loop ansi
test interface fd1-line-loop ansi initiate
test interface fd1-line-loop ansi terminate
test interface fd1-line-loop bellcore
test interface fd1-line-loop bellcore initiate
test interface fd1-line-loop bellcore terminate
test interface fd1-payload-loop
test interface fd1-payload-loop ansi
test interface fd1-payload-loop ansi initiate
test interface fd1-payload-loop ansi terminate
test interface fd1-payload-loop bellcore
test interface fd1-payload-loop bellcore initiate
test interface fd1-payload-loop bellcore terminate
test interface inband-line-loop
test interface inband-line-loop ansi
test interface inband-line-loop ansi initiate
test interface inband-line-loop ansi terminate
test interface inband-line-loop bellcore
test interface inband-line-loop bellcore initiate
test interface inband-line-loop bellcore terminate
test interface inband-line-loop initiate
test interface inband-line-loop terminate
test interface inband-payload-loop
test interface inband-payload-loop ansi
test interface inband-payload-loop ansi initiate
test interface inband-payload-loop ansi terminate
test interface inband-payload-loop bellcore
test interface inband-payload-loop bellcore initiate
test interface inband-payload-loop bellcore terminate
test msdp
```

```
test msdp dependent-peers
test msdp rpf-peer
test policy
<
```

**Configuration
Hierarchy Levels**

```
[edit dynamic-profiles routing-instances instance services mobile-ip home-agent
enable-service]
[edit logical-systems routing-instances instance services mobile-ip home-agent
enable-service]
[edit logical-systems services mobile-ip home-agent enable-service]
[edit routing-instances instance services mobile-ip home-agent enable-service]
[edit services mobile-ip home-agent enable-service]
```

**Related
Documentation**

- [Understanding Junos OS Access Privilege Levels on page 107](#)
- [Example: Configuring User Permissions with Access Privilege Levels on page 113](#)
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

CHAPTER 26

Configuration Statements

- [access](#) on page 1129
- [access \(Dynamic Access Routes\)](#) on page 1130
- [access-end](#) on page 1131
- [access-internal \(Dynamic Access-Internal Routes\)](#) on page 1132
- [access-start](#) on page 1133
- [active-server-group](#) on page 1134
- [accounting](#) on page 1136
- [accounting \(Access Profile\)](#) on page 1137
- [accounting \(Access Profile\)](#) on page 1138
- [accounting-options](#) on page 1139
- [accounting-order](#) on page 1141
- [always-write-option-82](#) on page 1142
- [authentication-order](#) on page 1143
- [accounting-port](#) on page 1144
- [accounting-port](#) on page 1145
- [accounting-port \(RADIUS Server\)](#) on page 1146
- [accounting-server](#) on page 1147
- [accounting-session-id-format](#) on page 1148
- [accounting-stop-on-access-deny](#) on page 1149
- [accounting-stop-on-failure](#) on page 1150
- [address \(Access Address Pool\)](#) on page 1151
- [address \(Access Control Service\)](#) on page 1151
- [address-assignment \(Access\)](#) on page 1152
- [address-assignment \(Address-Assignment Pools\)](#) on page 1155
- [address-pool](#) on page 1156
- [address-pool \(Access\)](#) on page 1157
- [address-protection](#) on page 1158
- [address-range](#) on page 1159

- [advertisement-interval](#) on page 1160
- [agent-address](#) on page 1161
- [allow-commands](#) on page 1162
- [allow-commands-regexps](#) on page 1163
- [allow-configuration](#) on page 1165
- [allow-configuration](#) on page 1166
- [allow-configuration-regexps](#) on page 1167
- [allow-configuration-regexps](#) on page 1168
- [allow-no-end-option \(DHCP Relay Agent\)](#) on page 1169
- [allow-snooped-clients](#) on page 1170
- [allowed-days](#) on page 1171
- [always-write-giaddr](#) on page 1172
- [always-write-option-82](#) on page 1173
- [announcement](#) on page 1174
- [archival](#) on page 1175
- [archive-sites \(Configuration File\)](#) on page 1176
- [archive-sites](#) on page 1177
- [attempts \(DHCP Local Server\)](#) on page 1178
- [attributes \(RADIUS Attributes\)](#) on page 1180
- [authentication \(Login\)](#) on page 1181
- [authentication \(DHCP Local Server\)](#) on page 1183
- [authentication \(DHCP Relay Agent\)](#) on page 1184
- [authentication-server](#) on page 1185
- [authentication-key](#) on page 1186
- [authentication-key-chains](#) on page 1187
- [authentication-order](#) on page 1188
- [authentication-order](#) on page 1189
- [authentication-order \(Access Profile\)](#) on page 1190
- [authentication-order \(Authenticator\)](#) on page 1191
- [authentication-profile-name](#) on page 1194
- [authentication-protocol](#) on page 1195
- [authentication-server](#) on page 1196
- [authentication-whitelist](#) on page 1197
- [authenticator](#) on page 1198
- [authorization](#) on page 1199
- [authorization-time-interval](#) on page 1200
- [authorization-order](#) on page 1202

- [authentication-order](#) on page 1203
- [backoff-factor](#) on page 1204
- [backoff-threshold](#) on page 1205
- [bfd](#) on page 1206
- [block-interval](#) on page 1207
- [boot-file](#) on page 1208
- [boot-loader-authentication](#) on page 1209
- [boot-server \(NTP\)](#) on page 1210
- [boot-server \(DHCP\)](#) on page 1211
- [broadcast](#) on page 1212
- [broadcast-client](#) on page 1213
- [ca-name](#) on page 1213
- [ca-type](#) on page 1214
- [ca-value](#) on page 1215
- [cache-size](#) on page 1216
- [cache-timeout-negative](#) on page 1217
- [captive-portal](#) on page 1218
- [certificate-verification](#) on page 1219
- [certificates](#) on page 1220
- [certification-authority](#) on page 1221
- [change-type](#) on page 1222
- [civic-based](#) on page 1223
- [ciphers](#) on page 1224
- [circuit-id \(DHCP Relay Agent\)](#) on page 1226
- [circuit-type](#) on page 1228
- [circuit-type \(DHCP Local Server\)](#) on page 1229
- [circuit-type \(DHCP Relay Agent\)](#) on page 1230
- [clear-on-abort \(DHCP Local Server\)](#) on page 1231
- [client-discover-match \(DHCP Local Server\)](#) on page 1233
- [client-id \(DHCP Local Server\)](#) on page 1234
- [client-id \(DHCP Relay Agent\)](#) on page 1235
- [class \(Assigning a Class to an Individual User\)](#) on page 1236
- [class \(Defining Login Classes\)](#) on page 1237
- [class \(Defining Login Classes\)](#) on page 1238
- [class-usage-profile](#) on page 1239
- [clients](#) on page 1240
- [client-accounting-algorithm](#) on page 1241

- [client-alive-count-max](#) on page 1242
- [client-alive-interval](#) on page 1243
- [client-authentication-algorithm](#) on page 1244
- [client-ia-type](#) on page 1245
- [client-identifier \(dhcp-client\)](#) on page 1246
- [client-identifier \(dhcpv6-client\)](#) on page 1247
- [client-list-name](#) on page 1248
- [client-list-name \(SNMP\)](#) on page 1249
- [client-type](#) on page 1250
- [coa-dynamic-variable-validation](#) on page 1251
- [commit-delay](#) on page 1252
- [community \(SNMP\)](#) on page 1253
- [configuration](#) on page 1254
- [connection-limit](#) on page 1255
- [connection-limit](#) on page 1256
- [contact \(SNMP\)](#) on page 1257
- [counters](#) on page 1258
- [country-code](#) on page 1259
- [crl \(Encryption Interface\)](#) on page 1260
- [custom-options](#) on page 1261
- [delegated-pool \(DHCP Local Server\)](#) on page 1263
- [delimiter \(DHCP Local Server\)](#) on page 1264
- [delimiter \(DHCP Relay Agent\)](#) on page 1266
- [deny-commands](#) on page 1268
- [deny-commands-regexps](#) on page 1269
- [deny-configuration](#) on page 1271
- [deny-configuration](#) on page 1272
- [deny-configuration-regexps](#) on page 1273
- [deny-configuration-regexps](#) on page 1274
- [destination \(Accounting\)](#) on page 1275
- [destination \(Accounting\)](#) on page 1276
- [destination \(Accounting\)](#) on page 1277
- [destination-classes](#) on page 1278
- [detection-time](#) on page 1279
- [destination-host \(Gx-Plus\)](#) on page 1280
- [destination-realm \(Gx-Plus\)](#) on page 1280
- [dhcp](#) on page 1281

- [dhcp \(DHCP Client\) on page 1282](#)
- [dhcp-client on page 1283](#)
- [dhcp-local-server on page 1285](#)
- [dhcp-relay on page 1294](#)
- [dhcpcv6 \(DHCP Local Server\) on page 1307](#)
- [dhcpcv6 \(DHCP Relay Agent\) on page 1312](#)
- [dhcpcv6 \(System Services\) on page 1318](#)
- [dhcpcv6-client on page 1322](#)
- [dhcp-attributes \(Access IPv4 Address Pools\) on page 1324](#)
- [dhcp-attributes \(Access IPv6 Address Pools\) on page 1326](#)
- [dhcp-local-server \(System Services\) on page 1328](#)
- [disable \(802.1X\) on page 1332](#)
- [disable \(802.1X\) on page 1333](#)
- [disable \(LLDP\) on page 1334](#)
- [disable \(LLDP-MED\) on page 1335](#)
- [disable \(LLDP Power Negotiation\) on page 1335](#)
- [disable-relay on page 1336](#)
- [diameter-instance \(Diameter Applications\) on page 1337](#)
- [disable \(System Services\) on page 1338](#)
- [dlv on page 1338](#)
- [domain \(Domain Map\) on page 1339](#)
- [domain-name-server \(Routing Instances and Access Profiles\) on page 1340](#)
- [domain-name-server-inet \(Routing Instances and Access Profiles\) on page 1341](#)
- [domain-name-server-inet6 \(Routing Instances and Access Profiles\) on page 1342](#)
- [dot1x on page 1343](#)
- [domain-name \(DHCP\) on page 1344](#)
- [domain-name \(DHCP Local Server\) on page 1345](#)
- [domain-name \(DHCP Relay Agent\) on page 1347](#)
- [domain-search on page 1348](#)
- [drop \(DHCP Relay Agent Option\) on page 1349](#)
- [dynamic-pool on page 1350](#)
- [dynamic-profile \(DHCP Local Server\) on page 1351](#)
- [dynamic-profile \(DHCP Relay Agent\) on page 1352](#)
- [dynamic-profile-options on page 1353](#)
- [dynamic-server on page 1354](#)
- [group \(DHCP Local Server\) on page 1355](#)
- [group \(DHCP Relay Agent\) on page 1359](#)

- [group \(System Services DHCP\)](#) on page 1364
- [eapol-block](#) on page 1367
- [elin](#) on page 1368
- [encoding](#) on page 1369
- [enhanced-accounting](#) on page 1370
- [enhanced-avs-max](#) on page 1371
- [enrollment-retry](#) on page 1372
- [enrollment-url](#) on page 1373
- [ethernet-port-type-virtual](#) on page 1374
- [ethernet-switching-options](#) on page 1375
- [events](#) on page 1381
- [exclude \(RADIUS Attributes\)](#) on page 1382
- [excluded-address](#) on page 1389
- [external-authority](#) on page 1390
- [failure-action](#) on page 1391
- [family \(Security Forwarding Options\)](#) on page 1392
- [falling-threshold \(Health Monitor\)](#) on page 1393
- [fast-start \(LLDP-MED\)](#) on page 1394
- [fields \(for Interface Profiles\)](#) on page 1395
- [file](#) on page 1396
- [file \(Associating with a Profile\)](#) on page 1397
- [file \(Configuring a Log File\)](#) on page 1398
- [file \(System Logging\)](#) on page 1399
- [files](#) on page 1401
- [filter-duplicates](#) on page 1402
- [filter-profile](#) on page 1403
- [filter-profile](#) on page 1404
- [finger](#) on page 1405
- [fingerprint-hash](#) on page 1406
- [flow-tap-dtcp](#) on page 1407
- [force-discover \(dhcp-client\)](#) on page 1408
- [format](#) on page 1409
- [forward-snooped-clients \(DHCP Local Server\)](#) on page 1410
- [forward-snooped-clients \(DHCP Relay Agent\)](#) on page 1411
- [forwarding-class \(VoIP\)](#) on page 1412
- [forwarding-options \(Security\)](#) on page 1413
- [ftp](#) on page 1414

- [full-name](#) on page 1415
- [global \(Gx-Plus\)](#) on page 1416
- [gx-plus \(Gx-Plus\)](#) on page 1417
- [guest-vlan](#) on page 1418
- [health-monitor](#) on page 1419
- [hold-multiplier](#) on page 1420
- [holddown-interval](#) on page 1421
- [host \(SSH Known Hosts\)](#) on page 1422
- [hostkey-algorithm](#) on page 1423
- [http](#) on page 1424
- [https](#) on page 1425
- [icmpv4-rate-limit](#) on page 1426
- [icmpv4-rate-limit](#) on page 1427
- [idle-timeout \(System-Login\)](#) on page 1428
- [idle-timeout \(Access\)](#) on page 1429
- [idle-timeout](#) on page 1430
- [idle-timeout \(System\)](#) on page 1431
- [idle-timeout \(System-Login\)](#) on page 1432
- [ignore \(RADIUS Attributes\)](#) on page 1433
- [ignore \(RADIUS Attributes\)](#) on page 1435
- [ignore-port-bounce](#) on page 1437
- [ip-address-first](#) on page 1438
- [immediate-update](#) on page 1439
- [include-ipv6 \(Gx-Plus\)](#) on page 1439
- [include-irb-and-l2](#) on page 1440
- [infranet-controller](#) on page 1442
- [interface \(802.1X\)](#) on page 1443
- [interface \(802.1X\)](#) on page 1445
- [interface \(Access Control Service\)](#) on page 1446
- [interface \(Captive Portal\)](#) on page 1447
- [interface \(DHCP Local Server\)](#) on page 1448
- [interface \(DHCP Relay Agent\)](#) on page 1450
- [interface \(LLDP\)](#) on page 1452
- [interface \(LLDP-MED\)](#) on page 1454
- [interface \(Static MAC Bypass\)](#) on page 1455
- [interface \(VoIP\)](#) on page 1456
- [interface \(System Services DHCP\)](#) on page 1457

- [interface-client-limit \(DHCP Local Server\)](#) on page 1458
- [interface-client-limit \(DHCP Relay Agent\)](#) on page 1460
- [interface-delete \(Subscriber Management or DHCP Client Management\)](#) on page 1461
- [interface-description-format](#) on page 1462
- [interface-name \(DHCP Local Server\)](#) on page 1463
- [interface-name \(DHCP Relay Agent\)](#) on page 1464
- [interface-profile](#) on page 1465
- [interface-traceoptions \(System Services DHCP\)](#) on page 1466
- [interfaces \(ARP\)](#) on page 1468
- [interval](#) on page 1469
- [interval \(Health Monitor\)](#) on page 1470
- [interfaces \(Security Zones\)](#) on page 1471
- [interface \(Static MAC Bypass\)](#) on page 1472
- [interface \(VoIP\)](#) on page 1473
- [interface-description-format](#) on page 1474
- [internet-options](#) on page 1476
- [interval \(Access Control Service\)](#) on page 1477
- [interval \(Health Monitor\)](#) on page 1478
- [juniper-dsl-attributes](#) on page 1479
- [kernel-replication \(System\)](#) on page 1479
- [key \(Authentication Keychain\)](#) on page 1480
- [key-chain \(Security\)](#) on page 1481
- [key-exchange](#) on page 1482
- [layer2-unicast-replies](#) on page 1484
- [ldap-url](#) on page 1485
- [lease-time](#) on page 1486
- [lease-time \(dhcp-client\)](#) on page 1487
- [liveness-detection](#) on page 1488
- [lldp](#) on page 1490
- [lldp-configuration-notification-interval](#) on page 1492
- [lldp-med \(Ethernet Switching\)](#) on page 1493
- [lldp-med-bypass](#) on page 1494
- [lldp-priority](#) on page 1494
- [lldp-tx-fast-init](#) on page 1495
- [load-key-file](#) on page 1496
- [local](#) on page 1497
- [local-certificate](#) on page 1498

- [local-server-group \(DHCP Relay Agent Option\)](#) on page 1499
- [location](#) on page 1500
- [location \(SNMP\)](#) on page 1501
- [location \(LLDP-MED\)](#) on page 1502
- [lockout-period](#) on page 1503
- [logical-system-name \(DHCP Local Server\)](#) on page 1504
- [login](#) on page 1505
- [login-alarms](#) on page 1506
- [login-script \(Op Scripts\)](#) on page 1507
- [login-tip](#) on page 1507
- [log-key-changes](#) on page 1508
- [mac-radius](#) on page 1509
- [macs](#) on page 1511
- [mac-address \(DHCP Local Server\)](#) on page 1513
- [mac-address \(DHCP Relay Agent\)](#) on page 1514
- [management-address](#) on page 1515
- [master-password](#) on page 1516
- [max-outstanding-requests \(Diameter Applications\)](#) on page 1517
- [max-pre-authentication-packets](#) on page 1518
- [max-sessions-per-connection](#) on page 1518
- [mau-type](#) on page 1519
- [maximum-certificates](#) on page 1520
- [maximum-hop-count](#) on page 1521
- [maximum-lease-time \(DHCP\)](#) on page 1522
- [maximum-lease-time \(DHCP\)](#) on page 1522
- [maximum-length](#) on page 1523
- [maximum-lifetime](#) on page 1524
- [maximum-requests](#) on page 1525
- [maximum-time](#) on page 1526
- [method](#) on page 1527
- [message](#) on page 1528
- [mib-profile](#) on page 1529
- [minimum-changes](#) on page 1530
- [minimum-character-changes](#) on page 1531
- [minimum-interval](#) on page 1532
- [minimum-length](#) on page 1533
- [minimum-lifetime](#) on page 1534

- [minimum-lower-cases](#) on page 1535
- [minimum-numeric](#)s on page 1536
- [minimum-reuse](#) on page 1537
- [minimum-punctuations](#) on page 1538
- [minimum-receive-interval](#) on page 1539
- [minimum-time](#) on page 1540
- [minimum-upper-cases](#) on page 1541
- [minimum-wait-time](#) on page 1542
- [multi-domain](#) on page 1543
- [multicast-client](#) on page 1544
- [multiplier](#) on page 1545
- [name](#) on page 1546
- [name-server](#) on page 1547
- [name-server \(Access\)](#) on page 1547
- [nas-identifier](#) on page 1548
- [nas-ip-address](#) on page 1549
- [nas-port-extended-format](#) on page 1550
- [nas-port-extended-format](#) on page 1552
- [nas-port-id-delimiter \(Subscriber Management\)](#) on page 1553
- [nas-port-id-format \(Subscriber Management\)](#) on page 1554
- [nas-port-type \(Subscriber Management\)](#) on page 1556
- [neighbor-discovery-router-advertisement \(Access\)](#) on page 1557
- [neighbor-port-info-display](#) on page 1558
- [netbios-snooping](#) on page 1559
- [next-hop \(Dynamic Access Routes\)](#) on page 1560
- [next-server](#) on page 1561
- [no-adaptation](#) on page 1562
- [no-allow-snooped-clients](#) on page 1563
- [no-bind-on-request \(DHCP Relay Agent\)](#) on page 1564
- [no-listen](#) on page 1565
- [no-mac-table-binding \(802.1X\)](#) on page 1566
- [no-reauthentication](#) on page 1566
- [no-vlan-interface-name](#) on page 1567
- [no-passwords](#) on page 1569
- [no-public-keys](#) on page 1569
- [no-reauthentication](#) on page 1570
- [no-tagging](#) on page 1570

- [no-tcp-forwarding](#) on page 1571
- [non-strict-priority-scheduling](#) on page 1571
- [nonvolatile](#) on page 1572
- [ntp](#) on page 1573
- [object-names](#) on page 1574
- [oid](#) on page 1575
- [operation](#) on page 1576
- [options \(Access Profile\)](#) on page 1577
- [options \(Access Profile\)](#) on page 1579
- [option \(DHCP server\)](#) on page 1581
- [option-60 \(DHCP Local Server\)](#) on page 1582
- [option-60 \(DHCP Relay Agent\)](#) on page 1583
- [option-82 \(DHCP Local Server Authentication\)](#) on page 1585
- [option-82 \(DHCP Local Server Pool Matching\)](#) on page 1586
- [option-82 \(DHCP Relay Agent\)](#) on page 1587
- [option-number \(DHCP Relay Agent Option\)](#) on page 1588
- [order](#) on page 1589
- [outbound-ssh](#) on page 1590
- [outbound-ssh](#) on page 1593
- [overrides \(DHCP Local Server\)](#) on page 1595
- [overrides \(DHCP Relay Agent\)](#) on page 1598
- [overrides \(New Relay Options\)](#) on page 1600
- [overrides \(System Services DHCP\)](#) on page 1602
- [password \(Login\)](#) on page 1603
- [password \(Access Control Service\)](#) on page 1604
- [password \(DHCP Local Server\)](#) on page 1605
- [password \(DHCP Relay Agent\)](#) on page 1607
- [password \(DHCP Local Server\)](#) on page 1609
- [password \(Login\)](#) on page 1610
- [path-length](#) on page 1611
- [partition \(Gx-Plus\)](#) on page 1612
- [peer \(NTP\)](#) on page 1613
- [permissions](#) on page 1614
- [pool \(DHCP Local Server Overrides\)](#) on page 1615
- [pool \(System\)](#) on page 1617
- [pool-match-order](#) on page 1618
- [port](#) on page 1619

- [port \(Access Control Service\) on page 1620](#)
- [port \(HTTP/HTTPS\) on page 1621](#)
- [port \(NETCONF\) on page 1622](#)
- [port \(RADIUS Server\) on page 1623](#)
- [port \(SRC Server\) on page 1624](#)
- [port \(TACACS+ Server\) on page 1624](#)
- [power-negotiation on page 1625](#)
- [preference \(Subscriber Management\) on page 1626](#)
- [prefix on page 1627](#)
- [prefix \(DHCP Relay Agent\) on page 1628](#)
- [preferred-prefix-length on page 1629](#)
- [process-inform on page 1630](#)
- [profile on page 1632](#)
- [profilerd on page 1633](#)
- [protocols on page 1634](#)
- [protocol-version on page 1647](#)
- [provisioning-order \(Diameter Applications\) on page 1648](#)
- [proxy on page 1649](#)
- [proxy-mode on page 1650](#)
- [ptopo-configuration-maximum-hold-time on page 1651](#)
- [ptopo-configuration-trap-interval on page 1652](#)
- [quiet-period on page 1653](#)
- [quiet-period \(Captive Portal\) on page 1654](#)
- [radius on page 1655](#)
- [radius \(System\) on page 1656](#)
- [radius \(Access Profile\) on page 1657](#)
- [radius \(System\) on page 1660](#)
- [radius-disconnect \(DHCP Local Server\) on page 1661](#)
- [radius-options \(edit system\) on page 1663](#)
- [radius-options \(Protocols 802.1X\) on page 1664](#)
- [radius-options on page 1665](#)
- [radius-options \(Access\) on page 1666](#)
- [radius-options \(edit system\) on page 1667](#)
- [radius-options \(Protocols 802.1X\) on page 1668](#)
- [radius-server on page 1669](#)
- [radius-server on page 1670](#)
- [radius-server on page 1672](#)

- [radius-server \(System\)](#) on page 1673
- [rapid-commit](#) on page 1674
- [rapid-commit \(DHCPv6 Local Server\)](#) on page 1675
- [rate-limit](#) on page 1676
- [reauthentication](#) on page 1677
- [reconfigure \(DHCP Local Server\)](#) on page 1678
- [reconfigure \(System Services DHCP\)](#) on page 1680
- [req-option](#) on page 1682
- [regex-additive-logic](#) on page 1683
- [redirect-url](#) on page 1684
- [relay-agent-interface-id \(DHCP Local Server\)](#) on page 1685
- [relay-agent-interface-id \(DHCPv6 Relay Agent\)](#) on page 1686
- [relay-agent-remote-id \(DHCP Local Server\)](#) on page 1687
- [relay-agent-remote-id \(DHCPv6 Relay Agent Username\)](#) on page 1688
- [relay-option \(DHCP Relay Agent\)](#) on page 1689
- [relay-option-82](#) on page 1690
- [relay-server-group \(DHCP Relay Agent Option\)](#) on page 1691
- [replace-ip-source-with \(Before Forwarding Packet\)](#) on page 1692
- [replace-ip-source-with](#) on page 1693
- [remote-debug-permission](#) on page 1694
- [restart \(Reset\)](#)
- [retransmission-attempt](#) on page 1699
- [retransmission-attempt \(dhcp-client\)](#) on page 1700
- [retransmission-attempt \(dhcpv6-client\)](#) on page 1701
- [retransmission-interval](#) on page 1702
- [retransmission-interval \(dhcp-client\)](#) on page 1703
- [retry](#) on page 1704
- [retry](#) on page 1705
- [retry \(RADIUS\)](#) on page 1706
- [retry-options](#) on page 1707
- [retries](#) on page 1708
- [retries \(Captive Portal\)](#) on page 1709
- [revert-interval](#) on page 1710
- [rising-threshold \(Health Monitor\)](#) on page 1711
- [rng](#) on page 1712
- [root-authentication](#) on page 1713
- [root-authentication](#) on page 1714

- [root-login](#) on page 1716
- [route-suppression \(DHCP Local Server and Relay Agent\)](#) on page 1717
- [router](#) on page 1718
- [routing-engine-profile](#) on page 1719
- [routing-instance](#) on page 1720
- [routing-instance](#) on page 1721
- [routing-instance-name \(DHCP Local Server\)](#) on page 1722
- [routing-instance-name \(DHCP Relay Agent\)](#) on page 1724
- [scp](#) on page 1725
- [security](#) on page 1726
- [secret](#) on page 1727
- [secret](#) on page 1728
- [secret](#) on page 1729
- [secure-authentication](#) on page 1730
- [send-acct-status-on-config-change \(Access Profile\)](#) on page 1731
- [send-release-on-delete \(DHCP Relay Agent\)](#) on page 1732
- [server \(NTP\)](#) on page 1733
- [server \(DNS, Port, and TFTP Service\)](#) on page 1734
- [server \(RADIUS Accounting\)](#) on page 1735
- [server \(TACACS+ Accounting\)](#) on page 1736
- [server-address](#) on page 1737
- [server-address \(dhcp-client\)](#) on page 1738
- [server-fail](#) on page 1739
- [server-fail-voip](#) on page 1741
- [server-group](#) on page 1743
- [server-identifier](#) on page 1744
- [server-reject-vlan](#) on page 1745
- [server-timeout](#) on page 1746
- [server-timeout \(Captive Portal\)](#) on page 1747
- [servers](#) on page 1748
- [service \(Service Accounting\)](#) on page 1749
- [service-deployment](#) on page 1750
- [service-profile \(DHCP Local Server\)](#) on page 1751
- [service-profile \(DHCP Relay Agent\)](#) on page 1752
- [services \(System Services\)](#) on page 1754
- [services \(Switches\)](#) on page 1758
- [services \(System Services\)](#) on page 1759

- [session \(Time-out\) on page 1763](#)
- [session \(Time-out\) on page 1764](#)
- [session-expiry on page 1765](#)
- [session-mode on page 1766](#)
- [single-connection on page 1767](#)
- [single-connection on page 1767](#)
- [sip-server on page 1768](#)
- [size on page 1769](#)
- [snmp on page 1770](#)
- [source-address \(NTP, RADIUS, System Logging, or TACACS+\) on page 1774](#)
- [source-address on page 1775](#)
- [source-address \(NTP, RADIUS, System Logging, or TACACS+\) on page 1776](#)
- [source-address \(SRC Software\) on page 1777](#)
- [source-address-giaddr on page 1778](#)
- [source-classes on page 1779](#)
- [source-ip-change \(Forwarding Options\) on page 1779](#)
- [source-port \(Port Addresses\) on page 1780](#)
- [ssh on page 1781](#)
- [ssh](#)
- [ssh-known-hosts on page 1784](#)
- [ssh-known-hosts on page 1785](#)
- [ssh-dsa on page 1786](#)
- [ssh-rsa on page 1787](#)
- [ssl-renegotiation on page 1787](#)
- [start-time on page 1788](#)
- [start-time \(Authentication Key Transmission\) on page 1789](#)
- [static \(Protocols 802.1X\) on page 1791](#)
- [static \(Protocols 802.1X\) on page 1792](#)
- [static-binding on page 1793](#)
- [static-subscribers on page 1794](#)
- [statistics \(Access Profile\) on page 1794](#)
- [statistics-service on page 1795](#)
- [strict \(DHCP Local Server\) on page 1796](#)
- [sub-prefix-length on page 1797](#)
- [subscriber-management-helper on page 1798](#)
- [supplicant on page 1799](#)
- [supplicant-timeout on page 1800](#)

- [system](#) on page 1801
- [system](#) on page 1806
- [system-generated-certificate](#) on page 1807
- [tacplus](#) on page 1808
- [tacplus](#) on page 1809
- [tacplus-options](#) on page 1810
- [tacplus-server](#) on page 1812
- [tacplus-server](#) on page 1813
- [targets](#) on page 1814
- [telnet](#) on page 1815
- [telnet](#)
- [tftp](#) on page 1818
- [threshold \(detection-time\)](#) on page 1819
- [threshold \(transmit-interval\)](#) on page 1820
- [timeout \(System\)](#) on page 1821
- [timeout \(DHCP Local Server\)](#) on page 1822
- [timeout \(Access Control Service\)](#) on page 1823
- [timeout \(RADIUS\)](#) on page 1824
- [timeout \(System\)](#) on page 1825
- [timeout-action \(Access Control Service\)](#) on page 1826
- [tlv-filter](#) on page 1827
- [tlv-select](#) on page 1829
- [token \(DHCP Local Server\)](#) on page 1831
- [trace \(DHCP Relay Agent\)](#) on page 1832
- [traceoptions](#) on page 1833
- [traceoptions \(DNS, Port, and TFTP Packet Forwarding\)](#) on page 1835
- [traceoptions \(802.1X\)](#) on page 1837
- [traceoptions \(Address-Assignment Pool\)](#) on page 1839
- [traceoptions \(DHCP\)](#) on page 1841
- [traceoptions \(DHCP Server\)](#) on page 1844
- [traceoptions \(LLDP\)](#) on page 1847
- [traceoptions \(Outbound SSH\)](#) on page 1849
- [traceoptions \(SBC Configuration Process\)](#) on page 1851
- [transfer-interval](#) on page 1853
- [transfer-interval \(Configuration\)](#) on page 1854
- [transfer-on-commit](#) on page 1855
- [transmit-interval](#) on page 1856

- [transmit-period on page 1857](#)
- [transmit-delay on page 1858](#)
- [trap-group on page 1859](#)
- [trap-options on page 1861](#)
- [trigger \(DHCP Local Server\) on page 1863](#)
- [tries-before-disconnect on page 1864](#)
- [trust-option-82 on page 1865](#)
- [trusted-key on page 1866](#)
- [uac-policy on page 1866](#)
- [uac-service on page 1867](#)
- [uac-service on page 1868](#)
- [uid on page 1869](#)
- [unattended-boot on page 1870](#)
- [unified-access-control on page 1871](#)
- [update-interval on page 1872](#)
- [update-router-advertisement on page 1873](#)
- [update-server on page 1874](#)
- [update-server \(dhcp-client\) on page 1874](#)
- [update-server \(dhcpv6-client\) on page 1875](#)
- [use-interface on page 1875](#)
- [use-interface-description on page 1876](#)
- [use-primary \(DHCP Local Server\) on page 1878](#)
- [use-primary \(DHCP Relay Agent\) on page 1879](#)
- [use-vlan-id on page 1881](#)
- [user \(Access\) on page 1882](#)
- [user \(Access\) on page 1883](#)
- [user-defined-option-82 on page 1884](#)
- [user-id on page 1885](#)
- [usb-control on page 1885](#)
- [user-keepalive on page 1886](#)
- [user-prefix \(DHCP Local Server\) on page 1887](#)
- [username-include \(DHCP Local Server\) on page 1889](#)
- [username-include \(DHCP Relay Agent\) on page 1891](#)
- [vendor-id on page 1893](#)
- [vendor-option on page 1894](#)
- [vendor-option on page 1895](#)
- [version \(BFD\) on page 1897](#)

- [version \(SNMP\) on page 1898](#)
- [view-configuration on page 1898](#)
- [vlan \(VoIP\) on page 1899](#)
- [vlan-assignment on page 1900](#)
- [vlan-nas-port-stacked-format on page 1901](#)
- [vpn \(Forwarding Options\) on page 1901](#)
- [version \(SNMP\) on page 1902](#)
- [versioning on page 1903](#)
- [voip on page 1904](#)
- [what on page 1905](#)
- [wait-for-acct-on-ack \(Access Profile\) on page 1906](#)
- [watchdog on page 1907](#)
- [web-management on page 1908](#)
- [web-management on page 1909](#)
- [web-management \(System Services\) on page 1910](#)
- [wins-server \(System\) on page 1914](#)
- [wins-server \(System\) on page 1915](#)
- [xnm-clear-text on page 1916](#)
- [xnm-ssl on page 1917](#)

access

Syntax

```
access {
  address-assignment
  pool pool-name
  address-pool pool-name
  profile profile-name {
    accounting (Access Profile) {
      accounting-stop-on-access-deny;
      accounting-stop-on-failure;
      (authentication-order (Access Profile) (ldap radius | none);
      order (radius | none);
    }
    radius {
      accounting-server [server-addresses];
      authentication-server [server-addresses];
    }
  }
}
```

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.
Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.

Description Configure authentication, authorization, and accounting (AAA) services.
The remaining statements are explained separately. See [CLI Explorer](#).



NOTE: The [edit access] hierarchy is not available on QFabric systems.

Default Not enabled

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

Related Documentation

- [Configuring 802.1X RADIUS Accounting \(CLI Procedure\) on page 386](#)

access (Dynamic Access Routes)

Syntax

```
access {
  route prefix {
    next-hop next-hop;
    metric route-cost;
    preference route-distance;
    tag route-tag;
    tag2 route-tag2;
  }
}
```

Hierarchy Level

```
[edit dynamic-profiles profile-name routing-instances $junos-routing-instance
 routing-options],
[edit dynamic-profiles profile-name routing-instances $junos-routing-instance routing-options
 rib routing-table-name],
[edit dynamic-profiles profile-name routing-options]
```

Release Information Statement introduced in Junos OS Release 9.5.
Support at the `[edit dynamic-profiles profile-name routing-instances $junos-routing-instance routing-options]` and `[edit dynamic-profiles profile-name routing-instances $junos-routing-instance routing-options rib routing-table-name]` hierarchy levels introduced in Junos OS Release 10.1.

Description Dynamically configure access routes in a dynamic client profile.



NOTE: Starting in Junos OS Release 15.1, we recommend that you use only access routes for framed route support. We recommend that you do not use access-internal routes. If you configure the access-internal statement in the dynamic profile, it is ignored. The subscriber's address is stored in the session database entry before the dynamic profile installs the framed route, enabling the next-hop address to be resolved when it is not explicitly specified in the Framed-Route RADIUS attribute [22] or Framed-IPv6-Route attribute [99].

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

routing—To view this statement in the configuration.
routing-control—To add this statement to the configuration.

Release History Table


Release	Description
15.1	Starting in Junos OS Release 15.1, we recommend that you use only access routes for framed route support.

- Related Documentation**
- [Configuring Dynamic Access Routes for Subscriber Management](#)

access-end

Syntax	access-end <i>HH:MM</i> ;
Hierarchy Level	[edit system login class]
Release Information	Statement introduced in Junos OS Release 10.1.
Description	Configure the end time for login access.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	• Configuring Time-Based User Access on page 80

access-internal (Dynamic Access-Internal Routes)

Syntax	<pre> access-internal { route <i>subscriber-ip-address</i> { qualified-next-hop <i>underlying-interface</i> { mac-address <i>address</i>; } } } </pre>				
Hierarchy Level	<pre> [edit dynamic-profiles <i>profile-name</i> routing-instances \$junos-routing-instance routing-options], [edit dynamic-profiles <i>profile-name</i> routing-instances \$junos-routing-instance routing-options rib <i>routing-table-name</i>], [edit dynamic-profiles routing-options] </pre>				
Release Information	<p>Statement introduced in Junos OS Release 9.5.</p> <p>Support at the <code>[edit dynamic-profiles <i>profile-name</i> routing-instances \$junos-routing-instance routing-options]</code> and <code>[edit dynamic-profiles <i>profile-name</i> routing-instances \$junos-routing-instance routing-options rib <i>routing-table-name</i>]</code> hierarchy levels introduced in Junos OS Release 10.1.</p>				
Description	<p>(Releases earlier than Junos OS Release 15.1) Dynamically configure access-internal routes in a dynamic client profile. Access-internal routes are optional, but are used instead of access routes if the next-hop address is not specified in the Framed-Route Attribute [22] for IPv4 or the Framed-IPv6-Route attribute [99] for IPv6.</p>				
<p> NOTE: Starting in Junos OS Release 15.1, we recommend that you use only access routes for framed route support. We recommend that you do not use access-internal routes. If you configure the <code>access-internal</code> statement in the dynamic profile, it is ignored. The subscriber's address is stored in the session database entry before the dynamic profile installs the framed route, enabling the next-hop address to be resolved when it is not explicitly specified in the Framed-Route RADIUS attribute (22) or Framed-IPv6-Route attribute [99].</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>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>				
Release History Table	<table> <tr> <th>Release</th><th>Description</th></tr> <tr> <td>15.1</td><td>Starting in Junos OS Release 15.1, we recommend that you use only access routes for framed route support.</td></tr> </table>	Release	Description	15.1	Starting in Junos OS Release 15.1, we recommend that you use only access routes for framed route support.
Release	Description				
15.1	Starting in Junos OS Release 15.1, we recommend that you use only access routes for framed route support.				

- Related Documentation**
- *Configuring Dynamic Access-Internal Routes for DHCP Subscriber Management*
 - *Configuring Dynamic Access-Internal Routes for PPP Subscriber Management*

access-start

Syntax	access-start <i>HH:MM</i> ;
Hierarchy Level	[edit system login class]
Release Information	Statement introduced in Junos OS Release 10.1.
Description	Configure the start time for login access.
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 Time-Based User Access on page 80

active-server-group

Syntax	<code>active-server-group <i>server-group-name</i> <allow-server-change>;</code>
Hierarchy Level	<pre> [edit forwarding-options dhcp-relay], [edit forwarding-options dhcp-relay dhcpv6], [edit forwarding-options dhcp-relay dhcpv6 group group-name], [edit forwarding-options dhcp-relay group group-name], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 group group-name], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group group-name], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group group-name], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group group-name], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group group-name], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group group-name] </pre>
Release Information	<p>Statement introduced in Junos OS Release 8.3.</p> <p>Support at the <code>[edit ... dhcpv6]</code> hierarchy levels introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.1 for EX Series switches.</p> <p>allow-server-change option added in Junos OS Release 16.2R1.</p>
Description	<p>Apply a DHCP relay agent configuration to the named group of DHCP server addresses. The server group itself is configured with the server-group statement. You can apply an active server group globally or for specific groups of interfaces, configured with the group statement. An active server group applied to an interface group overrides a global configuration.</p>
Options	<p>allow-server-change—(Optional) (DHCPv4 only) Enable the relay agent to accept and forward a DHCP request (renew or rebind) ACK message to the client from any DHCP local server in the active server group. Starting in Junos OS Release 18.4R1, this option also applies to DHCP information request (DHCPINFORM) ACK messages.</p> <p>Default: Forward ACK messages from only the original binding server.</p> <p>server-group-name—Name of the group of DHCP or DHCPv6 server addresses to which the DHCP or DHCPv6 relay agent configuration applies.</p>

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

Related Documentation

- [Extended DHCP Relay Agent Overview on page 632](#)
- [Configuring Active Server Groups to Apply a Common DHCP Relay Agent Configuration to Named Server Groups on page 701](#)
- [Configuring Group-Specific DHCP Relay Options on page 706](#)

accounting

Syntax

```

accounting {
  events [login change-log interactive-commands];
  destination {
    radius {
      server {
        server-address {
          accounting-port port-number;
          retry number;
          routing-instance routing-instance;
          secret password;
          source-address address;
          timeout seconds;
        }
      }
    }
    tacplus {
      server {
        server-address {
          port port-number;
          routing-instance routing-instance;
          secret password;
          single-connection;
          timeout seconds;
        }
      }
    }
  }
  enhanced-avs-max <number>;
}

```

Hierarchy Level [edit [system](#)]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.
enhanced-avs-max statement introduced in Junos OS Release 14.1.
Support for the **source-address-inet6** statement introduced in Junos OS Release 14.1X53-D10 for EX Series switches.

Description Configure audit of TACACS+ or RADIUS authentication events, configuration changes, and interactive commands. Auditing these factors helps you track network usage for auditing and billing purposes.

The remaining statements are explained separately.

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

- Related Documentation**
- [Configuring RADIUS System Accounting on page 223](#)
 - [Configuring TACACS+ System Accounting on page 242](#)
 - [enhanced-avs-max on page 1371](#)

accounting (Access Profile)

Syntax

```
accounting {
  accounting-stop-on-access-deny;
  accounting-stop-on-failure;
  order (radius | none);
}
```

Hierarchy Level [edit access profile *profile-name*]

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 OCX Series switches.

Description Configure the authentication order for authentication, authorization, and accounting (AAA) services.

Default Not enabled

Options **none**—Use no authentication for specified subscribers.
radius—Use RADIUS authentication for specified subscribers.
The remaining statements are explained separately. See [CLI Explorer](#).



NOTE: The [edit access] hierarchy is not available on QFabric systems.

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

- Related Documentation**
- [Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378](#)
 - [Configuring 802.1X RADIUS Accounting \(CLI Procedure\) on page 386](#)
 - [Understanding 802.1X and RADIUS Accounting on Switches on page 375](#)
 - [Understanding RADIUS Accounting on page 222](#)

accounting (Access Profile)

Syntax

```

accounting {
  accounting-stop-on-access-deny;
  accounting-stop-on-failure;
  address-change-immediate-update;
  ancp-speed-change-immediate-update;
  coa-immediate-update;
  coa-no-override service-class-attribute;
  duplication;
  duplication-filter;
  duplication-vrf {
    access-profile-name profile-name;
    vrf-name vrf-name;
  }
  immediate-update;
  order [accounting-method];
  send-acct-status-on-config-change
  statistics (time | volume-time);
  update-interval minutes;
  wait-for-acct-on-ack;
}

```

Hierarchy Level [edit access profile *profile-name*]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Configure RADIUS accounting parameters and enable RADIUS accounting for an access 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 admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Configuring Authentication and Accounting Parameters for Subscriber Access*
- *Configuring Per-Subscriber Session Accounting*
- *Understanding RADIUS Accounting Duplicate Reporting*

accounting-options

```
Syntax  accounting-options {
        class-usage-profile profile-name {
            destination-classes {
                destination-class-name;
            }
            file filename;
            interval minutes;
            source-classes {
                source-class-name;
            }
        }
        file filename {
            archive-sites {
                site-name;
            }
            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 {
                input-bytes;
                input-errors;
                input-multicast;
                input-packets;
                input-unicast;
                output-bytes;
                output-errors;
                output-multicast;
                output-packets;
                output-unicast;
                rpf-check-bytes;
                rpf-check-packets;
                rpf-check6-bytes;
                rpf-check6-packets;
                unsupported-protocol;
            }
            file filename;
            interval minutes;
        }
        mib-profile profile-name {
            file filename;
        }
    }
```

```

    interval minutes;
    object-names {
        mib-object-name;
    }
    operation (get | get-next | walk);
}
policy-decision-statistics-profile profile-name {
    application-aware-access-list-fields {
        address;
        application;
        application-group;
        input-bytes;
        input-interface;
        input-packets;
        mask;
        output-bytes;
        output-packets;
        subscriber-name;
        timestamp;
        vrf-name;
    }
    file filename;
}
routing-engine-profile profile-name {
    fields {
        field-name;
    }
    file filename;
    interval minutes;
}
}

```

Hierarchy Level [\[edit\]](#)

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 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

- [Understanding RADIUS Accounting on page 222](#)
- [Juniper-Switching-Filter VSA Match Conditions and Actions on page 443](#)
- [Configuring RADIUS System Accounting on page 223](#)
- [Configuring Remote Template Accounts for User Authentication on page 77](#)
- [Configuring Local User Template Accounts for User Authentication on page 75](#)


accounting-order

Syntax	<code>accounting-order (radius [<i>accounting-order-data-list</i>]);</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 8.0. Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Description	Specify the order in which accounting methods are used.
Options	radius —Use the RADIUS accounting method. [<i>accounting-order-data-list</i>] —Set of data listing the accounting order to be used, enclosed in brackets. This can be any combination of accounting methods, up to and including a list of the entire accounting order.
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">• <i>Configuring the Accounting Order</i>

always-write-option-82

Syntax	<pre>always-write-option-82 { apply-groups; apply-groups-except; }</pre>
Hierarchy Level	[edit forwarding-options dhcp-relay overrides]
Release Information	Statement introduced in Junos OS Release 15.1X49-D100.
Description	<p>Override the DHCP relay agent information option (option 82) in DHCP packets destined for a DHCP server. Using this option allows the DHCP relay agent to perform one of the following actions, depending on the configuration:</p> <ul style="list-style-type: none">• If the DHCP relay agent is configured to add option 82 information to the DHCP packets, the DHCP relay agent clears the existing option 82 values from the DHCP packets and inserts the new values before forwarding the packets to the DHCP server.• If the DHCP relay agent is not configured to add option 82 information to DHCP packets, the DHCP relay agent clears the existing option 82 values from the packets, but does not add any new values before forwarding the packets to the DHCP server.
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">• replace-ip-source-with (Before Forwarding Packet) on page 1692• overrides (New Relay Options) on page 1600


authentication-order

Syntax	<code>authentication-order [none password radius];</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</i>],</code> <code>[edit system]</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 OCX Series switches.
Description	Configure the order of authentication, authorization, and accounting (AAA) servers to use while sending authentication messages.
Default	Not enabled
Options	none —No authentication for specified subscribers. password —Password authentication. radius —RADIUS authentication.
<div>  NOTE: The <code>[edit access]</code> hierarchy is not available on QFabric systems. </div>	
Required Privilege Level	admin —To view this statement in the configuration. admin-control —To add this statement to the configuration.

accounting-port

Syntax	<code>accounting-port <i>port-number</i>;</code>
Hierarchy Level	<code>[edit system accounting destination radius server <i>server-address</i>],</code> <code>[edit system radius server <i>server-address</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Configure the accounting port number on which to contact the RADIUS server.
Options	<i>number</i> —Port number on which to contact the RADIUS server. Default: 1813
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

accounting-port

Syntax	<code>accounting-port <i>port-number</i>;</code>
Hierarchy Level	<code>[edit access radius-server <i>server-address</i>],</code> <code>[edit access profile <i>profile-name</i> radius-server <i>server-address</i>]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches with support for Enhanced Layer 2 software (ELS).</p> <p>Statement introduced on Junos OS without ELS in the following releases:</p> <ul style="list-style-type: none"> Junos OS Release 12.3 for EX Series switches: Release 12.3R10. Junos OS Release 14.1X53 for EX Series switches: Release 14.1X53-D25. Junos OS Release 15.1 for EX Series switches: Release 15.1R4.
Description	Configure the port number on which to contact the RADIUS accounting server.
	<div>  <p>NOTE: Specifying the accounting port is optional, and port 1813 is the default. However, we recommend that you configure it in order to avoid confusion, as some RADIUS servers might refer to an older default.</p> </div>
Options	<p><i>port-number</i>—Port number on which to contact the RADIUS accounting server. Most RADIUS servers use port 1813, as specified in RFC 2866.</p> <p>Default: 1813</p>
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 RADIUS System Accounting on page 223 <i>Configuring Router or Switch Interaction with RADIUS Servers</i> <i>Configuring Authentication and Accounting Parameters for Subscriber Access</i> <i>Configuring RADIUS Authentication for L2TP</i>

accounting-port (RADIUS Server)

Syntax	<code>accounting-port <i>port-number</i>;</code>
Hierarchy Level	<code>[edit system accounting destination radius server <i>server-address</i>],</code> <code>[edit system radius-server <i>server-address</i>]</code>
Release Information	Statement introduced in Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure the accounting port number on which to contact the RADIUS server.
Options	<i>number</i> —Port number on which to contact the RADIUS server. Default: 1813
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 RADIUS Server Authentication on page 203• Configuring RADIUS System Accounting on page 223

accounting-server

Syntax	<code>accounting-server[server-addresses];</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</i> radius]</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 OCX Series switches.
Description	Configure the Remote Authentication Dial-In User Service (RADIUS) server for authentication. To configure multiple RADIUS servers, include multiple server addresses. The servers are tried in order and in a round-robin fashion until a valid response is received from one of the servers or until all the configured retry limits are reached.
Default	Not enabled
Options	server-addresses —One or more addresses of RADIUS authentication servers.




NOTE: The `[edit access]` hierarchy is not available on QFabric systems.

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"> • show network-access aaa statistics authentication on page 2138 • Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378 • Understanding 802.1X and RADIUS Accounting on Switches on page 375 • Understanding RADIUS Accounting on page 222


accounting-session-id-format

Syntax	accounting-session-id-format (decimal description);
Hierarchy Level	[edit access profile <i>profile-name</i> radius options]
Release Information	Statement introduced in Junos OS Release 9.1. Statement introduced in Junos OS Release 9.1 for EX Series switches.
Description	Configure the format the router or switch uses to identify the accounting session.
Default	decimal
Options	decimal —Use the decimal format. description —Use the generic format, in the form: jnpr interface-specifier:subscriber-session-id .
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">• <i>Configuring RADIUS Server Options for Subscriber Access</i>• <i>Configuring Authentication and Accounting Parameters for Subscriber Access</i>

accounting-stop-on-access-deny

Syntax	accounting-stop-on-access-deny;
Hierarchy Level	[edit access profile <i>profile-name</i> accounting]
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 OCX Series switches.
Description	Configure the authentication order for authentication, authorization, and accounting (AAA) services to send an Acct-Stop message if the AAA server denies access to a supplicant.
<div>  NOTE: The [edit access] hierarchy is not available on QFabric systems. </div>	
Default	Not enabled
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"> • Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378 • Configuring 802.1X RADIUS Accounting (CLI Procedure) on page 386 • show network-access aaa statistics authentication on page 2138

accounting-stop-on-failure

Syntax	accounting-stop-on-failure;
Hierarchy Level	[edit access profile <i>profile-name</i> accounting]
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 OCX Series switches.
Description	<p>Configure RADIUS accounting to send an Acct-Stop message when a subscriber session has been successfully authenticated and authorized, but then fails before an Acct-Start message is sent. By default, an Acct-Stop message is sent only if an Acct-Start message has been exchanged with the accounting server.</p> <p>Consider a situation where RADIUS address pools are used to assign IP/IPv6 addresses. After a subscriber session is successfully authenticated, the RADIUS server authorizes the session by assigning an IP address from the RADIUS address pool and conveying that address in the Framed-IP-Address attribute. If a negotiation failure occurs at this point, the session is terminated before activating. The Acct-Start message is never sent because it is initiated by session activation. By default, an Acct-Stop message cannot be sent because the Acct-Start is never sent. However, if the acct-stop-on-failure statement is configured, the negotiation failure causes the Acct-Stop message to be sent, which explicitly notifies the RADIUS server that the session is disconnected and that it can free the allocated IP address back to the pool.</p>
	<p> NOTE: The [edit access] hierarchy is not available on QFabric systems.</p>
Default	Disabled
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"> • Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378 • Configuring 802.1X RADIUS Accounting (CLI Procedure) on page 386 • Understanding 802.1X and RADIUS Accounting on Switches on page 375 • Understanding RADIUS Accounting on page 222

address (Access Address Pool)

Syntax	<code>address <i>address-or-prefix</i>;</code>
Hierarchy Level	<code>[edit access address-pool <i>pool-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	Configure the IP address or prefix value for clients.
Options	<i>address-or-prefix</i> —An address or prefix value.
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 the Address Pool for L2TP Network Server IP Address Allocation

address (Access Control Service)

Syntax	<code>address <i>ip-address</i>;</code>
Hierarchy Level	<code>[edit services unified-access-control infranet-controller]</code>
Release Information	Statement introduced in Junos OS Release 12.2 for EX Series switches.
Description	Specify the address through which the switch will connect to the Junos Pulse Access Control Service.
Options	<i>ip-address</i> —Specify the IP address of the NAC 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 an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control (CLI Procedure) on page 519

address-assignment (Access)

```
Syntax address-assignment {
    abated-utilization percentage;
    abated-utilization-v6 percentage;
    high-utilization percentage;
    high-utilization-v6 percentage;
    neighbor-discovery-router-advertisement ndra-name;
    pool pool-name {
        family {
            inet {
                dhcp-attributes {
                    boot-file boot-file-name;
                    boot-server boot-server-name;
                    domain-name domain-name;
                    grace-period seconds;
                    maximum-lease-time (seconds | infinite);
                    name-server ipv4-address;
                    netbios-node-type (b-node | h-node | m-node | p-node);
                    next-server next-server-name;
                    option dhcp-option-identifier-code {
                        array {
                            byte [8-bit-value];
                            flag [ false | off | on | true];
                            integer [32-bit-numeric-values];
                            ip-address [ip-address];
                            short [signed-16-bit-numeric-value];
                            string [character string value];
                            unsigned-integer [unsigned-32-bit-numeric-value];
                            unsigned-short [16-bit-numeric-value];
                        }
                        byte 8-bit-value;
                        flag (false | off | on | true);
                        integer 32-bit-numeric-values;
                        ip-address ip-address;
                        short signed-16-bit-numeric-value;
                        string character string value;
                        unsigned-integer unsigned-32-bit-numeric-value;
                        unsigned-short 16-bit-numeric-value;
                    }
                }
                option-match {
                    option-82 {
                        circuit-id match-value {
                            range range-name;
                        }
                        remote-id match-value;
                        range range-name;
                    }
                }
            }
        }
        propagate-ppp-settings [interface-name];
        propagate-settings interface-name;
        router ipv4-address;
    }
}
```

```

server-identifier ip-address;
sip-server {
    ip-address ipv4-address;
    name sip-server-name;
}
tftp-server server-name;
wins-server ipv4-address;
}
host hostname {
    hardware-address mac-address;
    ip-address reserved-address;
}
network network address;
range range-name {
    high upper-limit;
    low lower-limit;
}
excluded-range range-name
    high upper-limit;
    low lower-limit;
}
xauth-attributes {
    primary-dns ip-address;
    primary-wins ip-address;
    secondary-dns ip-address;
    secondary-wins ip-address;
}
}
inet6 {
    dhcp-attributes {
        dns-server ipv6-address;
        grace-period seconds;
        maximum-lease-time (seconds | infinite);
        option dhcp-option-identifier-code {
            array {
                byte [8-bit-value];
                flag [ false | off | on | true];
                integer [32-bit-numeric-values];
                ip-address [ip-address];
                short [signed-16-bit-numeric-value];
                string [character string value];
                unsigned-integer [unsigned-32-bit-numeric-value];
                unsigned-short [16-bit-numeric-value];
            }
            byte 8-bit-value;
            flag ( false | off | on | true);
            integer 32-bit-numeric-values;
            ip-address ip-address;
            short signed-16-bit-numeric-value;
            string character string value;
            unsigned-integer unsigned-32-bit-numeric-value;
            unsigned-short 16-bit-numeric-value;
        }
        propagate-ppp-settings [interface-name];
        sip-server-address ipv6-address;
    }
}

```

```
        sip-server-domain-name domain-name;  
    }  
    prefix ipv6-network-prefix;  
    range range-name {  
        high upper-limit;  
        low lower-limit;  
        prefix-length delegated-prefix-length;  
    }  
    excluded-range range-name  
        high upper-limit;  
        low lower-limit;  
    }  
    }  
    link pool-name;  
    }  
}
```

Hierarchy Level	[edit access]
-----------------	---------------

Release Information	Statement introduced in Junos OS Release 10.4 for SRX300, SRX320, SRX340, SRX345, SRX550HM devices.
---------------------	---

Description	The address-assignment pool feature enables you to create IPv4 and IPv6 address pools that different client applications can share. For example, multiple client applications, such as DHCPv4 or DHCPv6, can use an address-assignment pool to provide addresses for their particular clients.
-------------	--

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

Related Documentation	<ul style="list-style-type: none">• <i>Dynamic VPN Overview</i>
-----------------------	---

address-assignment (Address-Assignment Pools)

Syntax

```

address-assignment {
  abated-utilization percentage;
  abated-utilization-v6 percentage;
  high-utilization percentage;
  high-utilization-v6 percentage;
  neighbor-discovery-router-advertisement ndra-pool-name;
  pool pool-name {
    active-drain;
    family family {
      dhcp-attributes {
        protocol-specific attributes;
      }
      excluded-address ip-address;
      excluded-range name low minimum-value high maximum-value;
      host hostname {
        hardware-address mac-address;
        ip-address ip-address;
      }
      network ip-prefix/<prefix-length>;
      prefix ipv6-prefix;
      range range-name {
        high upper-limit;
        low lower-limit;
        prefix-length prefix-length;
      }
    }
    hold-down;
    link pool-name;
  }
}

```

Hierarchy Level [edit access]

Release Information Statement introduced in Junos OS Release 9.0.
Statement introduced in Junos OS Release 12.1 for EX Series switches.

Description Configure address-assignment pools that can be used by different client applications.



NOTE: Support for subordinate statements is platform-specific. See individual statement topics for support information.

Options *pool-name*—Name assigned to an address-assignment pool.

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 admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Address-Assignment Pools Overview*
- *Address-Assignment Pool Configuration Overview*
- *Configuring an Address-Assignment Pool for L2TP LNS with Inline Services*

address-pool

Syntax

```
address-pool pool-name {
    address address-or-prefix;
    address-range <low lower-limit> <high upper-limit>;
}
```

Hierarchy Level [edit access]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Allocate IP addresses for clients.



NOTE: This statement is not supported for L2TP LNS on MX Series routers.

Options *pool-name*—Name assigned to an address pool.

The remaining statements are explained separately.

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

Related Documentation

- *Configuring the Address Pool for L2TP Network Server IP Address Allocation*

address-pool (Access)

Syntax

```
address-pool pool-name {
  address address or address prefix;
  address-range {
    high upper-limit;
    low lower-limit;
    mask network-mask;
  }
  primary-dns IP address;
  primary-wins IP address;
  secondary-dns IP address;
  secondary-wins IP address;
}
```

Hierarchy Level [edit access]

Release Information Statement introduced in Junos OS Release 10.4.

Description Create an address-pool for L2TP clients.

- Options**
- **pool-name**—Name assigned to the address-pool.
 - **address**—Configure subnet information for the address-pool.
 - **address-range**—Defines the address range available for clients.
 - **primary-dns**—Specify the primary-dns IP address.
 - **secondary-dns**—Specify the secondary-dns IP address.
 - **primary-wins**—Specify the primary-wins IP address.
 - **secondary-wins**—Specify the secondary-wins IP address.

Required Privilege Level

access—To view this statement in the configuration.
 access-control—To add this statement to the configuration.

Related Documentation

- [access-control on page 846](#)

address-protection

Syntax	<pre>address-protection { reassign-on-match; }</pre>
Hierarchy Level	[edit access], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> access]
Release Information	Statement introduced in Junos OS Release 11.2. Statement introduced in Junos OS Release 13.2X50-D10 on EX Series switches. reassign-on-match option added in Junos OS Release 18.4R1.
Description	<p>Prevent IPv4 addresses and IPv6 prefixes from being assigned to more than one subscriber session when you use AAA to supply IPv4 addresses.</p> <p>For IPv4:</p> <p>If enabled, the router checks the following attributes received from external servers:</p> <ul style="list-style-type: none">• <i>Framed-IP-Address</i>• <i>Framed-Pool</i> <p>The router then takes one of the following actions:</p> <ul style="list-style-type: none">• If an address matches an address in an address pool, the address is taken from the pool, provided it is available.• If the address is already in use, it is rejected as unavailable. <p>For IPv6:</p> <p>If enabled, the router checks the following attributes received from external servers:</p> <ul style="list-style-type: none">• <i>Framed-IPv6-Prefix</i>• <i>Framed-IPv6-Pool</i> <p>The router then takes one of the following actions:</p> <ul style="list-style-type: none">• If a prefix matches a prefix in an address pool, the prefix is taken from the pool, provided it is available.• If the prefix is already in use, it is rejected as unavailable.• If the prefix length requested from the external server does not exactly match the pool's prefix length, the authentication request is denied. If configured, the Acct-Stop message includes the cause for termination.

Options **reassign-on-match**—Enable reassignment of an address from an existing subscriber to a new subscriber requesting that address. The address in use must not be part of a locally configured pool and address protection must be enabled. The request from the new subscriber is still rejected, but the existing subscriber is sent a disconnect request to begin the logout process. This enables the new subscriber to renegotiate and be assigned that IP address.

If the requested address is in a locally configured pool, the existing subscriber is not disconnected.



NOTE: This option is not supported for IPv6.

Default: Rejects the address request from the new subscriber; the existing subscriber remains intact with the IP address.

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

Related Documentation

- *Configuring Duplicate IPv4 Address Protection for AAA*
- *Configuring Duplicate IPv6 Prefix Protection for Router Advertisement*

address-range

Syntax `address-range <low lower-limit> <high upper-limit>;`

Hierarchy Level [edit access [address-pool](#) *pool-name*]

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 address range.

Options


- **high upper-limit**—Upper limit of an address range.
- **low lower-limit**—Lower limit of an address range.

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

Related Documentation

- *Configuring the Address Pool for L2TP Network Server IP Address Allocation*

advertisement-interval

Syntax	<code>advertisement-interval seconds;</code>
Hierarchy Level	[edit protocols lldp], [edit routing-instances <i>routing-instance-name</i> protocols lldp]
Release Information	Statement introduced in Junos OS Release 9.6 for MX Series and T 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. Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.
Description	<p>Configure an interval for LLDP advertisement.</p> <p>For switches configured for Link Layer Discovery Protocol, configure the frequency at which LLDP advertisements are sent.</p> <p>The advertisement-interval value must be greater than or equal to four times the transmit-delay value, or an error will be returned when you attempt to commit the configuration.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p> NOTE: The default value of transmit-delay is 2 seconds. If you configure the advertisement-interval as less than 8 seconds and you do not configure a value for transmit-delay, the default value of transmit-delay is automatically changed to 1 second in order to satisfy the requirement that the advertisement-interval value must be greater than or equal to four times the transmit-delay value.</p> </div>
Default	Disabled.
Options	<p>seconds—Interval between LLDP advertisement.</p> <p>Default: 30</p> <p>Range: 5 through 32768</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 LLDP • show lldp on page 2109 • Configuring LLDP (CLI Procedure) on page 556

- [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)
- [transmit-delay on page 1858](#)
- [Understanding LLDP on page 555](#)


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"> • <i>Configuring the Agent Address for SNMP Traps</i>

allow-commands

Syntax	<code>allow-commands "(<i>regular-expression</i>) (<i>regular-expression1</i>) (<i>regular-expression2</i>)..."</code> ;
Hierarchy Level	[edit system login class <i>class-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	<p>Specify the operational mode commands that members of a login class can use.</p> <p>When specifying extended regular expressions using the allow/deny-commands and allow/deny-configuration statements, each expression separated by a pipe () symbol must be a complete standalone expression, and must be enclosed in parentheses (). Do not use spaces between regular expressions separated with parentheses and connected with the pipe () symbol.</p>
Default	If you omit this statement and the deny-commands statement, users can issue only those commands for which they have access privileges through the permissions statement.
Options	<i>regular-expression</i> —Extended (modern) regular expression as defined in POSIX 1003.2. If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks.
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">• Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125• deny-commands on page 1268• user on page 1883

allow-commands-regexps

Syntax	<code>allow-commands-regexps ["regular expression 1" "regular expression 2"];</code>
Hierarchy Level	[edit system login class <i>class-name</i>]
Release Information	Statement introduced in Junos OS Release 18.1.
Description	<p>Configure authorizations for operational mode commands using regular expressions. You can use the allow-commands-regexps statement to explicitly allow authorization for commands that would otherwise be denied by an access privilege level.</p> <p>For allow/deny-commands-regexps statements, you configure a set of strings in which each string is a regular expression, enclosed in double quotes and separated with a space operator. Each string is evaluated against the full path of the command, which provides faster matching than the allow/deny-command statements. You can also include values for variables in the regular expressions, which is not supported using allow/deny-commands.</p> <p>The statement deny-commands-regexps takes precedence if it is used in the same login class definition.</p>
	<p> NOTE: The allow/deny-commands and allow/deny-commands-regexps statements are mutually exclusive and cannot be configured together for a login class. At a given point in time, a login class can include either the allow/deny-commands statement, or the allow/deny-commands-regexps statement. If you have existing configurations using the allow/deny-commands statements, using the same configuration options with the allow/deny-commands-regexps statements might not produce the same results, as the search and match methods differ in the two forms of these statements.</p>
	<p>Authorizations can also be configured remotely by specifying Juniper Networks vendor-specific TACACS+ attributes in your authentication server's configuration. For a remote user, when the authorization parameters are configured both remotely and locally, authorization parameters configured remotely and locally are both considered together for authorization. For a local user, only the authorization parameters configured locally for the class are considered.</p>
Default	If you do not configure authorizations for operational mode commands using allow/deny-commands or allow/deny-commands-regexps , users can edit only those commands for which they have access privileges set with the permissions statement.


Options *regular expression*—Extended (modern) regular expression as defined in POSIX 1003.2.
If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks. Enter as many expressions as needed.

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

Related Documentation

- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)
- [Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies on page 117](#)
- [deny-commands-regexps on page 1269](#)

allow-configuration

Syntax	<code>allow-configuration "(regular-expression) (regular-expression1) (regular-expression2)..."</code> ;
Hierarchy Level	[edit system login class <i>class-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	<p>Explicitly allow configuration access to the specified levels in the hierarchy even if the permissions set with the permissions statement do not grant such access by default.</p> <p>When specifying extended regular expressions using the allow/deny-commands and allow/deny-configuration statements, each expression separated by a pipe () symbol must be a complete standalone expression, and must be enclosed in parentheses (). Do not use spaces between regular expressions separated with parentheses and connected with the pipe () symbol.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p> NOTE: The allow/deny-configuration and allow/deny-configuration-regexps statements are mutually exclusive and cannot be configured together for a login class. At a given point in time, a login class can include either the allow/deny-configuration statement, or the allow/deny-configuration-regexps statement. If you have existing configurations using the allow/deny-configuration statements, using the same configuration options with the allow/deny-configuration-regexps statements might not produce the same results, as the search and match methods differ in the two forms of these statements.</p> </div>
Default	If you omit this statement and the deny-configuration statement, users can edit only those commands for which they have access privileges through the permissions statement.
Options	<p>regular-expression—Extended (modern) regular expression as defined in POSIX 1003.2. If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks.</p>
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"> • Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125

- [Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies on page 117](#)
- [deny-configuration on page 1271](#)
- [user on page 1883](#)


allow-configuration

Syntax	<code>allow-configuration "regular-expression";</code>
Hierarchy Level	<code>[edit system login class <i>class-name</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 11.2 for SRX Series devices.
Description	Explicitly allow configuration access to the specified levels in the hierarchy even if the permissions set with the permissions statement do not grant such access by default.
Default	If you omit this statement and the deny-configuration statement, users can edit only those commands for which they have access privileges through the permissions statement.
Options	<i>regular-expression</i> —Extended (modern) regular expression as defined in POSIX 1003.2. If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.

allow-configuration-regexps

Syntax	<code>allow-configuration-regexps "regular expression 1" "regular expression 2";</code>
Hierarchy Level	<code>[edit system login class <i>class-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.2.
Description	<p>Explicitly allow configuration access to specified hierarchies using regular expressions even if the permissions set with the permissions statement allow that access.</p> <p>The statement deny-configuration-regexps takes precedence if it is used in the same login class definition.</p>
Default	If you do not configure this statement or the deny-configuration-regexps statement, users can edit only those commands for which they have access privileges set with the permissions statement.
Options	<p><i>regular expression</i>—Extended (modern) regular expression as defined in POSIX 1003.2.</p> <p>If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks.</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>

allow-configuration-regexps


Syntax	<code>allow-configuration-regexps ["regular expression 1" "regular expression 2"];</code>
Hierarchy Level	[edit system login class <i>class-name</i>]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	<p>Explicitly allow configuration access to specified hierarchies using regular expressions even if the permissions set with the permissions statement allow that access.</p> <p>The statement deny-configuration-regexps takes precedence if it is used in the same login class definition.</p> <div>  <p>NOTE: The allow/deny-configuration and allow/deny-configuration-regexps statements are mutually exclusive and cannot be configured together for a login class. At a given point in time, a login class can include either the allow/deny-configuration statement, or the allow/deny-configuration-regexps statement. If you have existing configurations using the allow/deny-configuration statements, using the same configuration options with the allow/deny-configuration-regexps statements might not produce the same results, as the search and match methods differ in the two forms of these statements.</p> </div>
Default	If you do not configure this statement or the deny-configuration-regexps statement, users can edit only those commands for which they have access privileges set with the permissions statement.
Options	<p>regular expression—Extended (modern) regular expression as defined in POSIX 1003.2. If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks. Enter as many expressions as needed..</p>
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"> • Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138 • Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies on page 117 • deny-configuration-regexps on page 1273

- [user on page 1883](#)

allow-no-end-option (DHCP Relay Agent)

Syntax	allow-no-end-option;
Hierarchy Level	[edit forwarding-options dhcp-relay overrides], [edit forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...]
Release Information	Statement introduced in Junos OS Release 14.1X53.
Description	<p>Enable a DHCP relay agent to process packets sent from clients without DHCP Option-255 (end-of-options).</p> <p>The default behavior in Junos OS is to drop packets that do not include Option 255. To override this default behavior, configure the allow-no-end-option CLI statement at the [edit forwarding-options dhcp-relay overrides] hierarchy level.</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"> • Extended DHCP Relay Agent Overview on page 632 • Overriding the Default DHCP Relay Configuration Settings on page 638 • DHCP Snooping Support on page 650

allow-snooped-clients

Syntax	allow-snooped-clients;
Hierarchy Level	<pre>[edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> interface <i>interface-name</i> overrides], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> overrides], [edit forwarding-options dhcp-relay dhcpv6 overrides], [edit forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides], [edit forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit forwarding-options dhcp-relay overrides], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay ...], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...]</pre>
Release Information	<p>Statement introduced in Junos OS Release 10.2.</p> <p>Support at the [edit ... dhcpv6] hierarchy levels introduced in Junos OS Release 12.1.</p>
Description	<p>Explicitly enable DHCP snooping support on the DHCP relay agent.</p> <p>Use the statement at the [edit ... dhcpv6] hierarchy levels to explicitly enable snooping support on the router for DHCPv6 relay agent.</p>
Default	DHCP snooping is disabled by default.
	<div>  <p>NOTE: On EX4300 and EX9200 switches, the allow-snooped-clients statement is enabled by default at the [edit forwarding-options dhcp-relay overrides] hierarchy level.</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"> • Extended DHCP Relay Agent Overview on page 632 • Overriding the Default DHCP Relay Configuration Settings on page 638 • DHCP Snooping Support on page 650 • Configuring DHCP Snooped Packets Forwarding Support for DHCP Relay Agent on page 655

allowed-days

Syntax	<code>allowed-days [<i>days-of-the-week</i>];</code>
Hierarchy Level	<code>[edit system login class <i>class-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 10.1.
Description	Specify the days of the week when users can log in.
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 Time-Based User Access on page 80

always-write-giaddr

Syntax	<code>always-write-giaddr;</code>
Hierarchy Level	<p>[edit forwarding-options dhcp-relay overrides],</p> <p>[edit forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides]</p>
Release Information	<p>Statement introduced in Junos OS Release 8.3.</p> <p>Statement introduced in Junos OS Release 12.1 for EX Series switches.</p>
Description	Overwrite the gateway IP address (giaddr) of every DHCP packet with the giaddr of the DHCP relay agent before forwarding the packet to the DHCP server.
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"> • Extended DHCP Relay Agent Overview on page 632 • dhcp-relay on page 1294


always-write-option-82

Syntax	<code>always-write-option-82;</code>
Hierarchy Level	<p>[edit forwarding-options dhcp-relay overrides], [edit forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay overrides], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides]</p>
Release Information	<p>Statement introduced in Junos OS Release 8.3.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Override the DHCP relay agent information option (option 82) in DHCP packets destined for a DHCP server. The use of this option causes the DHCP relay agent to perform one of the following actions, depending on how it is configured:</p> <ul style="list-style-type: none"> • If the DHCP relay agent is configured to add option 82 information to DHCP packets, it clears the existing option 82 values from the DHCP packets and inserts the new values before forwarding the packets to the DHCP server. • If the DHCP relay agent is not configured to add option 82 information to DHCP packets, it clears the existing option 82 values from the packets, but does not add any new values before forwarding the packets to the DHCP server.
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"> • Using DHCP Relay Agent Option 82 Information on page 657 • Extended DHCP Relay Agent Overview on page 632



announcement

Syntax	<code>announcement <i>text</i>;</code>
Hierarchy Level	[edit system login]
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 system login announcement. This announcement appears after a user logs in.
Options	<i>text</i> —Text of the announcement. If the text contains any spaces, enclose it in quotation marks.
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 Junos OS to Display a System Login Announcement on page 57• message on page 1528

archival

Syntax	<pre> archival { configuration { archive-sites { file://<path>/<filename>; ftp://username@host:<port>url-path password password; http://username@host:<port>url-path password password; pasvftp://username@host:<port>url-path password password; scp://username@host:<port>url-path password password; } transfer-interval interval; transfer-on-commit; } } </pre>
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 OCX Series switches.</p>
Description	Configure copying of the currently active configuration to an archive site. An archive site can be a file, or an FTP, HTTP, or SCP location.
Options	The remaining statements are explained separately.
	<div>  <p>NOTE: The [edit system archival] hierarchy is not available on QFabric systems.</p> </div>
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"> <i>Backing Up Configurations to an Archive Site</i>

archive-sites (Configuration File)

Syntax	<pre>archive-sites { file://<path>/<filename>; ftp://username@host:<port>url-path password password; pasvftp://username@host:<port>url-path password password; scp://username@host:<port>url-path password password; }</pre>
Hierarchy Level	[edit system archival configuration]
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	<p>Specify where to transfer the current configuration files. When specifying a URL in a Junos OS statement using an IPv6 host address, you must enclose the entire URL in quotation marks (" ") and enclose the IPv6 host address in brackets ([]). For example, "scp://username<:password>@[ipv6-host-address]<:port>/url-path"</p> <p>If you specify more than one archive site, the router or switch attempts to transfer the configuration files to the first archive site in the list, moving to the next only if the transfer fails.</p> <p>The destination filename is saved in the following format, where <i>n</i> corresponds to the number of the compressed configuration rollback file that has been archived:</p> <p>router-name_YYYYMMDD_HHMMSS_juniper.conf.n.gz</p> <div>  <p>NOTE: The time included in the destination filename is always in Coordinated Universal Time (UTC) regardless of whether the time on the router or switch is configured as UTC or the local time zone. The default time zone on the router or switch is UTC.</p> </div> <div>  <p>NOTE: The [edit system archival] hierarchy is not available on QFabric systems.</p> </div>
Options	<p>The prefix used in the configuration statement determines the form of transfer:</p> <p>file:// —transfer on a path to a named file</p> <p>ftp:// —transfer using active FTP server</p>

pasvftp:// —transfer to a device that only accepts passive FTP services

scp:// —transfer to a known host using background SCP file transfers

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

Related Documentation

- *Configuring Archive Sites for the Transfer of Active Configuration Files*
- *Junos OS Commit Model for Configurations*
- [configuration on page 1254](#)
- [transfer-on-commit on page 1855](#)

archive-sites

Syntax

```
archive-sites {
    site-name;
}
```

Hierarchy Level [edit accounting-options [file](#) *filename*]

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 ***router-name_log-filename_timestamp***.

Options ***site-name***—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

- *Configuring Archive Sites*

attempts (DHCP Local Server)

Syntax	<code>attempts <i>attempt-count</i>;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit system services dhcp-local-server reconfigure],</p> <p>[edit system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure]</p>
Release Information	<p>Statement introduced in Junos OS Release 10.0.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Support at the [edit ... dhcpv6 ...] hierarchy levels introduced in Junos OS Release 10.4.</p>
Description	Configure how many attempts are made to reconfigure all DHCP clients or only the DHCP clients serviced by the specified group of interfaces before reconfiguration is considered to have failed. A group configuration takes precedence over a DHCP local server configuration.
Options	<p><i>attempt-count</i>—Maximum number of attempts.</p> <p>Range: 1 through 10</p> <p>Default: 8</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 Dynamic Client Reconfiguration of Extended Local Server Clients Overview on page 693](#)
 - [Configuring Dynamic Reconfiguration Attempts for DHCP Clients on page 696](#)

attributes (RADIUS Attributes)

```
Syntax  attributes {
        exclude {
            attribute-name packet-type;
            standard-attribute number {
                packet-type [ access-request | accounting-off | accounting-on | accounting-start |
                    accounting-stop ];
            }
            vendor-id id-number {
                vendor-attribute vsa-number {
                    packet-type [ access-request | accounting-off | accounting-on | accounting-start |
                        accounting-stop ];
                }
            }
        }
        ignore {
            dynamic-iflset-name;
            framed-ip-netmask;
            idle-timeout;
            input-filter;
            logical-system-routing-instance;
            output-filter;
            session-timeout;
            standard-attribute number;
            vendor-id id-number {
                vendor-attribute vsa-number;
            }
        }
    }
```

Hierarchy Level [edit access profile *profile-name* **radius**]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Specify how the router or switch processes RADIUS attributes.

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 admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Filtering RADIUS Attributes and VSAs from RADIUS Messages*

authentication (Login)

Syntax	<pre> authentication { (encrypted-password "password" plain-text-password); load-key-file URL filename; no-public-keys; ssh-dsa "public-key"; ssh-ecdsa "public-key"; ssh-rsa "public-key"; } </pre>
Hierarchy Level	[edit system login user username]
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>Option no-public-keys introduced in Junos OS Release 15.1.</p>
Description	Authentication methods that a user can use to log in to the router or switch. You can assign multiple authentication methods to a single user.
Options	<p>encrypted-password "password"—Message Digest 5 (MD5) or other encrypted authentication. Specify the MD5 or other password. You can specify only one encrypted password for each user.</p> <p>You cannot configure a blank password for encrypted-password using blank quotation marks (" "). You must configure a password whose number of characters range from 1 through 128 characters and enclose the password in quotation marks.</p> <p>load-key-file URL filename—Load previously-generated RSA (SSH version 2) and DSA (SSH version 2) public keys from a named file at a specified URL location. The file contains one or more SSH keys.</p> <p>For information on valid filename and URL formats, see <i>Format for Specifying Filenames and URLs in Junos OS CLI Commands</i>.</p> <p>plain-text-password—When using this option, the command-line interface (CLI) prompts you for the password and then encrypts it.</p> <p>no-public-keys—Disables public key authentication for the user specified.</p> <p>ssh-dsa "public-key"—SSH version 2 authentication. Specify the DSA public key. You can specify one or more public keys for each user.</p> <p>ssh-ecdsa "public-key"—SSH version 2 authentication. Specify the ECDSA public key. You can specify one or more public keys for each user.</p> <p>ssh-rsa "public-key"—SSH version 2 authentication. Specify the RSA public key. You can specify one or more public keys for each user.</p>

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

Related Documentation

- [Configuring Junos OS User Accounts by Using a Configuration Group on page 84](#)
- [root-authentication on page 1714](#)

authentication (DHCP Local Server)

Syntax

```
authentication {
  password password-string;
  username-include {
    circuit-type;
    client-id;
    delimiter delimiter-character;
    domain-name domain-name-string;
    interface-description (device-interface | logical-interface);
    interface-name;
    logical-system-name;
    mac-address;
    option-60;
    option-82 <circuit-id> <remote-id>;
    relay-agent-interface-id;
    relay-agent-remote-id;
    relay-agent-subscriber-id;
    routing-instance-name;
    user-prefix user-prefix-string;
    vlan-tags;
  }
}
```

Hierarchy Level

```
[edit system services dhcp-local-server],
[edit system services dhcp-local-server dual-stack-group dual-stack-group-name],
[edit system services dhcp-local-server dhcpv6],
[edit system services dhcp-local-server dhcpv6 group group-name],
[edit system services dhcp-local-server group group-name],
[edit logical-systems logical-system-name routing-instances routing-instance-name system
  services dhcp-local-server ...],
[edit logical-systems logical-system-name system services dhcp-local-server ...],
[edit routing-instances routing-instance-name system services dhcp-local-server ...]
```

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 12.3R2 for EX Series switches.

Description Configure the parameters the router sends to the external AAA server. A group configuration takes precedence over a global DHCP relay or DHCP local server configuration.

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

- [Using External AAA Authentication Services with DHCP on page 682](#)

authentication (DHCP Relay Agent)

Syntax

```
authentication {
  password password-string;
  username-include {
    circuit-type;
    client-id;
    delimiter delimiter-character;
    domain-name domain-name-string;
    interface-description (device-interface | logical-interface);
    interface-name;
    logical-system-name;
    mac-address;
    option-60;
    option-82 <circuit-id> <remote-id>;
    relay-agent-interface-id;
    relay-agent-remote-id;
    relay-agent-subscriber-id;
    routing-instance-name;
    user-prefix user-prefix-string;
    vlan-tags;
  }
}
```

Hierarchy Level

```
[edit forwarding-options dhcp-relay],
[edit forwarding-options dhcp-relay dhcpv6],
[edit forwarding-options dhcp-relay dhcpv6 group group-name],
[edit forwarding-options dhcp-relay dual-stack-group dual-stack-group-name],
[edit forwarding-options dhcp-relay group group-name],
[edit logical-systems logical-system-name forwarding-options dhcp-relay ...],
[edit logical-systems logical-system-name routing-instances routing-instance-name
 forwarding-options dhcp-relay ...],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay ...]
```

Release Information

Statement introduced in Junos OS Release 9.1.

Statement introduced in Junos OS Release 12.3R2 for EX Series switches.

Support at the **[edit ... dhcpv6]** hierarchy levels introduced in Junos OS Release 11.4.

Support at the **[edit ... dual-stack-group dual-stack-group-name]** hierarchy level introduced in Junos OS Release 15.1.

Description

Configure the parameters the router sends to the external AAA server. A group configuration takes precedence over a global DHCP relay configuration. Use the statement at the **[edit...dhcpv6]** hierarchy levels to configure DHCPv6 support.

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

interface—To view this statement in the configuration.

interface-control—To add this statement to the configuration.

- Related Documentation**
- [dhcp-relay on page 1294](#)
 - [Using External AAA Authentication Services with DHCP on page 682](#)

authentication-server

Syntax	<code>authentication-server [<i>server-addresses</i>];</code>
Hierarchy Level	[edit access profile <i>profile-name</i> radius]
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 OCX Series switches.
Description	Configure the RADIUS server for authentication. To configure multiple RADIUS servers, include multiple server addresses. The servers are tried in order and in a round-robin fashion until a valid response is received from one of the servers or until all the configured retry limits are reached.
Options	<i>server-addresses</i> —Configure one or more RADIUS server addresses.
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"> • Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378 • show network-access aaa statistics authentication on page 2138

authentication-key

Syntax	<code>authentication-key <i>key-number</i> type <i>md5</i> value <<i>password</i>>;</code>
Hierarchy Level	<code>[edit system ntp]</code>
Release Information	Statement introduced before Junos OS Release 7.4.
Description	<p>Configure Network Time Protocol (NTP) authentication keys so that the SRX Series device can send authenticated packets. If you configure the SRX Series device to operate in authenticated mode, you must configure a key.</p> <p>Both the keys and the authentication scheme (MD5) must be identical between a set of peers sharing the same key number.</p>
Options	<p><i>key-number</i>—Positive integer that identifies the key.</p> <p><i>type md5</i>—Authentication type. It can only be <i>md5</i>.</p> <p><i>value password</i>—The key itself, which can be from 1 through 8 ASCII characters. If the key contains spaces, enclose it in quotation marks.</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>


authentication-key-chains

Syntax	<pre> authentication-key-chains { key-chain key-chain-name { description text-string; key key { algorithm (md5 hmac-sha-1); options (basic isis-enhanced); secret secret-data; start-time yyyy-mm-dd.hh:mm:ss; } tolerance seconds; } } </pre>
Hierarchy Level	[edit security]
Release Information	<p>Statement introduced in Junos OS Release 7.6.</p> <p>Statement introduced in Junos Limited edition for Junos OS Releases 16.1R7, 16.2R3, 17.1R3, 17.2R3, 17.3R3, and 17.4R2.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the BFD protocol introduced in Junos OS Release 9.6.</p> <p>Support for the BFD protocol introduced in Junos OS Release 9.6 for EX Series switches.</p> <p>Support for IS-IS introduced in JUNOS OS Release 11.2.</p> <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	<p>Configure authentication key updates for the Border Gateway Protocol (BGP), the Label Distribution Protocol (LDP) routing protocols, the Bidirectional Forwarding Detection (BFD) protocol, and the Intermediate System-to-Intermediate System (IS-IS) protocol. When the authentication-key-chains statement is configured at the [edit security] hierarchy level, and is associated with the BGP, LDP, or IS-IS protocols at the [edit protocols] hierarchy level or with the BFD protocol using the bfd-liveness-detection statement, authentication key updates can occur without interrupting routing and signaling protocols such as Open Shortest Path First (OSPF) and Resource Reservation Setup Protocol (RSVP).</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
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 Authentication Key Updates on page 284 • Example: Configuring BFD Authentication for Securing Static Routes • Example: Configuring Hitless Authentication Key Rollover for IS-IS

authentication-order

Syntax	<code>authentication-order [method1 method2...];</code>
Hierarchy Level	<code>[edit system]</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 the order in which the software tries different user authentication methods when attempting to authenticate a user. For each login attempt, the software tries the authentication methods in order, starting with the first one, until the password matches.
Default	If you do not include the authentication-order statement, users are verified based on their configured passwords.
Options	One or more of the following authentication methods listed in the order in which they must be tried: <ul style="list-style-type: none">• password—Use the password configured for the user with the authentication statement at the <code>[edit system login user]</code> hierarchy level.• radius—Use RADIUS authentication services.• tacplus—Use TACACS+ authentication services.
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">• Junos OS User Authentication Methods on page 185

authentication-order

Syntax	<code>authentication-order [none password radius];</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</i>],</code> <code>[edit system]</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 OCX Series switches.
Description	Configure the order of authentication, authorization, and accounting (AAA) servers to use while sending authentication messages.
Default	Not enabled
Options	none —No authentication for specified subscribers. password —Password authentication. radius —RADIUS authentication.
<div>  NOTE: The <code>[edit access]</code> hierarchy is not available on QFabric systems. </div>	
Required Privilege Level	admin —To view this statement in the configuration. admin-control —To add this statement to the configuration.

authentication-order (Access Profile)

Syntax	<code>authentication-order [(none ldap password radius secureid)];</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</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.
Description	(EX and QFX Series only) Configure the order of authentication, authorization, and accounting (AAA) methods to use while sending authentication messages.
Default	Not enabled
Options	none —No authentication for specified subscribers. ldap — Lightweight Directory Access Protocol. password —Locally configured password in access profile. radius —RADIUS authentication. secureid —RSA SecurID authentication.
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">• Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378• Configuring 802.1X RADIUS Accounting (CLI Procedure) on page 386

authentication-order (Authenticator)

Syntax	<code>authentication-order [dot1x mac-radius captive-portal];</code>
Hierarchy Level	[edit protocols <code>dot1x authenticator interface interface-name</code>]
Release Information	Statement introduced in Junos OS Release 15.1R3 for EX Series switches.
Description	<p>Configure the preferred order of authentication methods that the switch will use when attempting to authenticate a client. If multiple authentication methods are configured on a single interface, when one authentication method fails, the switch falls back to another method. You can configure the authentication-order statement to specify whether 802.1X authentication or MAC RADIUS authentication must be the first authentication method tried.</p> <p>By default, the switch attempts to authenticate a client by using 802.1X authentication first. If 802.1X authentication fails because there is no response from the client, and MAC RADIUS authentication is configured on the interface, the switch falls back to MAC RADIUS authentication. If MAC RADIUS fails, and captive portal is configured on the switch, the switch falls back to captive portal.</p> <p>Configuring MAC RADIUS authentication as the first method can help prevent the fallback timeout period which occurs after an 802.1X authentication attempt is made for a host that does not support 802.1X authentication. If MAC RADIUS authentication is configured as the first authentication method on an interface, then on receiving data from any client on that interface, the switch attempts to authenticate the client by using MAC RADIUS authentication. If MAC RADIUS authentication fails, then the switch falls back to 802.1X authentication. If 802.1X authentication fails, and captive portal is configured on the interface, the switch falls back to captive portal.</p> <p>802.1X authentication always has the highest priority, even if a client has been authenticated using another method. If the switch receives an EAP packet from a client that has been authenticated using MAC RADIUS authentication, the switch acknowledges the EAP packet and upgrades the authentication using 802.1X authentication credentials. Similarly, if a client has been authenticated through fallback to captive portal, and the switch receives an EAP packet from that client, the switch attempts to authenticate the client by using 802.1X authentication.</p> <p>The switch attempts authentication using only methods that are configured on the interface. If an authentication method is included in the authentication order, but is not configured on the interface, the switch ignores that method and attempts authentication using the next method in the order that is enabled. However, if a method is enabled on the interface, but is not included in the authentication order, the switch does not attempt using that method. For example, if captive portal is enabled for an interface, but the authentication order is configured as [mac-radius dot1x], the authentication method for that interface does not fall back to captive portal.</p>

The authentication order can be configured for all interfaces by using the **interface all** option. If the authentication order is configured for an individual interface, and there is also an authentication order configured for all interfaces, then the order for the individual interface is followed. If there is no authentication order configured for an individual interface, and there is an authentication order configured for all interfaces, then the configuration for all interfaces is followed.

Use the following guidelines when configuring the **authentication-order** statement:

- The authentication order must include at least two methods of authentication.
- 802.1X authentication must be one of the methods included in the authentication order.
- If captive portal is included in the authentication order, it must be the last method in the order.
- If **mac-radius-restrict** is configured on an interface, then the authentication order cannot be configured.

The valid combinations for **authentication-order** are as follows:

- **[dot1x mac-radius captive-portal]**
- **[dot1x captive-portal]**
- **[dot1x mac-radius]**
- **[mac-radius dot1x captive-portal]**

Default If **authentication-order** is not configured, the switch attempts to authenticate the client by using 802.1X authentication first, followed by MAC RADIUS authentication, and then captive portal, as follows:

1. 802.1X authentication—If 802.1X is configured on the interface, the switch sends EAPoL requests to the end device and attempts to authenticate the end device through 802.1X authentication. If the end device does not respond to the EAP requests, the switch checks whether MAC RADIUS authentication is configured on the interface.
2. MAC RADIUS authentication—If MAC RADIUS authentication is configured on the interface, the switch sends the MAC RADIUS address of the end device to the authentication server. If MAC RADIUS authentication is not configured, the switch checks whether captive portal is configured on the interface.
3. Captive portal authentication—If captive portal is configured on the interface, the switch attempts to authenticate the end device by using this method after attempting any other configured authentication methods.

Options	captive-portal —Configure captive portal authentication in the order of authentication methods on the interface.
	dot1x —Configure 802.1X authentication in the order of authentication methods on the interface.
	mac-radius —Configure MAC RADIUS authentication in the order of authentication methods on the interface.
Required Privilege Level	admin—To view this statement in the configuration.
	admin-control—To add this statement to the configuration.
Related Documentation	• Understanding Authentication on Switches on page 348
	• Configuring Flexible Authentication Order on page 514

authentication-profile-name

Syntax	<code>authentication-profile-name <i>access-profile-name</i>;</code>
Hierarchy Level	[edit protocols dot1x authenticator], [edit services captive-portal]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Added to [edit services captive-portal] hierarchy in Junos OS Release 10.1 for EX Series switches.
Description	Specify the name of the access profile to be used for 802.1X, MAC RADIUS, or captive portal authentication.
Default	No access profile is specified.
Options	<i>access-profile-name</i> —Name of the access profile. The access profile is configured at the [edit access profile] hierarchy level and contains the RADIUS server IP address and other information used for authentication.
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: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378• Example: Configuring MAC RADIUS Authentication on an EX Series Switch on page 502• Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527• Configuring 802.1X Interface Settings (CLI Procedure) on page 357• Configuring 802.1X Authentication (J-Web Procedure) on page 358• Configuring Captive Portal Authentication (CLI Procedure) on page 532

authentication-protocol

Syntax	authentication-protocol (eap-md5 pap);
Hierarchy Level	[edit protocols dot1x authenticator interface <i>interface-name</i> mac-radius]
Release Information	Statement introduced in Junos OS Release 15.1R3 for EX Series switches. The eap-peap was introduced in Junos OS Release 17.2R1 for EX Series switches.
Description	Specify the protocol to be used by a supplicant to provide authentication credentials for MAC RADIUS authentication. The protocols supported for MAC RADIUS authentication are EAP-MD5, which is the default, Protected Extensible Authentication Protocol (EAP-PEAP), and Password Authentication Protocol (PAP).
Default	If authentication-protocol is not configured, the EAP-MD5 authentication protocol is used for MAC RADIUS authentication.
Options	<p>eap-md5—Use the EAP-MD5 protocol for MAC RADIUS authentication. EAP-MD5 is an authentication method belonging to the Extensible Authentication Protocol (EAP) authentication framework. EAP-MD5 uses MD5 to hash the username and password. EAP-MD5 provides for a one-way client authentication. The server sends the client a random request for which the client must provide a response containing an encryption of the request and its password for establishing its identity.</p> <p>eap-peap—Use the EAP-PEAP protocol, also known as Protected EAP or PEAP, for MAC RADIUS authentication. EAP-PEAP is a protocol that encapsulates EAP within a potentially encrypted and authenticated Transport Layer Security (TLS) tunnel. By encapsulating the authentication process in a TLS tunnel, PEAP addresses the vulnerabilities of an EAP like EAP-MD5.</p> <p>pap—Use the PAP authentication protocol for MAC RADIUS authentication. PAP provides a simple password-based authentication for users to establish their identity by using a two-way handshake. PAP transmits plaintext passwords over the network without encryption. PAP must be configured if the Lightweight Directory Access Protocol (LDAP), which supports only plaintext passwords for client authentication, is used for RADIUS authentication.</p>
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"> • Understanding Authentication on Switches on page 348 • Configuring 802.1X RADIUS Accounting (CLI Procedure) on page 386

authentication-server

Syntax	<code>authentication-server [<i>server-addresses</i>];</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</i> radius]</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 OCX Series switches.
Description	Configure the RADIUS server for authentication. To configure multiple RADIUS servers, include multiple server addresses. The servers are tried in order and in a round-robin fashion until a valid response is received from one of the servers or until all the configured retry limits are reached.
Options	<i>server-addresses</i> —Configure one or more RADIUS server addresses.
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">• Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378• show network-access aaa statistics authentication on page 2138

authentication-whitelist

Syntax	<pre>authentication-whitelist { mac-address { interface <i>interface-name</i>; vlan-assignment (<i>vlan-id</i> <i>vlan-name</i>); } }</pre>
Hierarchy Level	<pre>[edit ethernet-switching-options]; [edit switch-options]</pre>
Release Information	<p>Statement introduced in Junos OS Release 10.1 for EX Series switches.</p> <p>The [edit switch-options] hierarchy level was introduced in Junos OS Release 13.2X50-D10 for EX Series switches (ELS).</p>
Description	<p>Configure MAC addresses for which RADIUS authentication is to be bypassed.</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"> • Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527 • Example: Setting Up Captive Portal Authentication on an EX Series Switch with ELS Support on page 539 • Configuring Captive Portal Authentication (CLI Procedure) on page 532 • Configuring Captive Portal Authentication (CLI Procedure) on an EX Series Switch with ELS Support on page 537

authenticator

Syntax

```

authenticator {
  authentication-profile-name access-profile-name;
  interface (all | [ interface-names ]) {
    disable;
    guest-vlan ( vlan-id | vlan-name );
    lldp-med-bypass;
    mac-radius <restrict>;
    maximum-requests number;
    no-reauthentication;
    quiet-period seconds;
    reauthentication interval;
    retries number;
    server-fail (deny | permit | use-cache | vlan-id | vlan-name);
    server-reject-vlan (vlan-id | vlan-name) {
      eapol-block;
      block-interval block-interval;
    }
    server-timeout seconds;
    supplicant (single | single-secure | multiple);
    supplicant-timeout seconds;
    transmit-period seconds;
  }
  no-mac-table-binding {
    interface interface-names;
    static mac-address;
  }
  radius-options {
    use-vlan-id;
    use-vlan-name;
  }
  static mac-address {
    vlan-assignment vlan-identifier;
  }
}

```

Hierarchy Level [edit protocols [dot1x](#)]

Release Information Statement introduced in Junos OS Release 9.0 for EX Series switches.
Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.

Description Configure an authenticator for 802.1X authentication.


The remaining statements are explained separately. See [CLI Explorer](#).



NOTE: You cannot configure 802.1X user authentication on interfaces that have been enabled for Q-in-Q tunneling.

Default	802.1X authentication is disabled.
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 802.1X Interface Settings (CLI Procedure) on page 357 • Specifying RADIUS Server Connections on Switches (CLI Procedure) on page 500 • Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch on page 509

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

authorization-time-interval

Syntax	<code>authorization-time-interval <i>minutes</i>;</code>
Hierarchy Level	[edit <code>system tacplus-options</code>]
Release Information	Statement introduced in Junos OS Release 17.4R1.
Description	<p>Configure the time interval at which the JUNOS device has to fetch the authorization profile configuration from the TACACS+ server and refresh the authorization profile stored locally on the JUNOS device. The TACACS+ server sends the authorization profile once by default after the user is successfully authenticated, and the authorization profile is stored locally on the JUNOS device. The authorization profile refresh feature enables the JUNOS device to check the authorization profile configured remotely on the TACACS+ server at the configured time interval.</p> <p>If there is a change in the remote authorization profile, the device fetches the authorization profile from the TACACS+ server and the authorization profile configured locally under the login class hierarchy. The device refreshes the authorization profile stored locally by combining the remote and locally-configured authorization profiles. This ensures that any changes made to the authorization profile configuration on the TACACS+ server are reflected on the JUNOS device without the user having to restart the authentication process.</p> <p>To enable periodic refresh of the authorization profile, you must set the time interval at which the JUNOS device has to fetch the authorization profile configuration from the TACACS+ server and refresh the authorization profile stored locally. The time interval can be configured directly on the TACACS+ server or locally on the JUNOS device using the CLI. Use the following guidelines to determine which time interval configuration takes precedence:</p> <ul style="list-style-type: none">• If there is no refresh time interval configured on the TACACS server for periodic refresh, the JUNOS device does not receive the time interval value in the authorization response. In this case, the value configured locally on the JUNOS device will take effect.• If the refresh time interval is configured on the TACACS server and there is no refresh time interval configured locally on the JUNOS device, the value configured on the TACACS server will take effect.• If refresh time interval is configured on the TACACS server and also on the JUNOS device locally, the value configured on the TACACS server will take precedence.• If there is no refresh time interval configured on the TACACS server and there is no refresh time interval configured on the JUNOS device, there will be no periodic refresh.• If the refresh time interval configured on the TACACS server is out of range or invalid, the refresh time interval value configured locally will take effect.

- If the refresh time interval configured on the TACACS server is out of range or invalid and there is no refresh time interval configured locally, there will be no periodic refresh.

After the periodic refresh time interval is set, if the user changes the refresh interval before the authorization request is sent from the JUNOS device, the updated refresh interval takes effect after the next immediate periodic refresh.

Default If the authorization time interval is not configured, the authorization profile is not refreshed during a TACACS+ authentication session.

Options *minutes*—The time interval at which the authorization profile that is configured on the TACACS+ server is fetched by the JUNOS device during a TACACS+ authentication session.

Range: 15 to 1440 minutes.

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

Related Documentation

- [tacplus-options on page 1810](#)
- [Configuring Periodic Refresh of the TACACS+ Authorization Profile on page 236](#)

authorization-order

Syntax	<code>authorization-order [<i>authorization-methods</i>];</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</i>]</code>
Release Information	<p>Statement introduced in Junos OS Release 9.6.</p> <p>Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.</p> <p>nasreq option added in Junos OS Release 16.1.</p>
Description	<p>Set the order in which AAA tries different methods to verify that a client is authorized access to the router or switch. For each login attempt, AAA tries the authorization methods in order, from first to last.</p> <p>A given subscriber does not undergo both authentication and authorization as separate steps. When both authentication-order and authorization-order are specified, DHCP subscribers honor the configured authorization order, all other subscribers use the configured authentication-order.</p>
Options	<p><i>authorization-methods</i>—Ordered list of methods to use for authorization attempts. The list includes one or more of the following methods in any combination:</p> <ul style="list-style-type: none">• jsrc—Use the JSRC application in an SRC environment to request authorization from the SAE when verifying that a subscriber can access the router or switch.<ul style="list-style-type: none">• When you configure both this option and authentication-order, AAA ignores the authentication order setting for DHCP subscribers. For non-DHCP subscribers, AAA ignores the authorization order and applies only the authentication order.• When you configure only this option, AAA applies the authorization order to both DHCP and non-DHCP subscribers.• nasreq—Use the NASREQ application to communicate with a NASREQ server for authorization of any subscriber type as an alternative to RADIUS authorization.• none—No authorization is performed. Can be used, for example, when the Diameter function Gx-Plus is employed for notification during subscriber provisioning.
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">• <i>JSRC Configuration Overview</i>• <i>Authorizing Subscribers with JSRC</i>

authentication-order

Syntax	<code>authentication-order [method1 method2...];</code>
Hierarchy Level	<code>[edit system]</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 the order in which the software tries different user authentication methods when attempting to authenticate a user. For each login attempt, the software tries the authentication methods in order, starting with the first one, until the password matches.
Default	If you do not include the authentication-order statement, users are verified based on their configured passwords.
Options	One or more of the following authentication methods listed in the order in which they must be tried: <ul style="list-style-type: none"> • password—Use the password configured for the user with the authentication statement at the <code>[edit system login user]</code> hierarchy level. • radius—Use RADIUS authentication services. • tacplus—Use TACACS+ authentication services.
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"> • Junos OS User Authentication Methods on page 185

backoff-factor

Syntax	<code>backoff-factor <i>seconds</i>;</code>
Hierarchy Level	<code>[edit system login retry-options]</code>
Release Information	Statement introduced in Junos OS Release 8.0.
Description	Configure the length of delay after each failed login attempt, which increases for each subsequent login attempt after the value specified in the backoff-threshold statement.
Options	<p><i>seconds</i>—Length of delay after each failed login attempt. The length of delay increases by this value for each subsequent login attempt after the value specified in the backoff-threshold option.</p> <p>Range: 5 through 10</p> <p>Default: 5</p>
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">• Limiting the Number of User Login Attempts for SSH and Telnet Sessions on page 87• retry-options on page 1707

backoff-threshold

Syntax	backoff-threshold <i>number</i> ;
Hierarchy Level	[edit system login retry-options]
Release Information	Statement introduced in Junos OS Release 8.0.
Description	Configure the threshold for the number of failed login attempts on the router before the user experiences a delay when attempting to reenter a password.
Options	<p><i>number</i>—Threshold for the number of failed login attempts before the user experiences a delay when attempting to reenter a password. Use the backoff-factor option to specify the length of delay, in seconds.</p> <p>Range: 1 through 3</p> <p>Default: 2</p>
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">• Limiting the Number of User Login Attempts for SSH and Telnet Sessions on page 87• retry-options on page 1707

bfd

Syntax	<pre> bfd { version (0 1 automatic); minimum-interval milliseconds; minimum-receive-interval milliseconds; multiplier number; no-adaptation; transmit-interval { minimum-interval milliseconds; threshold milliseconds; } detection-time { threshold milliseconds; } session-mode (automatic multihop singlehop); holddown-interval milliseconds; } </pre>
Hierarchy Level	<pre> [edit system services dhcp-local-server liveness-detection method], [edit system services dhcp-local-server dhcpv6 liveness-detection method], [edit forwarding-options dhcp-relay liveness-detection method], [edit forwarding-options dhcp-relay dhcpv6 liveness-detection method], [edit system services dhcp-local-server group <i>group-name</i> liveness-detection method], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> liveness-detection method], [edit forwarding-options dhcp-relay group <i>group-name</i> liveness-detection method], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> liveness-detection method] </pre>
Release Information	<p>Statement introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Configure Bidirectional Forwarding Detection (BFD) as the liveness detection method.</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>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"> <i>Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients</i> <i>Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714</i>

block-interval

Syntax	<code>block-interval <i>block-interval</i>;</code>
Hierarchy Level	[edit protocols dot1x authenticator interface (all [<i>interface-names</i>]) server-reject-vlan (<i>vlan-id</i> <i>vlan-name</i>)], [edit protocols dot1x authenticator interface (all [<i>interface-names</i>]) server-reject-vlan]
Release Information	Statement introduced in Junos OS Release 11.2 for EX Series switches.
Description	Specify the amount of time that the 802.1X interface ignores Extensible Authentication Protocol (EAP) start messages from the client when an EAPoL block has been enabled on the 802.1X interface.
Options	<i>block-interval</i> —The number of seconds for the interval. Range: 120 through 65,535
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"> • eapol-block on page 1367 • Example: Configuring Fallback Options on EX Series Switches for EAP-TTLS Authentication and Odyssey Access Clients on page 410

boot-file

Syntax	<code>boot-file <i>filename</i>;</code>
Hierarchy Level	[edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	For J Series Services Routers and EX Series switches only. Set the boot file advertised to DHCP clients. After the client receives an IP address and the boot file location from the DHCP server, the client uses the boot image stored in the boot file to complete DHCP setup.
Options	<i>filename</i> —The location of the boot file on the boot server. The filename can include a pathname.
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">• boot-server on page 1211

boot-loader-authentication

Syntax	<pre>boot-loader-authentication { (encrypted-password <i>password</i> plain-text-password); }</pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 13.2X51-D20 for EX Series switches.
Description	<p>Set the boot-loader password for accessing the U-Boot CLI during the boot process. The password can be entered either as a plain-text password or as an encrypted password.</p> <p>Encrypted passwords must be entered in Message Digest 5 (MD5) format. Plain-text passwords are encrypted by using MD5 by default. The encryption format for plain-text passwords can be changed by using the set system login password format command.</p> <p>Encrypted passwords must be between 1 and 128 characters long. The password must be enclosed in quotation marks and cannot be blank within the quotation marks (" ").</p> <p>The default requirements for plain-text passwords are as follows:</p> <ul style="list-style-type: none"> • The password must be between 6 and 128 characters long • You can include most character classes in a password (uppercase letters, lowercase letters, numbers, punctuation marks, and other special characters). Control characters are not recommended. • The password must contain at least one change of case or character class.
Options	<p>encrypted-password <i>password</i>— Enter a password that has already been encrypted. You can specify only one encrypted password.</p> <p>plain-text-password—Enter a plain-text password. The CLI prompts you for the password and then encrypts it. The CLI displays the encrypted version, and the software places the encrypted version in its user database. You can specify only one plain-text password.</p>
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"> • Using Unattended Mode for U-Boot to Prevent Unauthorized Access on page 288 • format on page 1409 • unattended-boot on page 1870

boot-server (NTP)

Syntax	<code>boot-server (address hostname);</code>
Hierarchy Level	<code>[edit system ntp]</code>
Release Information	Statement introduced before Junos OS Release 7.4.
Description	<p>Configure the server that NTP queries when the SRX Series device boots to determine the local date and time.</p> <p>When you boot the SRX Series device, it issues an ntpdate request, which polls a network server to determine the local date and time. You need to configure a server that the SRX Series device uses to determine the time when the SRX Series device boots. You can configure either an IP address or a hostname for the boot server. If you configure a hostname instead of an IP address, the ntpdate request resolves the hostname to an IP address when the SRX Series device boots up.</p> <p>If you configure an NTP boot server, then when the SRX Series device boots, it immediately synchronizes with the boot server even if the NTP process is explicitly disabled or if the time difference between the client and the boot server exceeds the threshold value of 1000 seconds.</p>
Options	<ul style="list-style-type: none">• address—The IP address of an NTP boot server.• hostname—The hostname of an NTP boot server.
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">• ntp on page 1573

boot-server (DHCP)

Syntax	<code>boot-server (address hostname);</code>
Hierarchy Level	[edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
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 name of the boot server advertised to DHCP clients. The client uses a boot file located on the boot server to complete DHCP setup.
Options	<ul style="list-style-type: none">• address—IP address of a DHCP boot server.• hostname—Hostname of a DHCP boot server.
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">• boot-file on page 1208

broadcast

Syntax	<code>broadcast address <key key-number> <routing-instance-name routing-instance-name> <ttl value> <version value>;</code>
Hierarchy Level	[edit system <i>ntp</i>]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	Configure the SRX Series device to operate in broadcast mode with the remote system at the specified address. In this mode, the SRX Series device sends periodic broadcast messages to a client population at the specified broadcast or multicast address. Normally, you include this statement only when the SRX Series device is operating as a transmitter.
Options	<p>address—The broadcast address on one of the local networks or a multicast address assigned to NTP. You must specify an address, not a hostname. If the multicast address is used, it must be 224.0.1.1.</p> <p>key key-number—(Optional) All packets sent to the address include authentication fields that are encrypted using the specified key number. Range: Any unsigned 32-bit integer</p> <p>routing-instance-name routing-instance-name—(Optional) The routing instance name in which the interface has an address in the broadcast subnet. Default: The default routing instance is used to broadcast packets.</p> <p>ttl value—(Optional) Time-to-live (TTL) value to use. Range: 1 through 255 Default: 1</p> <p>version value—(Optional) Specify the version number to be used in outgoing NTP packets. Range: 1 through 4 Default: 4</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">• ntp on page 1573

broadcast-client

Syntax	<code>broadcast-client;</code>
Hierarchy Level	<code>[edit system ntp]</code>
Release Information	Statement introduced before Junos OS Release 7.4.
Description	Configure the SRX Series device to listen for broadcast messages on the local network to discover other servers on the same subnet.
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"> • ntp on page 1573

ca-name

Syntax	<code>ca-name <i>ca-identity</i>;</code>
Hierarchy Level	<code>[edit security certificates certification-authority]</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	(Encryption interface on M Series and T Series routers and EX Series switches only) Specify the certificate authority (CA) identity to use in the certificate request.
Options	<i>ca-identity</i> —CA identity to use in the certificate request.
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"> • <i>Specifying the Certificate Authority Name</i>

ca-type


Syntax	<pre>ca-type { number { ca-value value; } }</pre>
Hierarchy Level	[edit protocols lldp-med interface (all <i>interface-name</i> location civic-based)]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	<p>For Link Layer Discovery Protocol–Media Endpoint Device (LLDP-MED), configure the address elements. These elements are included in the location information to be advertised from the switch to the MED. This information is used during emergency calls to identify the location of the MED.</p> <p>For further information about the values that can be used to comprise the location,, refer to RFC 4776, <i>Dynamic Host Configuration Protocol (DHCPv4 and DHCPv6) Option for Civic Addresses Configuration Information</i>. A subset of those values is provided below.</p> <p>The ca-value statement is explained separately.</p>
Default	Disabled.
Options	<p>value—Civic address elements that represent the civic or postal address. Values are:</p> <ul style="list-style-type: none"> • 0—A code that specifies the language used to describe the location. • 16—The leading-street direction, such as “N”. • 17—A trailing street suffix, such as “SW”. • 18—A street suffix or type, such as “Ave” or “Platz”. • 19—A house number, such as “6450”. • 20—A house-number suffix, such as “A” or “1/2”. • 21—A landmark, such as “Stanford University”. • 22—Additional location information, such as “South Wing”. • 23—The name and occupant of a location, such as “Carrillo's Holiday Market”. • 24—A house-number suffix, such as “95684”. • 25—A building structure, such as “East Library”.
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**
- [show lldp on page 2109](#)
 - [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
 - [Configuring LLDP-MED \(CLI Procedure\) on page 566](#)


ca-value

Syntax	<code>ca-value <i>value</i>;</code>
Hierarchy Level	<code>[edit protocols lldp-med interface (all <i>interface-name</i>) location civic-based ca-type <i>number</i>]</code>
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	For Link Layer Discovery Protocol–Media Endpoint Device (LLDP-MED), configure location information, such as street address and city, that is indexed by the ca-type code. This information is advertised from the switch to the MED and is used during emergency calls to identify the location of the MED.
Default	Disabled.
Options	<i>value</i> —Specify a value that correlates to the ca-type . See ca-type for a list of codes and suggested values.
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"> • show lldp on page 2109 • Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455 • Configuring LLDP-MED (CLI Procedure) on page 566

cache-size

Syntax	cache-size <i>bytes</i> ;
Hierarchy Level	[edit security certificates]
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	(Encryption interface on M Series and T Series routers and EX Series switches only) Configure the cache size for digital certificates.
Options	bytes —Cache size for digital certificates. Range: 64 through 4,294,967,295 Default: 2 megabytes (MB)
<div> NOTE: We recommend that you limit your cache size to 4 MB.</div>	
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">• <i>Configuring the Cache Size</i>

cache-timeout-negative


Syntax	<code>cache-timeout-negative <i>seconds</i>;</code>
Hierarchy Level	[edit security certificates]
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>(Encryption interface on M Series and T Series routers and EX Series switches only)</p> <p>Configure a negative cache for digital certificates.</p>
Options	<p><i>seconds</i>—Negative time to cache digital certificates, in seconds.</p> <p>Range: 10 through 4,294,967,295</p> <p>Default: 20</p>
<div>  <p>CAUTION: Configuring a large negative cache value can lead to a denial-of-service attack.</p> </div>	
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"> <i>Configuring the Negative Cache</i>

captive-portal

Syntax	<pre> captive-portal { authentication-profile-name authentication-profile-name custom-options { banner-message string; footer-bgcolor color; footer-message string; footer-text-color color; form-header-bgcolor color; form-header-message string; form-header-text-color color; form-reset-label label name; form-submit-label label name; header-bgcolor color; header-logo filename; header-message string; header-text-color color; post-authentication-url url-string; } interface (all [interface-names]) { quiet-period seconds; retries number-of-retries; server-timeout seconds; session-expiry seconds; supplicant (multiple single single-secure); } secure-authentication (http https); } </pre>
Hierarchy Level	[edit services]
Release Information	Statement introduced in Junos OS Release 10.1 for EX Series switches.
Description	<p>Configure captive portal to authenticate clients connected to the switch for access to the network.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Default	Captive portal is disabled.
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: Setting Up Captive Portal Authentication on an EX Series Switch on page 527 • Designing a Captive Portal Authentication Login Page on Switches on page 535 • Configuring Captive Portal Authentication (CLI Procedure) on page 532

- [Configuring an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control \(CLI Procedure\) on page 519](#)
- [Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service \(CLI Procedure\) on page 522](#)

certificate-verification

Syntax	<code>certificate-verification (optional required warning);</code>
Hierarchy Level	<code>[edit services unified-access-control]</code>
Release Information	Statement introduced in Junos OS Release 12.2 for EX Series switches.
Description	Specify certificate verification requirement for the connection from the switch to Junos Pulse Access Control service.
Default	warning
Options	<p>optional—The specification of a security certificate is optional.</p> <p>required—The specification of a security certificate is required.</p>
	<p> NOTE: Do not specify this option in Junos OS Release 12.2 for EX Series switches, because the specification of a security certificate (<code>ca-profile</code>) is not supported in this release.</p>
	warning —A warning is issue if a security certificate is not specified. 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	<ul style="list-style-type: none"> • Configuring an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control (CLI Procedure) on page 519 • Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service (CLI Procedure) on page 522 • Understanding Centralized Network Access Control and EX Series Switches on page 545

certificates

Syntax	<pre> certificates { cache-size bytes; cache-timeout-negative seconds; certification-authority ca-profile-name { ca-name ca-identity; crl file-name; encoding (binary pem); enrollment-url url-name; file certificate-filename; ldap-url url-name; } enrollment-retry attempts; local certificate-name { certificate-key-string; load-key-file URL filename; } maximum-certificates number; path-length certificate-path-length; } </pre>
Hierarchy Level	[edit security]
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>(Encryption interface on M Series and T Series routers and EX Series switches only)</p> <p>Configure the digital certificates for IPsec.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
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"> <i>Configuring Digital Certificates for an ES PIC</i>

certification-authority

Syntax	<pre> certification-authority <i>ca-profile-name</i> { <i>ca-name</i> <i>ca-identity</i>; <i>crl</i> <i>file-name</i>; <i>encoding</i> (binary pem); <i>enrollment-url</i> <i>url-name</i>; <i>file</i> <i>certificate-filename</i>; <i>ldap-url</i> <i>url-name</i>; } </pre>
Hierarchy Level	[edit security certificates]
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 before Junos OS Release 12.1 for the SRX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
Description	<p>(Encryption interface on M Series and T Series routers and EX Series switches only)</p> <p>Configure a certificate authority profile name.</p> <p>Configure certification authority (CA) for X.509 certificate.</p>
Options	<ul style="list-style-type: none"> • <i>profile-name</i>—Name of this CA configuration. • <i>ca-name</i> <i>name</i>—Name of the CA. • <i>crl</i> <i>filename</i>—Certificate revocation list (CRL) filename. • <i>encoding</i>—Certificate encoding, either binary or pem (privacy-enhanced mail). • <i>enrollment-url</i> <i>url</i>—Enrollment URL. • <i>file</i> <i>filename</i>—Certificate filename. • <i>ldap-url</i> <i>url</i>—Lightweight Directory Access Protocol (LDAP) URL.
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"> • <i>Configuring the Certificate Authority Properties for an ES PIC</i> • <i>Configuring the Certificate Authority Properties for an ES PIC</i>


change-type

Syntax	change-type (character-sets set-transitions);
Hierarchy Level	[edit system login password]
Release Information	Statement introduced in Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Set requirements for using character sets in plain-text passwords. When you combine this statement with the minimum-changes statement, you can check for the total number of character sets included in the password or for the total number of character-set changes in the password. Newly created passwords must meet these requirements.
Options	Specify one of the following: <ul style="list-style-type: none">• character-sets—The number of character sets in the password. Valid character sets include uppercase letters, lowercase letters, numbers, punctuation, and other special characters.• set-transitions—The number of transitions between character sets.
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">• minimum-changes on page 1530

civic-based

Syntax	<pre>civic-based { what number; country-code code; ca-type { number { ca-value value; } } }</pre>
Hierarchy Level	[edit protocols lldp-med interface (all <i>interface-name</i>) location]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	<p>For Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED), configure the geographic location to be advertised from the switch to the MED. This information is used during emergency calls to identify the location of the MED.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Default	Disabled.
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"> • show lldp on page 2109 • Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455 • Configuring LLDP-MED (CLI Procedure) on page 566

ciphers

Syntax	<code>ciphers [cipher-1 cipher-2 cipher-3 ...]</code>
Hierarchy Level	<code>[edit system services ssh]</code>
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Specify the set of ciphers the SSH server can use to perform encryption and decryption functions.
Options	<ul style="list-style-type: none"> • 3des-cbc—Triple Data Encryption Standard (DES) in Cipher Block Chaining (CBC) mode. • aes128-cbc—128-bit Advanced Encryption Standard (AES) in CBC mode. • aes128-ctr—128-bit AES in counter mode. • aes128-gcm@openssh.com—128-bit AES in Galois/Counter Mode. • aes192-cbc—192-bit AES in CBC mode. • aes192-ctr—192-bit AES in counter mode. • aes256-cbc—256-bit AES in CBC mode. • aes256-ctr—256-bit AES in counter mode. • aes256-gcm@openssh.com—256-bit AES in Galois/Counter Mode. • arcfour—128-bit RC4-stream cipher in CBC mode. • arcfour128—128-bit RC4-stream cipher in CBC mode. • arcfour256—256-bit RC4-stream cipher in CBC mode. • blowfish-cbc—128-bit blowfish-symmetric block cipher in CBC mode. • cast128-cbc—128-bit cast in CBC mode. • chacha20-poly1305@openssh.com—ChaCha20 stream cipher and Poly1305 MAC
	<p> NOTE: Ciphers represent a set. To configure SSH ciphers use the <code>set</code> command as shown in the following example:</p> <pre>user@host#set system services ssh ciphers [aes256-cbc aes192-cbc]</pre>
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 SSH Service for Remote Access to the Router or Switch on page 253](#)
 - [key-exchange on page 1482](#)
 - [macs on page 1511](#)

circuit-id (DHCP Relay Agent)

Syntax

```
circuit-id {
  include-irb-and-l2;
  keep-incoming-circuit-id;
  no-vlan-interface-name;
  prefix prefix;
  use-interface-description (logical | device);
  use-vlan-id;
}
```

Hierarchy Level

```
[edit forwarding-options dhcp-relay relay-option-82],
[edit forwarding-options dhcp-relay group group-name relay-option-82],
[edit logical-systems logical-system-name forwarding-options dhcp-relay relay-option-82],
[edit logical-systems logical-system-name forwarding-options dhcp-relay group group-name
relay-option-82],
[edit logical-systems logical-system-name routing-instances routing-instance-name
forwarding-options dhcp-relay relay-option-82],
[edit logical-systems logical-system-name routing-instances routing-instance-name
forwarding-options dhcp-relay group group-name relay-option-82],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay
relay-option-82],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay group
group-name relay-option-82]
```

Release Information

Statement introduced in Junos OS Release 8.3.
Statement introduced in Junos OS Release 12.3 for EX Series switches.
include-irb-and-l2 , **no-vlan-interface-name**, and **use-vlan-id** options added in Junos OS Release 14.1.

Description

Specify the Agent Circuit ID suboption (suboption 1) of the DHCP relay agent information option (option 82) to include in DHCP packets destined for a DHCP server. Optionally specify that the suboption includes a prefix, textual description, or VLAN tag.



NOTE: For Layer 3 interfaces, when you configure *relay-option-82* only, the Agent Circuit ID is the default. If no VLAN tags are configured, then the default is the logical interface device (IFL) name. For integrated routing and bridging (IRB) interfaces, the default is the Layer 2 IFL name and bridge domain name.

The interface to bridge domain relationship may be implicit (the interface is mapped to the bridge domain by the system based on VLAN tag) or explicit (the interface is mapped to the bridge domain by configuring it in the bridge domain definition). For the explicit case, tagging might not be relevant for the mapping.

The format of the Agent Circuit ID information for Fast Ethernet or Gigabit Ethernet interfaces that do not use virtual LANs (VLANs), stacked VLANs (S-VLANs), or bridge domains is as follows:

```
(fe | ge)-fpc/pic/port.subunit
```



NOTE: For remote systems, the *subunit* is required and is used to differentiate an interface for remote systems.

The format of the Agent Circuit ID information for Fast Ethernet or Gigabit Ethernet interfaces that use VLANs is as follows:

```
(fe | ge)-fpc/pic/port:vlan-id
```

The format of the Agent Circuit ID information for Fast Ethernet or Gigabit Ethernet interfaces that use S-VLANs is as follows:

```
(fe | ge)-fpc/pic/port:svlan-id-vlan-id
```

In the case of an IRB interface, the format displays the Layer 2 interface instead of the IRB interface along with the bridge domain name. For IRB interfaces (or other pseudo devices) the default format is as follows:

- IRB interfaces that use bridge domains but do not use VLANs or S-VLANs:

```
(fe | ge)-fpc/pic/port.subunit:bridge-domain-name
```

- IRB interfaces that use VLANs:

```
(fe | ge)-fpc/pic/port.subunit:vlan-name
```

To include the IRB interface name with the Layer 2 interface name, configure the **include-irb-and-l2** statement. The format is as follows:

- IRB interfaces that use bridge domains but do not use VLANs or S-VLANs:

```
(fe | ge)-fpc/pic/port:bridge-domain-name+irb.subunit
```

- IRB interfaces that use VLANs:

```
(fe | ge)-fpc/pic/port:vlan-name+irb.subunit
```

To include only the IRB interface name without the Layer 2 interface and bridge domain or VLAN, configure the **no-vlan-interface-name** statement. The format is as follows:

```
irb.subunit
```

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	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"> • Using DHCP Relay Agent Option 82 Information on page 657 • Configuring Option 82 Information

circuit-type

Syntax	circuit-type;
Hierarchy Level	<pre>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> authentication username-include], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server authentication username-include], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group <i>group-name</i> authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> authentication username-include], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> authentication username-include], [edit system services dhcp-local-server authentication username-include], [edit system services dhcp-local-server group <i>group-name</i> authentication username-include]</pre>
Release Information	Statement introduced in Junos OS Release 9.1.
Description	Specify that the circuit type is concatenated with the username during the subscriber authentication process.
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 External AAA Authentication Services to Authenticate DHCP Clients on page 594

circuit-type (DHCP Local Server)

Syntax	<code>circuit-type;</code>
Hierarchy Level	<pre> [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server authentication username-include], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 authentication username-include], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group group-name authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include], [edit system services dhcp-local-server authentication username-include], [edit system services dhcp-local-server dhcpv6 authentication username-include], [edit system services dhcp-local-server dhcpv6 group group-name authentication username-include], [edit system services dhcp-local-server group group-name authentication username-include] </pre>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Specify that the circuit type is concatenated with the username during the subscriber authentication or client authentication process.
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**
- [Using External AAA Authentication Services with DHCP on page 682](#)

circuit-type (DHCP Relay Agent)


Syntax	circuit-type;
Hierarchy Level	<p>[edit forwarding-options dhcp-relay authentication username-include],</p> <p>[edit forwarding-options dhcp-relay dhcpv6 authentication username-include],</p> <p>[edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit forwarding-options dhcp-relay dual-stack-group <i>dual-stack-group-name</i> authentication username-include],</p> <p>[edit forwarding-options dhcp-relay group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay ...],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Support at the [edit ... dhcpv6] hierarchy levels introduced in Junos OS Release 11.4.</p> <p>Support at the [edit ... dual-stack-group <i>dual-stack-group-name</i>] hierarchy level introduced in Junos OS Release 15.1.</p>
Description	Specify that the circuit type is concatenated with the username during the subscriber authentication or client authentication process. Use the statement at the [edit ... dhcpv6] hierarchy levels to configure DHCPv6 support.
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"> • Using External AAA Authentication Services with DHCP on page 682 • Creating Unique Usernames for DHCP Clients on page 684

clear-on-abort (DHCP Local Server)

Syntax	clear-on-abort;
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit system services dhcp-local-server reconfigure],</p> <p>[edit system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure]</p>
Release Information	<p>Statement introduced in Junos OS Release 10.0.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Support at the [edit ... dhcpv6 ...] hierarchy levels introduced in Junos OS Release 10.4.</p>
Description	Delete all DHCP clients or only the DHCP clients serviced by the specified group of interfaces when reconfiguration fails; that is, when the maximum number of retry attempts have been made without success. A group configuration takes precedence over a DHCP local server configuration.
Default	Restores the original client configuration when reconfiguration fails.
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"> Configuring Dynamic Client Reconfiguration of Extended Local Server Clients Overview on page 693

- [Configuring Deletion of the Client When Dynamic Reconfiguration Fails on page 697](#)

client-discover-match (DHCP Local Server)

Syntax	<code>client-discover-match <option60-and-option82 incoming-interface>;</code>
Hierarchy Level	<p>[edit system services dhcp-local-server overrides], [edit system services dhcp-local-server group <i>group-name</i> overrides], [edit system services dhcp-local-server group <i>group-name</i> interface <i>interface-name</i> overrides] [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server ... overrides], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server ...overrides], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server ...overrides]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.4. Statement introduced in Junos OS Release 12.3R2 for EX Series switches. incoming-interface option added in Junos OS Release 13.3.</p>
Description	Configure the match criteria DHCP local server uses to uniquely identify DHCP subscribers or clients when primary identification fails. The options are mutually exclusive.
Default	By default, DHCP uses the option60-and-option82 option.
Options	<p>incoming-interface—(Optional) Allow only one client device to connect on the interface. If the client device changes, the router deletes the existing client binding and creates a binding for the newly connected device.</p>
	<p> NOTE: The overrides client-discover-match incoming-interface configuration deletes and replaces the existing binding when a new device connects. This action differs from the overrides interface-client-limit 1 statement, which retains the existing binding and rejects the newly connected client.</p>
	<p>option60-and-option82—(Optional) Use option 60 and option 82 information to identify subscribers.</p>
Required Privilege Level	<p>system—To view this statement in the configuration. system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Extended DHCP Local Server Overview on page 611 • Overriding the Default DHCP Local Server Configuration Settings Overview on page 617 • DHCP Auto Logout Overview on page 698

- *Allowing Only One DHCP Client Per Interface*

client-id (DHCP Local Server)

Syntax	client-id;
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit system services dhcp-local-server dhcpv6 group <i>group-name</i> authentication username-include]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.6.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Specify that the DHCPv6 Client-ID option (option 1) in the client PDU name is concatenated with the username during the subscriber authentication or client authentication process.
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"> • Creating Unique Usernames for DHCP Clients on page 684

client-id (DHCP Relay Agent)

Syntax	<code>client-id;</code>
Hierarchy Level	<p>[edit forwarding-options dhcp-relay dhcpv6 authentication username-include],</p> <p>[edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 ...],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 ...],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 ...]</p>
Release Information	<p>Statement introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Specify that the client ID is concatenated with the username during the subscriber authentication or client authentication process.
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"> • Using External AAA Authentication Services with DHCP on page 682 • Creating Unique Usernames for DHCP Clients on page 684

class (Assigning a Class to an Individual User)

Syntax	<code>class <i>class-name</i>;</code>
Hierarchy Level	<code>[edit system login 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.
Description	Assign a user to a login class. You must assign each user to a login class.
Options	<i>class-name</i> —One of the classes defined at the <code>[edit system login class]</code> hierarchy level.
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 Junos OS User Accounts by Using a Configuration Group on page 84

class (Defining Login Classes)

Syntax

```
class class-name {
  allow-commands "regular-expression";
  ( allow-configuration | allow-configuration-regexps ) "regular expression 1" "regular
    expression 2";
  cli {
    prompt name;
  }
  configuration-breadcrumbs;
  deny-commands "regular-expression";
  ( deny-configuration | deny-configuration-regexps ) "regular expression 1" "regular
    expression 2";
  idle-timeout minutes;
  login-script filename;
  login-tip;
  permissions [ permissions ];
}
```

Hierarchy Level [edit system [login](#)]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Define a login class.

Options *class-name*—A name you choose for the login class.

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 admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- [Defining Junos OS Login Classes on page 52](#)
- [user on page 1883](#)

class (Defining Login Classes)

Syntax	<pre>class <i>class-name</i> { access-end; access-start; allow-commands "<i>regular-expression</i>"; allow-configuration "<i>regular-expression</i>"; deny-commands "<i>regular-expression</i>"; deny-configuration "<i>regular-expression</i>"; <i>idle-timeout</i> <i>minutes</i>; login-tip; permissions [<i>permissions</i>]; }</pre>
Hierarchy Level	[edit system login]
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	Define a login class.
Options	<i>class-name</i> —A name you choose for the login class. 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	<ul style="list-style-type: none">• Defining Junos OS Login Classes on page 52• user on page 1882

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

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">• <i>Configuring SNMP Communities</i>

client-accounting-algorithm

Syntax	client-accounting-algorithm (direct round-robin);
Hierarchy Level	[edit access profile <i>profile-name</i> radius options]
Release Information	Statement introduced in Junos OS Release 10.0. Statement introduced in Junos OS for EX Series switches Release 13.2X50-D10.
Description	Configure the access method the router uses to access RADIUS accounting servers.
Default	direct
Options	direct —Use the direct method. round-robin —Use the round-robin method.
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">• <i>Configuring RADIUS Server Parameters for Subscriber Access</i>• <i>Configuring RADIUS Server Options for Subscriber Access</i>


client-alive-count-max

Syntax	<code>client-alive-count-max$number$;</code>
Hierarchy Level	[edit system services ssh]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Configure the number of client alive messages that can be sent without sshd receiving any messages back from the client. If this threshold is reached while client alive messages are being sent, sshd will disconnect the client, terminating the session. Client alive messages are sent through the encrypted channel. Use in conjunction with client-alive-interval to disconnect unresponsive SSH clients.
Default	3 messages
Options	Range: 0 through 255
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 SSH Service for Remote Access to the Router or Switch on page 253

client-alive-interval

Syntax	<code>client-alive-interval <i>seconds</i>;</code>
Hierarchy Level	<code>[edit system services ssh]</code>
Release Information	Statement introduced in Junos OS Release 12.1.
Description	Configure a timeout interval in seconds, after which if no data has been received from the client, sshd will send a message through the encrypted channel to request a response from the client. This option applies to SSH protocol version 2 only. Use in conjunction with client-alive-count-max to disconnect unresponsive SSH clients.
Default	0 seconds
Options	Range: 1 through 65535
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 SSH Service for Remote Access to the Router or Switch on page 253

client-authentication-algorithm

Syntax	client-authentication-algorithm (direct round-robin);
Hierarchy Level	[edit access profile <i>profile-name</i> radius options]
Release Information	Statement introduced in Junos OS Release 10.0. Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Description	<p>Configure the method that the authenticator uses to access RADIUS authentication servers when there are multiple servers configured. Initially, a RADIUS client sends a request to a RADIUS authentication or accounting server. The router or switch, acting as the authenticator, waits for a response from the server before sending another request.</p> <p>When there are multiple RADIUS server connections configured for a client, the authenticator attempts to reach the different servers in the order that they are configured. If there is no response from the first RADIUS server, the authenticator attempts to reach the next RADIUS server. This process repeats until the client is either granted access or there are no more configured servers.</p> <p>If the direct method is configured, the authenticator always treats the first server in the list as the primary server. The authenticator moves on to the second server only if the attempt to reach the first server fails. If the round-robin method is configured, the server chosen first will be rotated based on which server was used last. The first server in the list is treated as a primary for the first authentication request, but for the second request, the second server configured is treated as primary, and so on. With this method, all of the configured servers receive roughly the same number of requests on average so that no single server has to handle all of the requests.</p>
	<div> NOTE: The round-robin access method is not recommended for use with EX Series switches.</div>
Default	The direct option is the default.
Options	<p>direct—Use the direct access method. The authenticator contacts the first RADIUS server on the list for each request, the second server if the first one fails, and so on.</p> <p>round-robin—Use the round-robin method. The authenticator contacts the first RADIUS server for the first request, the second server for the second request, and so on.</p>
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.

- Related Documentation**
- [Configuring RADIUS Server Parameters for Subscriber Access](#)
 - [Configuring RADIUS Server Options for Subscriber Access](#)

client-ia-type

Syntax	<pre>client-ia-type { ia-na; ia-pd; }</pre>
Hierarchy Level	<pre>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client] [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client] [edit tenants <i>tenant-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client]</pre>
Release Information	<p>Statement introduced in Junos OS Release 12.1X45-D10.</p> <p>The logical-systems and tenants options are introduced in Junos OS Release 18.4R1.</p>
Description	Configure the DHCPv6 client identity association type.
Options	<p>ia-na— Identity association for nontemporary address</p> <p>ia-pd—Identity association for prefix delegation</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"> • DHCPv6 Client Overview on page 819

client-identifier (dhcp-client)

Syntax	<pre>client-identifier { user-id {ascii <i>ascii</i> hexadecimal <i>hexadecimal</i>; use-interface-description {logical device}; prefix [host-name routing-instance-name]; }</pre>
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcp-client]
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	The DHCP server identifies a client by a client-identifier value.
Options	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">• DHCPv6 Client Overview on page 819

client-identifier (dhcpv6-client)

Syntax	client-identifier duid-type (duid-ll duid-llt vendor);
Hierarchy Level	<pre>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcpv6-client] [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client] [edit tenants <i>tenant-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client]</pre>
Release Information	<p>Statement introduced in Junos OS Release 12.1X45-D10.</p> <p>The logical-systems and tenants options are introduced in Junos OS Release 18.4R1.</p>
Description	The DHCPv6 server identifies a client by a client-identifier value.
Options	<p>duid-type—The DHCPv6 client is identified by a DHCP unique identifier (DUID).</p> <p>duid-ll—Link Layer address.</p> <p>duid-llt—Link Layer address plus time.</p> <p>vendor—Vendor-assigned unique ID based on the enterprise number.</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"> • DHCPv6 Client Overview on page 819

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">• <i>Adding a Group of Clients to an SNMP Community</i>

client-list-name (SNMP)

Syntax	<code>client-list-name <i>client-list-name</i> ;</code>
Hierarchy Level	<code>[edit snmp community <i>community-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 8.5.
Description	Specify the name of the list of SNMP network management system (NSM) clients that are authorized to collect information about network operations. You cannot use an SNMP client list and individually configured SNMP clients in the same configuration.
Options	<i>client-list-name</i> — Name of the client list. Client list is the list of IP address prefixes defined with the prefix-list statement in the policy-options hierarchy.
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 SNMP Implementation in Junos OS</i>

client-type

Syntax	client-type (autoconfig stateful);
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client] [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client] [edit tenants <i>tenant-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client]
Release Information	Statement introduced in Junos OS Release 12.1X45-D10. The logical-systems and tenants options are introduced in Junos OS Release 18.4R1.
Description	The type of DHCPv6 client.
Options	<ul style="list-style-type: none">• autoconfig—Autoconfig client type for router advertisement• stateful— Stateful client type for address assignment
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">• DHCPv6 Client Overview on page 819


coa-dynamic-variable-validation

Syntax	coa-dynamic-variable-validation;
Hierarchy Level	[edit access profile <i>profile-name</i> radius options]
Release Information	Statement introduced in Junos OS Release 12.1. Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Description	Specify that when a CoA operation includes a change to a client profile dynamic variable that cannot be applied (such as an update to a non-existent filter), the router does not apply any changes to client profile dynamic variables in the request, and responds with a NACK message.
Default	If you do not configure this statement, the router does not apply any incorrect variable updates, but does make any other changes to the client profile dynamic variables, and responds with an ACK message.
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"> • <i>Configuring RADIUS Server Options for Subscriber Access</i> • <i>RADIUS Server Options for Subscriber Access</i> • <i>Configuring RADIUS Server Parameters for Subscriber Access</i>


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">• <i>Configuring the Commit Delay Timer</i>


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"> • <i>Configuring SNMP Communities</i> • <i>Configuring the SNMP Community String</i>


configuration

Syntax	<pre> configuration { transfer-interval interval; transfer-on-commit; archive-sites { file://<path>/<filename>; ftp://username@host:<port>url-path password password; http://username@host:<port>url-path password password; pasvftp://username@host:<port>url-path password password; scp://username@host:<port>url-path password password; } } </pre>
Hierarchy Level	[edit system archival]
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	Configure the router or switch to periodically transfer its currently active configuration (or after each commit).
	<div>  <p>NOTE: The [edit system archival] hierarchy is not available on QFabric systems.</p> </div>
Options	The remaining statements are explained separately. See CLI Explorer .
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>Backing Up Configurations to an Archive Site</i> • <i>archive</i> • archive-sites on page 1176 • transfer-interval on page 1854 • transfer-on-commit on page 1855

connection-limit

Syntax	<code>connection-limit <i>limit</i>;</code>
Hierarchy Level	<code>[edit system services finger],</code> <code>[edit system services ftp],</code> <code>[edit system services netconf ssh],</code> <code>[edit system services ssh],</code> <code>[edit system services telnet],</code> <code>[edit system services xnm-clear-text],</code> <code>[edit system services xnm-ssl]</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 OCX Series switches.</p>
Description	Configure the maximum number of connections sessions for each type of system services (finger, ftp, ssh, telnet, xnm-clear-text, or xnm-ssl) per protocol (either IPv6 or IPv4).
Options	<p>limit—(Optional) Maximum number of established connections per protocol (either IPv6 or IPv4).</p> <p>Range: 1 through 250</p> <p>Default: 75</p>
	<p> NOTE: The actual number of maximum connections depends on the availability of system resources, and might be fewer than the configured <code>connection-limit</code> value if the system resources are limited.</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"> • Configuring clear-text or SSL Service for Junos XML Protocol Client Applications on page 263 • Configuring DTCP-over-SSH Service for the Flow-Tap Application on page 261 • Configuring Finger Service for Remote Access to the Router on page 250 • Configuring FTP Service for Remote Access to the Router or Switch on page 249 • Configuring SSH Service for Remote Access to the Router or Switch on page 253 • Configuring Telnet Service for Remote Access to a Router or Switch on page 248

connection-limit

Syntax	<code>connection-limit <i>limit</i>;</code>
Hierarchy Level	<pre>[edit system services finger] [edit system services ftp] [edit system services netconf ssh] [edit system services ssh] [edit system services telnet] [edit system services xnm-clear-text] [edit system services xnm-ssl]</pre>
Release Information	Statement introduced in Junos OS Release 11.4.
Description	Configure the maximum number of connection sessions for each type of system services (finger, ftp, ssh, telnet, xnm-clear-text, or xnm-ssl) per protocol (either IPv6 or IPv4).
Options	<p>limit—Maximum number of established connections per protocol (either IPv6 or IPv4).</p> <p>Range: 1 through 250</p> <p>Default: 75</p>
	<p> NOTE: The actual number of maximum connections depends on the availability of system resources, and might be fewer than the configured <code>connection-limit</code> value if the system resources are limited.</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>

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"> <i>Configuring the System Contact on a Device Running Junos OS</i>

counters

Syntax	<pre>counters { counter-name; }</pre>
Hierarchy Level	[edit accounting-options filter-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	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">• <i>Configuring the Counters</i>

country-code

Syntax	<code>country-code <i>code</i>;</code>
Hierarchy Level	[edit protocols <code>lldp-med</code> <code>interface</code> (all <i>interface-name</i>)]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	For Link Layer Discovery Protocol–Media Endpoint Device (LLDP-MED), configure the two-letter country code to include in the location information. Location information is advertised from the switch to the MED, and is used during emergency calls to identify the location of the MED. The country code is required when configuring LLDP-MED based on location.
Default	Disabled.
Options	<i>code</i> —Two-letter ISO 3166 country code in capital ASCII letters; for example, US or DE.
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"> • show lldp on page 2109 • Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455 • Configuring LLDP-MED (CLI Procedure) on page 566

crl (Encryption Interface)

Syntax	<code>crl <i>file-name</i>;</code>
Hierarchy Level	[edit security certificates]
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>(Encryption interface on M Series and T Series routers and EX Series switches only)</p> <p>Configure the certificate revocation list (CRL). A CRL is a time-stamped list identifying revoked certificates, which is signed by a CA and made available to the participating IPsec peers on a regular periodic basis.</p>
Options	<p><i>file-name</i>—Specify the file from which to read the CRL.</p>
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">• <i>Configuring the Certificate Authority Properties for an ES PIC</i>

custom-options

Syntax

```
custom-options {
  banner-message string;
  footer-bgcolor color;
  footer-message string;
  footer-text-color color;
  form-header-bgcolor color;
  form-header-message string;
  form-header-text-color color;
  form-reset-label label name;
  form-submit-label label name;
  header-bgcolor color;
  header-logo filename;
  header-message string;
  header-text-color color;
  post-authentication-url url-string;
}
```

Hierarchy Level [edit services [captive-portal](#)]

Release Information Statement introduced in Junos OS Release 10.1 for EX Series switches.

Description Specify the design elements of a captive portal login page.

Options **banner-message**—The first screen displayed before the captive portal login page is displayed—for example, a disclaimer message.

Range: 1–2047 characters

footer-bgcolor —The hexadecimal color code for the color of the footer bar across the bottom of the captive portal login page—for example, #2E8B57 (sea green).

Values: # symbol followed by six characters.

footer-message—Text message displayed in the footer bar across the bottom of the captive portal login page.

Range: 1–2047 characters

Default: Copyright ©2010, Juniper Networks Inc.

footer-text-color — Color of the text in the footer.

Default: The default color is white.

form-header-bgcolor —The hexadecimal color code for the background color of the header bar across the top of the form area of the captive portal login page.

Values: # symbol followed by six characters.

form-header-message—Text message displayed in the header bar across the top of the form area of the captive portal login page.

Range: 1–255 characters

Default: Captive Portal User Authentication

form-header-text-color—Color of the text in the form header.

Default: The default color is black.

form-reset-label—Label displayed in the button that the user can select to clear the username and password fields on the form.

Range: 1–255 characters

Default: Reset

form-submit-label —Label displayed in the button that the user selects to submit their login information—for example, **Log In** .

Range: 1–255 characters

Default: Log In

header-bgcolor—The hexadecimal color code for the color of the header bar across the top of the captive portal login page.

Values: # symbol followed by six characters.

header-logo—Filename of the file containing the image of the logo displayed at the top of the captive portal login page. The image file can be in GIF, JPEG, or PNG format.

Default: The Juniper Networks logo

header-message—Text displayed in the header bar across the bottom of the captive portal login page.

Range: 1–2047 characters

Default: User Authentication

header-text-color—Color of the text in the header.

Default: The default color is white.

post-authentication-url—URL to which the users are directed upon successful authentication—for example **www.mycafe.com**.

Range: 1–255 characters

Default: The page originally requested by the user.

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">• Designing a Captive Portal Authentication Login Page on Switches on page 535• Configuring Captive Portal Authentication (CLI Procedure) on page 532
------------------------------	--

delegated-pool (DHCP Local Server)

Syntax	<code>delegated-pool <i>pool-name</i>;</code>
Hierarchy Level	<pre>[edit system services dhcp-local-server dhcpv6 overrides], [edit system services dhcp-local-server dhcpv6 group group-name overrides], [edit system services dhcp-local-server dhcpv6 group group-name interface interface-name overrides], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 ...], [edit logical-systems <i>logical-system-name</i> system services system services dhcp-local-server dhcpv6 ...], [edit routing-instances <i>routing-instance-name</i> system services system services dhcp-local-server dhcpv6 ...]</pre>
Release Information	<p>Statement introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Specify the address pool that assigns the IA_PD address. A pool specified by RADIUS VSA 26-161 takes precedence over the pool specified by this delegated-pool statement.
Options	<i>pool-name</i> —Name of the address-assignment pool.
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>Specifying the Delegated Address-Assignment Pool to Be Used for DHCPv6 Prefix Delegation</i> Overriding the Default DHCP Local Server Configuration Settings Overview on page 617

delimiter (DHCP Local Server)

Syntax	<code>delimiter <i>delimiter-character</i>;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit system services dhcp-local-server authentication username-include],</p> <p>[edit system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit system services dhcp-local-server group group-name authentication username-include]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Specify the character used as the delimiter between the concatenated components of the username.
Options	<i>delimiter-character</i> —Character that separates components that make up the concatenated username. You cannot use the semicolon (;) as a delimiter.

Default: . (period)



NOTE: When you include the *interface-description* in the username, the delimiter must not be a character that is part of the interface description. For example, if the text description is configured as “Backbone connection/PHL01”, you cannot use the forward slash (/) as the delimiter.

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 External AAA Authentication Services with DHCP on page 682
------------------------------	--

delimiter (DHCP Relay Agent)

Syntax	<code>delimiter <i>delimiter-character</i>;</code>
Hierarchy Level	<p>[edit forwarding-options dhcp-relay authentication username-include], [edit forwarding-options dhcp-relay dhcpv6 authentication username-include], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include], [edit forwarding-options dhcp-relay dual-stack-group <i>dual-stack-group-name</i> authentication username-include], [edit forwarding-options dhcp-relay group <i>group-name</i> authentication username-include], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay authentication username-include], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 authentication username-include], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay authentication username-include], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 authentication username-include], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.1. Statement introduced in Junos OS Release 12.3R2 for EX Series switches. Support at the [edit ... dhcpv6] hierarchy levels introduced in Junos OS Release 11.4. Support at the [edit ... dual-stack-group <i>dual-stack-group-name</i>] hierarchy level introduced in Junos OS Release 15.1.</p>
Description	Specify the character used as the delimiter between the concatenated components of the username. Use the statement at the [edit ... dhcpv6] hierarchy levels to configure DHCPv6 support.
Options	<i>delimiter-character</i> —Character that separates components that make up the concatenated username. You cannot use the semicolon (;) as a delimiter.

Default: . (period)



NOTE: When you include the *interface-description* in the username, the delimiter must not be a character that is part of the interface description. For example, if the text description is configured as “Backbone connection/PHL01”, you cannot use the forward slash (/) as the delimiter.


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">• Using External AAA Authentication Services with DHCP on page 682• Creating Unique Usernames for DHCP Clients on page 684
------------------------------	---

deny-commands


Syntax	<code>deny-commands "(regular-expression) (regular-expression1) (regular-expression2)..."</code> ;
Hierarchy Level	[edit system login class]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	<p>Specify the operational mode commands that the user is denied permission to issue even though the permissions set with the permissions statement would allow it.</p> <p>When specifying extended regular expressions using the allow/deny-commands and allow/deny-configuration statements, each expression separated by a pipe () symbol must be a complete standalone expression, and must be enclosed in parentheses (). Do not use spaces between regular expressions separated with parentheses and connected with the pipe () symbol.</p>
Default	If you omit this statement and the allow-commands statement, users can issue only those commands for which they have access privileges through the permissions statement.
Options	regular-expression —Extended (modern) regular expression as defined in POSIX 1003.2. If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks.
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">• Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125• allow-commands on page 1162• user on page 1883

deny-commands-regexps

Syntax	<code>deny-commands-regexps ["regular expression 1" "regular expression 2"];</code>
Hierarchy Level	[edit system login class <i>class-name</i>]
Release Information	Statement introduced in Junos OS Release 18.1.
Description	<p>Configure authorizations for operational mode commands using regular expressions. You can use the deny-commands-regexps statement to explicitly deny authorization for commands that would otherwise be permitted by an access privilege level.</p> <p>For allow/deny-commands-regexps statements, you configure a set of strings in which each string is a regular expression, enclosed in double quotes and separated with a space operator. Each string is evaluated against the full path of the command, which provides faster matching than the allow/deny-command statements. You can also include values for variables in the regular expressions, which is not supported using allow/deny-commands.</p> <p>Expressions configured with this statement take precedence over allow-commands-regexps if the two statements are used in the same login class definition.</p>
	<p> NOTE: The allow/deny-commands and allow/deny-commands-regexps statements are mutually exclusive and cannot be configured together for a login class. At a given point in time, a login class can include either the allow/deny-commands statement, or the allow/deny-commands-regexps statement. If you have existing configurations using the allow/deny-commands statements, using the same configuration options with the allow/deny-commands-regexps statements might not produce the same results, as the search and match methods differ in the two forms of these statements.</p>
	<p>Authorizations can also be configured remotely by specifying Juniper Networks vendor-specific TACACS+ attributes in your authentication server's configuration. For a remote user, when the authorization parameters are configured both remotely and locally, authorization parameters configured remotely and locally are both considered together for authorization. For a local user, only the authorization parameters configured locally for the class are considered.</p>
Default	If you do not configure authorizations for operational mode commands using allow/deny-commands or allow/deny-commands-regexps , users can edit only those commands for which they have access privileges set with the permissions statement.

Options	<i>regular expression</i> —Extended (modern) regular expression as defined in POSIX 1003.2. If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks. Enter as many expressions as needed.
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">• Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138• allow-commands-regexps on page 1163

deny-configuration


Syntax	<code>deny-configuration "(regular-expression) (regular-expression1) (regular-expression2)..."</code> ;
Hierarchy Level	[edit system login class]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	<p>Explicitly deny configuration access to the specified levels in the hierarchy even if the permissions set with the permissions statement grant such access by default. Note that the user cannot view a particular hierarchy if configuration access is denied for that hierarchy.</p> <p>When specifying extended regular expressions using the allow/deny-commands and allow/deny-configuration statements, each expression separated by a pipe () symbol must be a complete standalone expression, and must be enclosed in parentheses (). Do not use spaces between regular expressions separated with parentheses and connected with the pipe () symbol.</p>
	<p> NOTE: The allow/deny-configuration and allow/deny-configuration-regexps statements are mutually exclusive and cannot be configured together for a login class. At a given point in time, a login class can include either the allow/deny-configuration statement, or the allow/deny-configuration-regexps statement. If you have existing configurations using the allow/deny-configuration statements, using the same configuration options with the allow/deny-configuration-regexps statements might not produce the same results, as the search and match methods differ in the two forms of these statements.</p>
Default	If you omit this statement and the allow-configuration statement, users can edit those levels in the configuration hierarchy for which they have access privileges through the permissions statement.
Options	regular-expression —Extended (modern) regular expression as defined in POSIX 1003.2. If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.

- Related Documentation**
- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
 - [allow-configuration on page 1165](#)
 - [user on page 1883](#)

deny-configuration

Syntax	<code>deny-configuration "regular-expression";</code>
Hierarchy Level	<code>[edit system login class]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 11.2 for SRX Series devices.
Description	Explicitly deny configuration access to the specified levels in the hierarchy even if the permissions set with the permissions statement grant such access by default.
Default	If you omit this statement and the allow-configuration statement, users can edit those levels in the configuration hierarchy for which they have access privileges through the permissions statement.
Options	regular-expression —Extended (modern) regular expression as defined in POSIX 1003.2. If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.

deny-configuration-regexps

Syntax	<code>deny-configuration-regexps ["regular expression 1" "regular expression 2"];</code>
Hierarchy Level	[edit system login class <i>class-name</i>]
Release Information	Statement introduced in Junos OS Release 11.2.
Description	<p>Explicitly deny configuration access to specified hierarchies using regular expressions even if the permissions set with the permissions statement allow that access.</p> <p>Expressions configured with this statement take precedence over allow-configuration-regexps if the two statements are used in the same login class definition.</p> <div>  <p>NOTE: The allow/deny-configuration and allow/deny-configuration-regexps statements are mutually exclusive and cannot be configured together for a login class. At a given point in time, a login class can include either the allow/deny-configuration statement, or the allow/deny-configuration-regexps statement. If you have existing configurations using the allow/deny-configuration statements, using the same configuration options with the allow/deny-configuration-regexps statements might not produce the same results, as the search and match methods differ in the two forms of these statements.</p> </div>
Default	If you do not configure this statement or the deny-configuration-regexps statement, users can edit only those commands for which they have access privileges set with the permissions statement.
Options	<p>regular expression—Extended (modern) regular expression as defined in POSIX 1003.2.</p> <p>If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks. Enter as many expressions as needed.</p>
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"> • Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138 • allow-configuration-regexps on page 1168 • user on page 1883

deny-configuration-regexps

Syntax	<code>deny-configuration-regexps "regular expression 1" "regular expression 2";</code>
Hierarchy Level	<code>[edit system login class class-name]</code>
Release Information	Statement introduced in Junos OS Release 11.2. Statement introduced in Junos OS Release 11.2 for SRX Series devices.
Description	Explicitly deny configuration access to specified hierarchies using regular expressions even if the permissions set with the permissions statement allow that access. Expressions configured with this statement take precedence over allow-configuration-regexps if the two statements are used in the same login class definition.
Default	If you do not configure this statement or the deny-configuration-regexps statement, users can edit only those commands for which they have access privileges set with the permissions statement.
Options	<i>regular expression</i> —Extended (modern) regular expression as defined in POSIX 1003.2. If the regular expression contains any spaces, operators, or wildcard characters, enclose it in quotation marks.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

destination (Accounting)

```
Syntax destination {
    radius {
        server {
            server-address {
                accounting-port port-number;
                retry number;
                routing-instance (Accounting and Authentication) routing-instance;
                secret password;
                source-address address;
                source-address-inet6 IPv6-source-address;
                timeout seconds;
            }
        }
    }
    tacplus {
        server {
            server-address {
                port port-number;
                routing-instance (Accounting and Authentication) routing-instance;
                secret password;
                single-connection;
                timeout seconds;
            }
        }
    }
}
```

Hierarchy Level [edit system **accounting**]

Release Information Statement introduced before Junos OS Release 7.4.
radius statement added in 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 authentication server.

Options **source-address-inet6 IPv6-source-address**—A valid IPv6 address configured on one of the routers or switch interfaces.

The remaining statements are explained separately.

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

- Related Documentation**
- [Configuring RADIUS System Accounting on page 223](#)
 - [Configuring TACACS+ System Accounting on page 242](#)

destination (Accounting)

Syntax

```
destination {
  radius {
    server {
      server-address {
        accounting-port port-number;
        max-outstanding-requests value;
        port port-number;
        retry value;
        secret password;
        source-address source-address;
        timeout seconds;
      }
    }
  }
  tacplus {
    server {
      server-address {
        port port-number;
        secret password;
        single-connection;
        timeout seconds;
      }
    }
  }
}
```

Hierarchy Level [edit system accounting]

Release Information Statement introduced before Junos OS Release 7.4.
radius statement added in Junos OS Release 7.4. Support for IPv6 source address added in Junos OS Release 12.1X47-D15 for SRX1500, SRX5400, SRX5600, and SRX5800 devices.

Description Configure the authentication server.

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.

destination (Accounting)

```
Syntax destination {
    radius {
        server {
            server-address {
                accounting-port port-number;
                retry number;
                routing-instance (Accounting and Authentication) routing-instance;
                secret password;
                source-address address;
                source-address-inet6 IPv6-source-address;
                timeout seconds;
            }
        }
    }
    tacplus {
        server {
            server-address {
                port port-number;
                routing-instance (Accounting and Authentication) routing-instance;
                secret password;
                single-connection;
                timeout seconds;
            }
        }
    }
}
```

Hierarchy Level [edit system **accounting**]

Release Information Statement introduced before Junos OS Release 7.4.
radius statement added in 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 authentication server.

Options **source-address-inet6 IPv6-source-address**—A valid IPv6 address configured on one of the routers or switch interfaces.

The remaining statements are explained separately.

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

- Related Documentation**
- [Configuring RADIUS System Accounting on page 223](#)
 - [Configuring TACACS+ System Accounting on page 242](#)

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

detection-time

Syntax	<pre>detection-time { threshold milliseconds; }</pre>
Hierarchy Level	<p>[edit system services dhcp-local-server liveness-detection method bfd], [edit system services dhcp-local-server dhcpv6 liveness-detection method bfd], [edit forwarding-options dhcp-relay liveness-detection method bfd], [edit forwarding-options dhcp-relay dhcpv6 liveness-detection method bfd], [edit system services dhcp-local-server group <i>group-name</i> liveness-detection method bfd], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> liveness-detection method bfd], [edit forwarding-options dhcp-relay group <i>group-name</i> liveness-detection method bfd], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> liveness-detection method bfd]</p>
Release Information	<p>Statement introduced in Junos OS Release 12.1. Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Enable failure detection. The BFD failure detection timers are adaptive and can be adjusted to be faster or slower. For example, the timers can adapt to a higher value if the adjacency fails, or a neighbor can negotiate a higher value for a timer than the one configured.</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>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"> • Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients • Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714

destination-host (Gx-Plus)

Syntax	<code>destination-host <i>hostname</i>;</code>
Hierarchy Level	<code>[edit access gx-plus partition <i>partition-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.2. Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Description	Configure the host on which the PCRF application resides.
Options	<i>hostname</i> —Host on which the PCRF is installed.
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">• <i>Configuring Gx-Plus</i>• <i>Configuring the Gx-Plus Partition</i>

destination-realm (Gx-Plus)

Syntax	<code>destination-realm <i>realm</i>;</code>
Hierarchy Level	<code>[edit access gx-plus partition <i>partition-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.2. Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Description	Configure the realm in which the PCRF host resides.
Options	<i>realm</i> —Realm in which the PCRF host resides.
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">• <i>Configuring Gx-Plus</i>• <i>Configuring the Gx-Plus Partition</i>

dhcp

```
Syntax  dhcp {
    boot-file filename;
    boot-server (address | hostname);
    default-lease-time seconds;
    domain-name domain-name;
    domain-search [domain-list];
    maximum-lease-time seconds;
    name-server {
        address;
    }
    next-server next-server
    option option-identifier-code ;
    pool address/prefix-length {
        address-range {
            low address;
            high address;
        }
        exclude-address {
            address;
        }
    }
    router {
        address;
    }
    static-binding mac-address {
        fixed-address {
            address;
        }
        host-name hostname;
        client-identifier (ascii client-id | hexadecimal client-id);
    }
    wins-server {
        address;
    }
}
```

Hierarchy Level [edit system services]
[edit logical-systems *logical -system-name* system services]

Release Information Statement introduced before Junos OS Release 7.4.
The **logical-systems** option is introduced in Junos OS Release 18.4R1.

Description Configure a router, or a switch as a DHCP server. A DHCP server can allocate network addresses and deliver configuration information to client hosts on a TCP/IP network.

The remaining statements are explained separately.

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

Related Documentation

- [System Management Configuration Statements](#)
- [Example: Complete DHCP Server Configuration on page 583](#)

dhcp (DHCP Client)

Syntax

```
dhcp {  
  client-identifier duid-type (duid-ll | duid-llt | vendor);  
  no-dns-install;  
  rapid-commit;  
  options name;  
}
```

Hierarchy Level

```
[edit interfaces interface-name unit logical-unit-number family inet]  
[edit logical-systems name interfaces interface-name unit logical-unit-number family inet]  
[edit tenants tenant-name interfaces interface-name unit logical-unit-number family inet]
```

Release Information Statement introduced in Junos OS Release 9.0 for EX Series switches.
The **logical-systems** and **tenants** options are introduced in Junos OS Release 18.4R1.

Description Configure a Dynamic Host Configuration Protocol (DHCP) client for an IPv4 interface for logical systems and tenant systems.

The remaining statements are described separately.

Options **client-identifier duid-type**—Identify a client by a client-identifier value. This statement is mandatory.

no-dns-install—Configure the DHCPv6 client DNS information.

options—Specify options requested by the DHCPv4 client.

The remaining statements are explained separately.

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

Related Documentation

- [Configuring a DHCP Client \(CLI Procedure\) on page 677](#)

dhcp-client

Syntax

```
dhcp-client {
  client-identifier {
    prefix {
      host-name;
      logical-system-name;
      routing-instance-name;
    }
    use-interface-description (device | logical);
    user-id (ascii string | hexadecimal string);
  }
  force-discover;
  lease-time (length | infinite);
  no-dns-install;
  options no-hostname;
  retransmission-attempt value;
  retransmission-interval seconds;
  server-address server-address;
  update-server;
  vendor-id vendor-id;
}
```

Hierarchy Level [edit interfaces *interface-name* unit *logical-unit-number* family *family*]

Release Information Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.

Description Configure the Dynamic Host Configuration Protocol (DHCP) client.

- Options**
- **force-discover**—Forces the DHCP client to send a DHCP discover packet after one to three failed **dhcp-request** attempts. The **force-discover** option ensures that the DHCP server will assign the same or a new IP address to the client.
 - **lease-time**—Specify the time to negotiate and exchange DHCP information.
 - **infinite**—Lease never expires.
 - **length**—Number of seconds.
 - **no-dns-install**—Do not add DNS information to the DHCP client (resolve.conf) even after learn from DHCP server
 - **retransmission-attempt**—Specify the number of times the device attempts to retransmit a DHCP packet fallback. Range is 0-6.
 - **server-address**—Specify the preferred DHCP server address that is sent to DHCP clients.
 - **update-server**—Propagate TCP/IP settings to a local DHCP server.
 - **vendor-id**—Vendor class ID for the DHCP client.

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">• DHCP Server, Client, and Relay Agent Overview on page 742

dhcp-local-server

```
Syntax  dhcp-local-server {
    access-profile profile-name;
    authentication {
        password password-string;
        username-include {
            circuit-type;
            delimiter delimiter-character;
            domain-name domain-name-string;
            interface-description (device-interface | logical-interface);
            interface-name;
            logical-system-name;
            mac-address;
            option-60;
            option-82 <circuit-id> <remote-id>;
            routing-instance-name;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
    dhcpv6 {
        access-profile profile-name;
        authentication {
            ...
        }
        duplicate-clients incoming-interface;
        group group-name {
            access-profile profile-name;
            authentication {
                ...
            }
        }
        interface interface-name {
            access-profile profile-name;
            exclude;
            overrides {
                asymmetric-lease-time seconds;
                asymmetric-prefix-lease-time seconds;
                delay-advertise {
                    based-on (option-15 | option-16 | option-18 | option-37) {
                        equals {
                            ascii ascii-string;
                            hexadecimal hexadecimal-string;
                        }
                        not-equals {
                            ascii ascii-string;
                            hexadecimal hexadecimal-string;
                        }
                        starts-with {
                            ascii ascii-string;
                            hexadecimal hexadecimal-string;
                        }
                    }
                }
            }
        }
    }
}
```

```

        delay-time seconds;
    }
    dual-stack dual-stack-group-name;
    interface-client-limit number;
    multi-address-embedded-option-response;
    process-inform {
        pool pool-name;
    }
    protocol-attributes attribute-set-name;
    rapid-commit;
}
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
trace;
upto upto-interface-name;
}
liveness-detection {
    failure-action (clear-binding | clear-binding-if-interface-up | log-only);
    method {
        bfd {
            version (0 | 1 | automatic);
            minimum-interval milliseconds;
            minimum-receive-interval milliseconds;
            multiplier number;
            no-adaptation;
            transmit-interval {
                minimum-interval milliseconds;
                threshold milliseconds;
            }
            detection-time {
                threshold milliseconds;
            }
            session-mode (automatic | multihop | singlehop);
            holddown-interval milliseconds;
        }
        layer2-liveness-detection {
            max-consecutive-retries number;
            transmit-interval interval;
        }
    }
}
}
overrides {
    asymmetric-lease-time seconds;
    asymmetric-prefix-lease-time seconds;
    delay-advertise {
        based-on (option-15 | option-16 | option-18 | option-37) {
            equals {
                ascii ascii-string;
                hexadecimal hexadecimal-string;
            }
            not-equals {
                ascii ascii-string;
                hexadecimal hexadecimal-string;
            }
            starts-with {

```

```

        ascii ascii-string;
        hexadecimal hexadecimal-string;
    }
}
delay-time seconds;
}
delegated-pool;
dual-stack dual-stack-group-name;
interface-client-limit number;
multi-address-embedded-option-response;
process-inform {
    pool pool-name;
}
protocol-attributes attribute-set-name;
rapid-commit;
}
route-suppression;
server-duid-type type;
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
liveness-detection {
    failure-action (clear-binding | clear-binding-if-interface-up | log-only);
    method {
        bfd {
            version (0 | 1 | automatic);
            minimum-interval milliseconds;
            minimum-receive-interval milliseconds;
            multiplier number;
            no-adaptation;
            transmit-interval {
                minimum-interval milliseconds;
                threshold milliseconds;
            }
            detection-time {
                threshold milliseconds;
            }
            session-mode (automatic | multihop | singlehop);
            holddown-interval milliseconds;
        }
        layer2-liveness-detection {
            max-consecutive-retries number;
            transmit-interval interval;
        }
    }
}
}
overrides {
    asymmetric-lease-time seconds;
    asymmetric-prefix-lease-time seconds;
    delay-advertise {
        based-on (option-15 | option-16 | option-18 | option-37) {
            equals {
                ascii ascii-string;
                hexadecimal hexadecimal-string;
            }
        }
    }
}

```

```

    not-equals {
        ascii ascii-string;
        hexadecimal hexadecimal-string;
    }
    starts-with {
        ascii ascii-string;
        hexadecimal hexadecimal-string;
    }
}
delay-time seconds;
}
delegated-pool;
dual-stack dual-stack-group-name;
include-option-82 {
    forcerenew;
    nak;
}
interface-client-limit number;
multi-address-embedded-option-response;
process-inform {
    pool pool-name;
}
protocol-attributes attribute-set-name;
rapid-commit;
}
reconfigure {
    attempts attempt-count;
    clear-on-abort;
    strict;
    support-option-pd-exclude;
    timeout timeout-value;
    token token-value;
    trigger {
        radius-disconnect;
    }
}
reauthenticate (<lease-renewal> <remote-id-mismatch >);
requested-ip-network-match subnet-mask;
route-suppression;
server-duid-type type;
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
dual-stack-group name {
    access-profile access-profile;
    authentication {
        password password-string;
        username-include {
            circuit-type;
            delimiter delimiter-character;
            domain-name domain-name-string;
            interface-description (device-interface | logical-interface);
            interface-name;
            logical-system-name;
            mac-address;

```

```

    relay-agent-interface-id;
    relay-agent-remote-id;
    routing-instance-name;
    user-prefix user-prefix-string;
    vlan-tags;
  }
}
classification-key {
  circuit-id circuit-id;
  mac-address mac-address;
  remote-id remote-id;
}
dual-stack-interface-client-limit number;
dynamic-profile profile-name {
  aggregate-clients (merge | replace);
  use-primary primary-profile-name;
}
liveness-detection {
  failure-action (clear-binding | clear-binding-if-interface-up | log-only);
  method {
    layer2-liveness-detection {
      max-consecutive-retries number;
      transmit-interval interval;
    }
  }
}
on-demand-address-allocation;
protocol-master (inet | inet6);
reauthenticate (<lease-renewal> <remote-id-mismatch>);
service-profile service-profile;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
duplicate-clients-in-subnet (incoming-interface | option-82);
dynamic-profile profile-name <aggregate-clients (merge | replace) | use-primary
primary-profile-name>;
forward-snooped-clients (all-interfaces | configured-interfaces |
non-configured-interfaces);
group group-name {
  authentication {
    ...
  }
}
dynamic-profile profile-name <aggregate-clients (merge | replace) | use-primary
primary-profile-name>;
interface interface-name {
  exclude;
  overrides {
    asymmetric-lease-time seconds;
    client-discover-match (option60-and-option82 | incoming-interface);
    delay-offer {
      based-on (option-60 | option-77 | option-82) {
        equals {
          ascii ascii-string;
          hexadecimal hexadecimal-string;
        }
        not-equals {

```

```

        ascii ascii-string;
        hexadecimal hexadecimal-string;
    }
    starts-with {
        ascii ascii-string;
        hexadecimal hexadecimal-string;
    }
}
delay-time seconds;
}
include-option-82 {
    forcerenew;
    nak;
}
dual-stack dual-stack-group-name;
interface-client-limit number;
process-inform {
    pool pool-name;
}
protocol-attributes attribute-set-name;
}
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
trace;
upto upto-interface-name;
}
liveness-detection {
    failure-action (clear-binding | clear-binding-if-interface-up | log-only);
    method {
        bfd {
            version (0 | 1 | automatic);
            minimum-interval milliseconds;
            minimum-receive-interval milliseconds;
            multiplier number;
            no-adaptation;
            transmit-interval {
                minimum-interval milliseconds;
                threshold milliseconds;
            }
            detection-time {
                threshold milliseconds;
            }
            session-mode (automatic | multihop | singlehop);
            holddown-interval milliseconds;
        }
        layer2-liveness-detection {
            max-consecutive-retries number;
            transmit-interval interval;
        }
    }
}
}
overrides {
    asymmetric-lease-time seconds;
    client-discover-match (option60-and-option82 | incoming-interface);
    delay-offer {

```

```

based-on (option-60 | option-77 | option-82) {
  equals {
    ascii ascii-string;
    hexadecimal hexadecimal-string;
  }
  not-equals {
    ascii ascii-string;
    hexadecimal hexadecimal-string;
  }
  starts-with {
    ascii ascii-string;
    hexadecimal hexadecimal-string;
  }
}
delay-time seconds;
}
include-option-82 {
  forcerenew;
  nak;
}
dual-stack dual-stack-group-name;
interface-client-limit number;
process-inform {
  pool pool-name;
}
protocol-attributes attribute-set-name;
}
requested-ip-network-match subnet-mask
route-suppression;
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
liveness-detection {
  failure-action (clear-binding | clear-binding-if-interface-up | log-only);
  method {
    bfd {
      version (0 | 1 | automatic);
      minimum-interval milliseconds;
      minimum-receive-interval milliseconds;
      multiplier number;
      no-adaptation;
      transmit-interval {
        minimum-interval milliseconds;
        threshold milliseconds;
      }
    }
    detection-time {
      threshold milliseconds;
    }
    session-mode (automatic | multihop | singlehop);
    holdddown-interval milliseconds;
  }
  layer2-liveness-detection {
    max-consecutive-retries number;
    transmit-interval interval;
  }
}

```

```

    }
  }
  on-demand-address-allocation;
  overrides {
    asymmetric-lease-time seconds;
    client-discover-match <option60-and-option82 | incoming-interface>;
    delay-offer {
      based-on (option-60 | option-77 | option-82) {
        equals {
          ascii ascii-string;
          hexadecimal hexadecimal-string;
        }
        not-equals {
          ascii ascii-string;
          hexadecimal hexadecimal-string;
        }
        starts-with {
          ascii ascii-string;
          hexadecimal hexadecimal-string;
        }
      }
      delay-time seconds;
    }
    dual-stack dual-stack-group-name;
    interface-client-limit number;
    process-inform {
      pool pool-name;
    }
    protocol-attributes attribute-set-name;
  }
  pool-match-order {
    external-authority;
    ip-address-first;
    option-82;
  }
  protocol-master;
  reauthenticate (<lease-renewal> <remote-id-mismatch >);
  reconfigure {
    attempts attempt-count;
    clear-on-abort;
    strict;
    timeout timeout-value;
    token token-value;
    trigger {
      radius-disconnect;
    }
  }
  requested-ip-network-match subnet-mask;
  route-suppression;
  service-profile dynamic-profile-name;
  short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}

```


Hierarchy Level [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services],
 [edit logical-systems *logical-system-name* system services],
 [edit routing-instances *routing-instance-name* system services],
 [edit system services]

Release Information Statement introduced in Junos OS Release 9.0.
 Statement introduced in Junos OS Release 12.1 for EX Series switches.
 Statement introduced in Junos OS Release 13.2X51 for the QFX Series.
 Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

Description Configure Dynamic Host Configuration Protocol (DHCP) local server options on the router or switch to enable the router or switch to function as an extended DHCP local server. The DHCP local server receives DHCP request and reply packets from DHCP clients and then responds with an IP address and other optional configuration information to the client.

The extended DHCP local server is incompatible with the DHCP server on J Series routers and, therefore, is not supported on J Series routers. Also, the DHCP local server and the DHCP/BOOTP relay server, which are configured under the **[edit forwarding-options helpers]** hierarchy level, cannot both be enabled on the router or switch at the same time. The extended DHCP local server is fully compatible with the extended DHCP relay feature.

The **dhcpv6** stanza configures the router or switch to support Dynamic Host Configuration Protocol for IPv6 (DHCPv6). The DHCPv6 local server is fully compatible with the extended DHCP local server and the extended DHCP relay feature.



NOTE: When you configure the **dhcp-local-server** statement at the routing instance hierarchy level, you must use a routing instance type of **virtual-router**.

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

- [Extended DHCP Local Server Overview on page 611](#)
- [DHCPv6 Local Server Overview on page 628](#)

dhcp-relay

```
Syntax dhcp-relay {
    access-profile profile-name;
    active-server-group server-group-name;
    authentication {
        password password-string;
        username-include {
            circuit-type;
            delimiter delimiter-character;
            domain-name domain-name-string;
            interface-description (device-interface | logical-interface);
            interface-name;
            logical-system-name;
            mac-address;
            option-60;
            option-82 <circuit-id> <remote-id>;
            routing-instance-name;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
    bulk-leasequery {
        attempts number-of-attempts;
        timeout seconds;
        trigger automatic;
    }
    dhcpv6 {
        access-profile profile-name;
        active-server-group server-group-name;
    }
    authentication {
        password password-string;
        username-include {
            circuit-type;
            client-id;
            delimiter delimiter-character;
            domain-name domain-name-string;
            interface-description (device-interface | logical-interface);
            interface-name interface-name;
            logical-system-name;
            mac-address mac-address;
            relay-agent-interface-id;
            relay-agent-remote-id;
            relay-agent-subscriber-id;
            routing-instance-name;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
    bulk-leasequery {
        attempts number-of-attempts;
        timeout seconds;
    }
}
```

```

    trigger automatic;
}
duplicate-clients incoming-interface;
dynamic-profile profile-name {
    aggregate-clients (merge | replace);
    use-primary primary-profile-name;
}
forward-only {
    logical-system <current | default | logical-system-name>;
    routing-instance <current | default | routing-instance-name>;
}
forward-only-replies;
}
forward-snooped-clients (all-interfaces | configured-interfaces |
    non-configured-interfaces);
group group-name {
    access-profile profile-name;
    active-server-group server-group-name;
    authentication {
        password password-string;
        username-include {
            circuit-type;
            client-id;
            delimiter delimiter-character;
            domain-name domain-name-string;
            interface-description (device-interface | logical-interface);
            interface-name interface-name;
            logical-system-name;
            mac-address mac-address;
            relay-agent-interface-id;
            relay-agent-remote-id;
            relay-agent-subscriber-id;
            routing-instance-name;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
}
dynamic-profile profile-name {
    aggregate-clients (merge | replace);
    use-primary primary-profile-name;
}
forward-only {
    logical-system <current | default | logical-system-name>;
    routing-instance <current | default | routing-instance-name>;
}
interface interface-name {
    access-profile profile-name;
    dynamic-profile profile-name {
        aggregate-clients (merge | replace);
        use-primary primary-profile-name;
    }
    exclude;
    overrides {
        allow-snooped-clients;
        asymmetric-lease-time seconds;
    }
}

```

```

asymmetric-prefix-lease-time seconds;
client-negotiation-match incoming-interface;
delay-authentication;
delete-binding-on-renegotiation;
dual-stack dual-stack-group-name;
interface-client-limit number;
no-allow-snooped-clients;
no-bind-on-request;
relay-source interface-name;
send-release-on-delete;
}
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
trace;
upto upto-interface-name;
}
}
lease-time-validation {
    lease-time-threshold seconds;
    violation-action action;
}
liveness-detection {
    failure-action (clear-binding | clear-binding-if-interface-up | log-only);
    method {
        bfd {
            version (0 | 1 | automatic);
            minimum-interval milliseconds;
            minimum-receive-interval milliseconds;
            multiplier number;
            no-adaptation;
            transmit-interval {
                minimum-interval milliseconds;
                threshold milliseconds;
            }
            detection-time {
                threshold milliseconds;
            }
            session-mode (automatic | multihop | singlehop);
            holddown-interval milliseconds;
        }
        layer2-liveness-detection {
            max-consecutive-retries number;
            transmit-interval interval;
        }
    }
}
overrides {
    allow-snooped-clients;
    asymmetric-lease-time seconds;
    asymmetric-prefix-lease-time seconds;
    client-negotiation-match incoming-interface;
    delay-authentication;
    delete-binding-on-renegotiation;
    dual-stack dual-stack-group-name;
    interface-client-limit number;

```

```

no-allow-snooped-clients;
no-bind-on-request;
relay-source interface-name;
send-release-on-delete;
}
relay-agent-interface-id {
include-irb-and-l2;
keep-incoming-interface-id;
no-vlan-interface-name;
prefix prefix;
use-interface-description (logical | device);
use-option-82 <strict>;
use-vlan-id;
}
relay-agent-remote-id {
include-irb-and-l2;
keep-incoming-interface-id;
no-vlan-interface-name;
prefix prefix;
use-interface-description (logical | device);
use-option-82 <strict>;
use-vlan-id;
}
relay-option {
option-number option-number;
default-action {
drop;
forward-only;
relay-server-group relay-server-group;
}
equals (ascii ascii-string | hexadecimal hexadecimal-string) {
drop;
forward-only;
relay-server-group relay-server-group;
}
starts-with (ascii ascii-string | hexadecimal hexadecimal-string) {
drop;
forward-only;
relay-server-group relay-server-group;
}
}
remote-id-mismatch disconnect;
route-suppression;
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
leasequery {
attempts number-of-attempts;
timeout seconds;
}
lease-time-validation {
lease-time-threshold seconds;
violation-action action;
}
liveness-detection {

```

```

failure-action (clear-binding | clear-binding-if-interface-up | log-only);
method {
  bfd {
    version (0 | 1 | automatic);
    minimum-interval milliseconds;
    minimum-receive-interval milliseconds;
    multiplier number;
    no-adaptation;
    transmit-interval {
      minimum-interval milliseconds;
      threshold milliseconds;
    }
    detection-time {
      threshold milliseconds;
    }
    session-mode (automatic | multihop | singlehop);
    holddown-interval milliseconds;
  }
  layer2-liveness-detection {
    max-consecutive-retries number;
    transmit-interval interval;
  }
  route-suppression;
  service-profile dynamic-profile-name;
}
}
no-snoop;
overrides {
  allow-snooped-clients;
  asymmetric-lease-time seconds;
  asymmetric-prefix-lease-time seconds;
  client-negotiation-match incoming-interface;
  delay-authentication;
  delete-binding-on-renegotiation;
  dual-stack dual-stack-group-name;
  interface-client-limit number;
  no-allow-snooped-clients;
  no-bind-on-request;
  relay-source interface-name;
  send-release-on-delete;
}
relay-agent-interface-id {
  include-irb-and-l2;
  keep-incoming-interface-id ;
  no-vlan-interface-name;
  prefix prefix;
  use-interface-description (logical | device);
  use-option-82 <strict>;
  use-vlan-id;
}
relay-agent-remote-id {
  include-irb-and-l2;
  keep-incoming-remote-id ;
  no-vlan-interface-name;
  prefix prefix;
}

```

```

    use-interface-description (logical | device);
    use-option-82 <strict>;
    use-vlan-id;
}
relay-option {
    option-number option-number;
    default-action {
        drop;
        forward-only;
        relay-server-group relay-server-group;
    }
    equals (ascii ascii-string | hexadecimal hexadecimal-string) {
        drop;
        forward-only;
        relay-server-group relay-server-group;
    }
    starts-with (ascii ascii-string | hexadecimal hexadecimal-string) {
        drop;
        forward-only;
        relay-server-group relay-server-group;
    }
}
relay-option-vendor-specific{
    host-name;
    location;
    remote-id-mismatch disconnect;
    route-suppression;
    server-group {
        server-group-name {
            server-ip-address;
        }
    }
    server-response-time seconds;
    service-profile dynamic-profile-name;
    short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
dual-stack-group dual-stack-group-name {
    access-profile profile-name;
    authentication {
        password password-string;
        username-include {
            circuit-type;
            delimiter delimiter-character;
            domain-name domain-name-string;
            interface-description (device-interface | logical-interface);
            interface-name;
            logical-system-name;
            mac-address;
            relay-agent-interface-id;
            relay-agent-remote-id;
            routing-instance-name;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
}

```

```

classification-key {
    circuit-id circuit-id;
    mac-address mac-address;
    remote-id remote-id;
}
dual-stack-interface-client-limit number;
dynamic-profile profile-name {
    aggregate-clients (merge | replace);
    use-primary primary-profile-name;
}
liveness-detection {
    failure-action (clear-binding | clear-binding-if-interface-up | log-only);
    method {
        layer2-liveness-detection {
            max-consecutive-retries number;
            transmit-interval interval;
        }
    }
}
protocol-master (inet | inet6);
relay-agent-interface-id {
    include-irb-and-l2;
    keep-incoming-interface-id ;
    no-vlan-interface-name;
    prefix prefix;
    use-interface-description (logical | device);
    use-option-82 <strict>;
    use-vlan-id;
}
relay-agent-remote-id {
    include-irb-and-l2;
    keep-incoming-remote-id ;
    no-vlan-interface-name;
    prefix prefix;
    use-interface-description (logical | device);
    use-option-82 <strict>;
    use-vlan-id;
}
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
duplicate-clients-in-subnet (incoming-interface | option-82):
dynamic-profile profile-name {
    aggregate-clients (merge | replace);
    use-primary primary-profile-name;
}
forward-only {
    logical-system <current | default | logical-system-name>;
    routing-instance <current | default | routing-instance-name>;
}
forward-only-replies;
forward-snooped-clients (all-interfaces | configured-interfaces |
    non-configured-interfaces);
group group-name {
    access-profile profile-name;
}

```



```

active-server-group server-group-name;
authentication {
    password password-string;
    username-include {
        circuit-type;
        delimiter delimiter-character;
        domain-name domain-name-string;
        interface-description (device-interface | logical-interface);
        interface-name interface-name;
        logical-system-name;
        mac-address;
        option-60;
        option-82 [circuit-id] [remote-id];
        routing-instance-name;
        user-prefix user-prefix-string;
    }
    vlan-tags;
}
dynamic-profile profile-name {
    aggregate-clients (merge | replace);
    use-primary primary-profile-name;
}
forward-only {
    logical-system <current | default | logical-system-name>;
    routing-instance <current | default | routing-instance-name>;
}
forward-only {
    logical-system <current | default | logical-system-name>;
    routing-instance <current | default | routing-instance-name>;
}
interface interface-name {
    access-profile profile-name;
    exclude;
    liveness-detection {
        failure-action (clear-binding | clear-binding-if-interface-up | log-only);
        method {
            bfd {
                version (0 | 1 | automatic);
                minimum-interval milliseconds;
                minimum-receive-interval milliseconds;
                multiplier number;
                no-adaptation;
                transmit-interval {
                    minimum-interval milliseconds;
                    threshold milliseconds;
                }
                detection-time {
                    threshold milliseconds;
                }
                session-mode (automatic | multihop | singlehop);
                holddown-interval milliseconds;
            }
        }
    }
}
overrides {

```

```

allow-no-end-option;
allow-snooped-clients;
always-write-giaddr;
always-write-option-82;
asymmetric-lease-time seconds;
client-discover-match <option60-and-option82 | incoming-interface>;
delay-authentication;
delete-binding-on-renegotiation;
disable-relay;
dual-stack dual-stack-group-name;
interface-client-limit number;
layer2-unicast-replies;
no-allow-snooped-clients;
no-bind-on-request;
proxy-mode;
relay-source
replace-ip-source-with;
send-release-on-delete;
trust-option-82;
}
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
trace;
upto upto-interface-name;
}
overrides {
allow-no-end-option
allow-snooped-clients;
always-write-giaddr;
always-write-option-82;
asymmetric-lease-time seconds;
asymmetric-prefix-lease-time seconds;
client-discover-match (option60-and-option82 | incoming-interface);
delay-authentication;
delete-binding-on-renegotiation;
disable-relay;
dual-stack dual-stack-group-name;
interface-client-limit number;
layer2-unicast-replies;
no-allow-snooped-clients;
no-bind-on-request;
proxy-mode;
relay-source
replace-ip-source-with;
send-release-on-delete;
trust-option-82;
}
relay-option {
option-number option-number;
default-action {
drop;
forward-only;
relay-server-group group-name;
}
}
equals (ascii ascii-string | hexadecimal hexadecimal-string) {

```

```

    drop;
    forward-only;
    relay-server-group relay-server-group;
}
starts-with (ascii ascii-string | hexadecimal hexadecimal-string) {
    drop;
    forward-only;
    local-server-group local-server-group;
    relay-server-group relay-server-group;
}
}
relay-option-82 {
    circuit-id {
        prefix prefix;
        use-interface-description (logical | device);
    }
    remote-id {
        prefix prefix;
        use-interface-description (logical | device);
    }
    server-id-override
}
remote-id-mismatch disconnect;
route-suppression:
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
leasequery {
    attempts number-of-attempts;
    timeout seconds;
}
lease-time-validation {
    lease-time-threshold seconds;
    violation-action action;
}
liveness-detection {
    failure-action (clear-binding | clear-binding-if-interface-up | log-only);
    method {
        bfd {
            version (0 | 1 | automatic);
            minimum-interval milliseconds;
            minimum-receive-interval milliseconds;
            multiplier number;
            no-adaptation;
            transmit-interval {
                minimum-interval milliseconds;
                threshold milliseconds;
            }
            detection-time {
                threshold milliseconds;
            }
            session-mode (automatic | multihop | singlehop);
            holddown-interval milliseconds;
        }
        layer2-liveness-detection {

```

```

        max-consecutive-retries number;
        transmit-interval interval;
    }
}
no-snoop;
overrides {
    allow-no-end-option
    allow-snooped-clients;
    always-write-giaddr;
    always-write-option-82;
    asymmetric-lease-time seconds;
    asymmetric-prefix-lease-time seconds;
    client-discover-match (option60-and-option82 | incoming-interface);
    delay-authentication;
    delete-binding-on-renegotiation;
    disable-relay;
    dual-stack dual-stack-group-name;
    interface-client-limit number;
    layer2-unicast-replies;
    no-allow-snooped-clients;
    no-bind-on-request;
    proxy-mode;
    relay-source
    replace-ip-source-with;
    send-release-on-delete;
    trust-option-82;
}
relay-option {
    option-number option-number;
    default-action {
        drop;
        forward-only;
        relay-server-group group-name;
    }
    equals (ascii ascii-string | hexadecimal hexadecimal-string) {
        drop;
        forward-only;
        relay-server-group relay-server-group;
    }
    starts-with (ascii ascii-string | hexadecimal hexadecimal-string) {
        drop;
        forward-only;
        local-server-group local-server-group;
        relay-server-group relay-server-group;
    }
}
relay-option-82 {
    circuit-id {
        prefix prefix;
        use-interface-description (logical | device);
    }
    remote-id {
        prefix prefix;
        use-interface-description (logical | device);
    }
}

```

```

    }
    server-id-override
  }
}
remote-id-mismatch disconnect;
route-suppression:
server-group {
  server-group-name {
    server-ip-address;
  }
}
server-response-time seconds;
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}

```

Hierarchy Level [edit forwarding-options],
 [edit logical-systems *logical-system-name* forwarding-options],
 [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* forwarding-options],
 [edit routing-instances *routing-instance-name* forwarding-options]

Release Information Statement introduced in Junos OS Release 8.3.
 Statement introduced in Junos OS Release 12.1 for EX Series switches.
 Statement introduced in Junos OS Release 13.2X51 for the QFX Series.
 Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

Description Configure extended Dynamic Host Configuration Protocol (DHCP) relay and DHCPv6 relay options on the router or switch to enable the router (or switch) to function as a DHCP relay agent. A DHCP relay agent forwards DHCP request and reply packets between a DHCP client and a DHCP server.

DHCP relay supports the attachment of dynamic profiles and also interacts with the local AAA Service Framework to use back-end authentication servers, such as RADIUS, to provide subscriber authentication or client authentication. You can attach dynamic profiles and configure authentication support on a global basis or for a specific group of interfaces.

The extended DHCP and DHCPv6 relay agent options configured with the **dhcp-relay** and **dhcpv6** statements are incompatible with the DHCP/BOOTP relay agent options configured with the **bootp** statement. As a result, the extended DHCP or DHCPv6 relay agent and the DHCP/BOOTP relay agent cannot both be enabled on the router (or switch) at the same time.

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 interface—To view this statement in the configuration.
 interface-control—To add this statement to the configuration.

**Related
Documentation**

- [Extended DHCP Relay Agent Overview on page 632](#)
- [DHCPv6 Relay Agent Overview on page 648](#)
- [DHCP Relay Proxy Overview on page 636](#)
- [Using External AAA Authentication Services with DHCP on page 682](#)

dhcpv6 (DHCP Local Server)

```
Syntax dhcpv6 {
    access-profile profile-name;
    authentication {
        password password-string;
        username-include {
            circuit-type;
            client-id;
            delimiter delimiter-character;
            domain-name domain-name-string;
            interface-description (device-interface | logical-interface);
            logical-system-name;
            mac-address;
            relay-agent-interface-id;
            relay-agent-remote-id;
            relay-agent-subscriber-id;
            routing-instance-name;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
    duplicate-clients incoming-interface;
    group group-name {
        access-profile profile-name;
        authentication {
            ...
        }
        interface interface-name {
            access-profile profile-name;
            exclude;
            liveness-detection {
                failure-action (clear-binding | clear-binding-if-interface-up | log-only);
                method {
                    bfd {
                        version (0 | 1 | automatic);
                        minimum-interval milliseconds;
                        minimum-receive-interval milliseconds;
                        multiplier number;
                        no-adaptation;
                        transmit-interval {
                            minimum-interval milliseconds;
                            threshold milliseconds;
                        }
                        detection-time {
                            threshold milliseconds;
                        }
                    }
                    session-mode (automatic | multihop | singlehop);
                    holddown-interval milliseconds;
                }
            }
        }
    }
    overrides {
        asymmetric-lease-time seconds;
    }
}
```

```

asymmetric-prefix-lease-time seconds;
client-negotiation-match incoming-interface;
delay-advertise {
    based-on (option-15 | option-16 | option-18 | option-37) {
        equals {
            ascii ascii-string;
            hexadecimal hexadecimal-string;
        }
        not-equals {
            ascii ascii-string;
            hexadecimal hexadecimal-string;
        }
        starts-with {
            ascii ascii-string;
            hexadecimal hexadecimal-string;
        }
    }
    delay-time seconds;
}
delete-binding-on-renegotiation;
interface-client-limit number;
multi-address-embedded-option-response;
process-inform {
    pool pool-name;
}
protocol-attributes attribute-set-name;
rapid-commit;
}
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
trace;
upto upto-interface-name;
}
liveness-detection {
    failure-action (clear-binding | clear-binding-if-interface-up | log-only);
    method {
        bfd {
            version (0 | 1 | automatic);
            minimum-interval milliseconds;
            minimum-receive-interval milliseconds;
            multiplier number;
            no-adaptation;
            transmit-interval {
                minimum-interval milliseconds;
                threshold milliseconds;
            }
            detection-time {
                threshold milliseconds;
            }
            session-mode (automatic | multihop | singlehop);
            holddown-interval milliseconds;
        }
    }
    layer2-liveness-detection {
        max-consecutive-retries number;
        transmit-interval interval;
    }
}

```



```

    }
  }
}
overrides {
  asymmetric-lease-time seconds;
  asymmetric-prefix-lease-time seconds;
  client-negotiation-match incoming-interface;
  delay-advertise {
    based-on (option-15 | option-16 | option-18 | option-37) {
      equals {
        ascii ascii-string;
        hexadecimal hexadecimal-string;
      }
      not-equals {
        ascii ascii-string;
        hexadecimal hexadecimal-string;
      }
      starts-with {
        ascii ascii-string;
        hexadecimal hexadecimal-string;
      }
    }
  }
  delay-time seconds;
}
delegated-pool;
delete-binding-on-renegotiation;
interface-client-limit number;
multi-address-embedded-option-response;
process-inform {
  pool pool-name;
}
protocol-attributes attribute-set-name;
rapid-commit;
}
route-suppression;
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
liveness-detection {
  failure-action (clear-binding | clear-binding-if-interface-up | log-only);
  method {
    bfd {
      version (0 | 1 | automatic);
      minimum-interval milliseconds;
      minimum-receive-interval milliseconds;
      multiplier number;
      no-adaptation;
      transmit-interval {
        minimum-interval milliseconds;
        threshold milliseconds;
      }
      detection-time {
        threshold milliseconds;
      }
    }
    session-mode (automatic | multihop | singlehop);
  }
}

```

```
    holddown-interval milliseconds;
  }
  layer2-liveness-detection {
    max-consecutive-retries number;
    transmit-interval interval;
  }
}
}
overrides {
  asymmetric-lease-time seconds;
  asymmetric-prefix-lease-time seconds;
  client-negotiation-match incoming-interface;
  delay-advertise {
    based-on (option-15 | option-16 | option-18 | option-37) {
      equals {
        ascii ascii-string;
        hexadecimal hexadecimal-string;
      }
      not-equals {
        ascii ascii-string;
        hexadecimal hexadecimal-string;
      }
      starts-with {
        ascii ascii-string;
        hexadecimal hexadecimal-string;
      }
    }
    delay-time seconds;
  }
  delegated-pool;
  delete-binding-on-renegotiation;
  interface-client-limit number;
  multi-address-embedded-option-response;
  process-inform {
    pool pool-name;
  }
  protocol-attributes attribute-set-name;
  rapid-commit;
  reconfigure {
    attempts attempt-count;
    clear-on-abort;
    strict;
    timeout timeout-value;
    token token-value;
    trigger {
      radius-disconnect;
    }
  }
}
}
reauthenticate (<lease-renewal> <remote-id-mismatch >);
reconfigure {
  attempts attempt-count;
  clear-on-abort;
  strict;
  support-option-pd-exclude;
```

```

timeout timeout-value;
token token-value;
trigger {
    radius-disconnect;
}
}
requested-ip-network-match subnet-mask;
route-suppression;
server-duid-type type;
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}

```

Hierarchy Level [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services **dhcp-local-server**],
 [edit logical-systems *logical-system-name* system services **dhcp-local-server**],
 [edit routing-instances *routing-instance-name* system services **dhcp-local-server**],
 [edit system services **dhcp-local-server**]

Release Information Statement introduced in Junos OS Release 9.6.
 Statement introduced in Junos OS Release 12.3 for EX Series switches.

Description Configure DHCPv6 local server options on the router or switch to enable the router or switch to function as a server for the DHCP protocol for IPv6. The DHCPv6 local server sends and receives packets using the IPv6 protocol and informs IPv6 of the routing requirements of router clients. The local server works together with the AAA service framework to control subscriber access (or DHCP client access) and accounting.

The DHCPv6 local server is fully compatible with the extended DHCP local server and DHCP relay agent.

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 • [DHCPv6 Local Server Overview on page 628](#)

dhcprv6 (DHCP Relay Agent)

```
Syntax  dhcprv6 {
    access-profile profile-name;
    active-server-group server-group-name;
}
authentication {
    password password-string;
    username-include {
        circuit-type;
        client-id;
        delimiter delimiter-character;
        domain-name domain-name-string;
        interface-description (device-interface | logical-interface);
        interface-name interface-name;
        logical-system-name;
        mac-address mac-address;
        relay-agent-interface-id;
        relay-agent-remote-id;
        relay-agent-subscriber-id;
        routing-instance-name;
        user-prefix user-prefix-string;
        vlan-tags;
    }
}
bulk-leasequery {
    attempts number-of-attempts;
    timeout seconds;
    trigger automatic;
}
duplicate-clients incoming-interface;
dynamic-profile profile-name {
    aggregate-clients (merge | replace);
    use-primary primary-profile-name;
}
forward-only {
    logical-system <current | default | logical-system-name>;
    routing-instance <current | default | routing-instance-name>;
}
forward-only-replies;
}
forward-snooped-clients (all-interfaces | configured-interfaces |
    non-configured-interfaces);
group group-name {
    access-profile profile-name;
    active-server-group server-group-name;
    authentication {
        password password-string;
        username-include {
            circuit-type;
            client-id;
            delimiter delimiter-character;
            domain-name domain-name-string;

```

```

interface-description (device-interface | logical-interface);
interface-name;
logical-system-name;
mac-address;
relay-agent-interface-id;
relay-agent-remote-id;
relay-agent-subscriber-id;
routing-instance-name;
user-prefix user-prefix-string;
vlan-tags;
}
}
dynamic-profile profile-name {
    aggregate-clients (merge | replace);
    use-primary primary-profile-name;
}
forward-only {
    logical-system <current | default | logical-system-name>;
    routing-instance <current | default | routing-instance-name>;
}
interface interface-name {
    access-profile profile-name;
    dynamic-profile profile-name {
        aggregate-clients (merge | replace);
        use-primary primary-profile-name;
    }
    exclude;
    overrides {
        allow-snooped-clients;
        asymmetric-lease-time seconds;
        asymmetric-prefix-lease-time seconds;
        client-negotiation-match incoming-interface;
        delay-authentication;
        delete-binding-on-renegotiation;
        dual-stack dual-stack-group-name;
        interface-client-limit number;
        no-allow-snooped-clients;
        no-bind-on-request;
        relay-source interface-name;
        send-release-on-delete;
    }
    service-profile dynamic-profile-name;
    short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
    trace;
    upto upto-interface-name;
}
}
lease-time-validation {
    lease-time-threshold seconds;
    violation-action action;
}
liveness-detection {
    failure-action (clear-binding | clear-binding-if-interface-up | log-only);
    method {
        bfd {

```

```

    version (0 | 1 | automatic);
    minimum-interval milliseconds;
    minimum-receive-interval milliseconds;
    multiplier number;
    no-adaptation;
    transmit-interval {
        minimum-interval milliseconds;
        threshold milliseconds;
    }
    detection-time {
        threshold milliseconds;
    }
    session-mode (automatic | multihop | singlehop);
    holddown-interval milliseconds;
}
layer2-liveness-detection {
    max-consecutive-retries number;
    transmit-interval interval;
}
}
}
overrides {
    allow-snooped-clients;
    asymmetric-lease-time seconds;
    asymmetric-prefix-lease-time seconds;
    client-negotiation-match incoming-interface;
    delay-authentication;
    delete-binding-on-renegotiation;
    dual-stack dual-stack-group-name;
    interface-client-limit number;
    no-allow-snooped-clients;
    no-bind-on-request;
    relay-source interface-name;
    send-release-on-delete;
}
relay-agent-interface-id {
    include-irb-and-l2;
    keep-incoming-interface-id ;
    no-vlan-interface-name;
    prefix prefix;
    use-interface-description (logical | device);
    use-option-82;
}
relay-agent-remote-id {
    include-irb-and-l2;
    keep-incoming-interface-id ;
    no-vlan-interface-name;
    prefix prefix;
    use-interface-description (logical | device);
    use-option-82 <strict>;
}
relay-option {
    option-number option-number;
    default-action {
        drop;
    }
}

```

```

    forward-only;
    relay-server-group relay-server-group;
  }
  equals (ascii ascii-string | hexadecimal hexadecimal-string) {
    drop;
    forward-only;
    relay-server-group relay-server-group;
  }
  starts-with (ascii ascii-string | hexadecimal hexadecimal-string) {
    drop;
    forward-only;
    relay-server-group relay-server-group;
  }
}
remote-id-mismatch disconnect;
route-suppression;
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}
leasequery {
  attempts number-of-attempts;
  timeout seconds;
}
lease-time-validation {
  lease-time-threshold seconds;
  violation-action action;
}
liveness-detection {
  failure-action (clear-binding | clear-binding-if-interface-up | log-only);
  method {
    bfd {
      version (0 | 1 | automatic);
      minimum-interval milliseconds;
      minimum-receive-interval milliseconds;
      multiplier number;
      no-adaptation;
      transmit-interval {
        minimum-interval milliseconds;
        threshold milliseconds;
      }
      detection-time {
        threshold milliseconds;
      }
      session-mode (automatic | multihop | singlehop);
      holddown-interval milliseconds;
    }
    layer2-liveness-detection {
      max-consecutive-retries number;
      transmit-interval interval;
    }
    route-suppression;
    service-profile dynamic-profile-name;
  }
}
no-snoop;

```

```

overrides {
  allow-snooped-clients;
  asymmetric-lease-time seconds;
  asymmetric-prefix-lease-time seconds;
  client-negotiation-match incoming-interface;
  delay-authentication;
  delete-binding-on-renegotiation;
  dual-stack dual-stack-group-name;
  interface-client-limit number;
  no-allow-snooped-clients;
  no-bind-on-request;
  relay-source interface-name;
  send-release-on-delete;
}
relay-agent-interface-id {
  include-irb-and-l2;
  keep-incoming-interface-id ;
  no-vlan-interface-name;
  prefix prefix;
  use-interface-description (logical | device);
  use-option-82;
}
relay-agent-remote-id {
  include-irb-and-l2;
  keep-incoming-interface-id ;
  no-vlan-interface-name;
  prefix prefix;
  use-interface-description (logical | device);
  use-option-82 <strict>;
}
relay-option {
  option-number option-number;
  default-action {
    drop;
    forward-only;
    relay-server-group relay-server-group;
  }
  equals (ascii ascii-string | hexadecimal hexadecimal-string) {
    drop;
    forward-only;
    relay-server-group relay-server-group;
  }
  starts-with (ascii ascii-string | hexadecimal hexadecimal-string) {
    drop;
    forward-only;
    relay-server-group relay-server-group;
  }
}
relay-option-vendor-specific{
  host-name;
  location;
  remote-id-mismatch disconnect;
  route-suppression;
  server-group {
    server-group-name {

```



```

        server-ip-address;
    }
}
server-response-time seconds;
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}

```

Hierarchy Level [edit forwarding-options [dhcp-relay](#)],
 [edit logical-systems *logical-system-name* forwarding-options [dhcp-relay](#)],
 [edit logical-systems *logical-system-name* routing-instances *routing-instance-name*
 forwarding-options [dhcp-relay](#)],
 [edit routing-instances *routing-instance-name* forwarding-options [dhcp-relay](#)]

Release Information Statement introduced in Junos OS Release 11.4.
 Statement introduced in Junos OS Release 12.3 for EX Series switches.
 Support for **forward-snooped-clients** introduced in Junos OS Release 15.1X53-D56 for EX Series switches and Junos OS Release 17.1R1.

Description Configure DHCPv6 relay options on the router or switch and enable the router or switch to function as a DHCPv6 relay agent. A DHCPv6 relay agent forwards DHCPv6 request and reply packets between a DHCPv6 client and a DHCPv6 server.

The DHCPv6 relay agent server is fully compatible with the extended DHCP local server and DHCP relay agent. However, the options configured with the **dhcpv6** statement are incompatible with the DHCP/BOOTP relay agent options configured with the **bootp** statement. As a result, the DHCPv6 relay agent and the DHCP/BOOTP relay agent cannot be enabled on the router or switch at the same time.

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 interface—To view this statement in the configuration.
 interface-control—To add this statement to the configuration.

Related Documentation

- [dhcp-relay on page 1294](#)
- [DHCPv6 Relay Agent Overview on page 648](#)
- [Using External AAA Authentication Services with DHCP on page 682](#)

dhcprv6 (System Services)

```
Syntax  dhcprv6 {
        authentication {
            password password;
            username-include {
                circuit-type;
                client-id;
                delimiter delimiter-character;
                domain-name domain-name;
                interface-name;
                logical-system-name;
                relay-agent-interface-id;
                relay-agent-remote-id;
                relay-agent-subscriber-id;
                routing-instance-name;
                user-prefix user-prefix;
            }
        }
        dynamic-profile {
            profile-name;
            aggregate-clients {
                merge;
                replace;
            }
            junos-default-profile;
            use-primary dynamic-profile-name;
        }
        group group-name {
            authentication {
                password password;
                username-include {
                    circuit-type;
                    client-id;
                    delimiter delimiter-character;
                    domain-name domain-name;
                    interface-name;
                    logical-system-name;
                    relay-agent-interface-id;
                    relay-agent-remote-id;
                    relay-agent-subscriber-id;
                    routing-instance-name;
                    user-prefix user-prefix;
                }
            }
            dynamic-profile {
                profile-name;
                aggregate-clients {
                    merge;
                    replace;
                }
            }
            junos-default-profile;
            use-primary dynamic-profile;
        }
    }
```

```

}
interface interface-name {
  dynamic-profile {
    profile-name;
    aggregate-clients {
      merge;
      replace;
    }
    junos-default-profile;
    use-primary dynamic-profile-name;
  }
  exclude;
  overrides {
    delegated-pool pool-name;
    interface-client-limit number;
    process-inform {
      pool pool-name;
    }
    rapid-commit ;
  }
  service-profile service-profile-name
  trace ;
  upto interface-name;
}
liveness-detection {
  failure-action {
    clear-binding;
    clear-binding-if-interface-up;
    log-only;
  }
  method {
    bfd {
      detection-time {
        threshold milliseconds;
      }
      holddown-interval interval;
      minimum-interval milliseconds;
      minimum-receive-interval milliseconds;
      multiplier number;
      no-adaptation;
      session-mode (automatic | multihop | single-hop);
      transmit-interval {
        minimum-interval milliseconds;
        threshold milliseconds;
      }
    }
    version (0 | 1 | automatic);
  }
}
overrides {
  delegated-pool pool-name;
  interface-client-limit number;
  process-inform {
    pool pool-name;
  }
  rapid-commit ;
}

```

```
}
reconfigure {
  attempts number;
  clear-on-abort;
  strict;
  timeout number;
  token token-name;
  trigger {
    radius-disconnect;
  }
}
service-profile service-profile-name;
}
liveness-detection {
  failure-action {
    clear-binding;
    clear-binding-if-interface-up;
    log-only;
  }
}
method {
  bfd {
    detection-time {
      threshold milliseconds;
    }
    holddown-interval interval;
    minimum-interval milliseconds;
    minimum-receive-interval milliseconds;
    multiplier number;
    no-adaptation;
    session-mode (automatic | multihop | single-hop);
    transmit-interval {
      minimum-interval milliseconds;
      threshold milliseconds;
    }
  }
  version (0 | 1 | automatic);
}
}
overrides {
  delegated-pool pool-name;
  interface-client-limit number;
  process-inform {
    pool pool-name;
  }
  rapid-commit ;
}
reconfigure {
  attempts number;
  clear-on-abort;
  strict;
  timeout number;
  token token-name;
  trigger {
    radius-disconnect;
  }
}
}
```

```
service-profile service-profile-name;  
}
```

Hierarchy Level [edit system services]

Release Information Statement introduced in Junos OS Release 10.4.

Description Configure DHCPv6 server to provide IPv6 addresses to clients.



NOTE: SRX Series devices do not support client authentication.

Options

- **duplicate-clients-on-interface**—Allow duplicate clients on different interfaces in a subnet.

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

- [DHCP Server, Client, and Relay Agent Overview on page 742](#)

dhcpv6-client

Syntax	<pre> dhcpv6-client { client-ia-type { ia-na; ia-pd; } client-identifier duid-type (duid-ll duid-llt vendor); client-type (autoconfig stateful); rapid-commit; req-option (dns-server domain fqdn nis-domain nis-server ntp-server sip-domain sip-server time-zone vendor-spec); retransmission-attempt <i>number</i>; update-router-advertisement { interface <i>interface-name</i>; } update-server; } </pre>
Hierarchy Level	<pre> [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6] [edit logical-systems <i>name</i> interfaces <i>name</i> unit <i>name</i> family inet6] [edit tenants <i>tenant-name</i> interfaces <i>name</i> unit <i>name</i> family inet6] </pre>
Release Information	<p>Statement introduced in Junos OS Release 12.1X45-D10.</p> <p>The logical-systems and tenants options are introduced in Junos OS Release 18.4R1.</p>
Description	Configure the Dynamic Host Configuration Protocol version 6 (DHCPv6) client.
Options	<p>client-ia-type— Identity association type for DHCPv6 client. This statement is mandatory.</p> <p>client-identifier duid-type— Identity a client by a client-identifier value. This statement is mandatory.</p> <p>client-type— Identify the type of DHCPv6 client. This statement is mandatory.</p> <p>rapid-commit— The use of the two-message exchange for address assignment.</p> <p>req-option— Specify options requested by the DHCPv6 client.</p> <p>retransmission-attempt number— Specify the number of times the device retransmits a DHCPv6 client packet if a DHCPv6 server fails to respond. After the specified number of attempts, no further attempts at reaching a server are made.</p> <p>update-router-advertisement— Specify the interface used to delegate prefixes.</p> <p>update-server— Propagate TCP/IP settings to the DHCPv6 server.</p> <p>For detailed information about these commands, 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">• DHCP Server, Client, and Relay Agent Overview on page 742• Minimum DHCPv6 Client Configuration on page 820

dhcp-attributes (Access IPv4 Address Pools)

```
Syntax  dhcp-attributes {
    boot-file boot-file-name;
    boot-server boot-server-name;
    domain-name domain-name;
    grace-period seconds;
    maximum-lease-time (seconds | infinite);
    name-server ipv4-address;
    netbios-node-type (b-node | h-node | m-node | p-node);
    next-server next-server-name;
    option dhcp-option-identifier-code {
        array {
            byte [8-bit-value];
            flag [ false | off | on | true];
            integer [32-bit-numeric-values];
            ip-address [ip-address];
            short [signed-16-bit-numeric-value];
            string [character string value];
            unsigned-integer [unsigned-32-bit-numeric-value];
            unsigned-short [16-bit-numeric-value];
        }
        byte 8-bit-value;
        flag ( false | off | on | true);
        integer 32-bit-numeric-values;
        ip-address ip-address;
        short signed-16-bit-numeric-value;
        string character string value;
        unsigned-integer unsigned-32-bit-numeric-value;
        unsigned-short 16-bit-numeric-value;
    }
    option-match {
        option-82 {
            circuit-id match-value {
                range range-name;
            }
            remote-id match-value;
            range range-name;
        }
    }
    propagate-ppp-settings [interface-name];
    propagate-settings interface-name;
    router ipv4-address;
    server-identifier ip-address;
    sip-server {
        ip-address ipv4-address;
        name sip-server-name;
    }
    tftp-server server-name;
    wins-server ipv4-address;
}
```


Hierarchy Level	[edit access address-assignment pool <i>pool-name</i> family inet]
Release Information	Statement introduced in Junos OS Release 10.4.
Description	Configure attributes for IPv4 address pools that can be used by different clients. The DHCP attributes for this statement uses standard IPv4 DHCP options.
Required Privilege Level	access—To view this statement in the configuration. access-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• DHCP Server, Client, and Relay Agent Overview on page 742

dhcp-attributes (Access IPv6 Address Pools)

Syntax

```
dhcp-attributes {
  dns-server ipv6-address;
  grace-period seconds;
  maximum-lease-time (seconds | infinite);
  option dhcp-option-identifier-code {
    array {
      byte [8-bit-value];
      flag [ false| off |on |true];
      integer [32-bit-numeric-values];
      ip-address [ip-address];
      short [signed-16-bit-numeric-value];
      string [character string value];
      unsigned-integer [unsigned-32-bit-numeric-value];
      unsigned-short [16-bit-numeric-value];
    }
    byte 8-bit-value;
    flag ( false | off | on | true);
    integer 32-bit-numeric-values;
    ip-address ip-address;
    short signed-16-bit-numeric-value;
    string character string value;
    unsigned-integer unsigned-32-bit-numeric-value;
    unsigned-short 16-bit-numeric-value;
  }
  propagate-ppp-settings [interface-name];
  sip-server-address ipv6-address;
  sip-server-domain-name domain-name;
}
```

Hierarchy Level [edit access address-assignment pool *pool-name* family inet6]

Release Information Statement introduced in Junos OS Release 10.4.

Description Configure attributes for address pools that can be used by different clients.

- Options**
- **dns-server *IPv6-address***—Specify a DNS server to which clients can send DNS queries.
 - **grace-period *seconds***—Specify the grace period offered with the lease.

Range: 0 through 4,294,967,295 seconds

Default: 0 (no grace period)

- **maximum-lease-time *seconds***—Specify the maximum length of time in seconds for which a client can request and hold a lease on a DHCP server.

Range: 30 through 4,294,967,295 seconds

Default: 86,400 seconds (24 hours)

- **option *dhcp-option-identifier-code***—Specify the DHCP option identifier code.
- **propagate-ppp-settings [*interface-name***—Specify PPP interface name for propagating DNS or WINS settings.
- **sip-server-address *IPv6-address***—Specify the IPv6 address of the SIP outbound proxy server.
- **sip-server-domain-name *domain-name***—Specify the domain name of the SIP outbound proxy server.

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

Related Documentation	<ul style="list-style-type: none">• DHCP Server, Client, and Relay Agent Overview on page 742
------------------------------	---

dhcp-local-server (System Services)

Syntax

```
dhcp-local-server {
  dhcpv6 {
    authentication {
      password password;
      username-include {
        circuit-type;
        client-id;
        delimiter delimiter-character;
        domain-name domain-name;
        interface-name;
        logical-system-name;
        relay-agent-interface-id;
        relay-agent-remote-id;
        relay-agent-subscriber-id;
        routing-instance-name;
        user-prefix user-prefix;
      }
    }
  }
  dynamic-profile {
    profile-name;
    aggregate-clients {
      merge;
      replace;
    }
    junos-default-profile;
    use-primary dynamic-profile-name;
  }
  group group-name {
    authentication {
      password password;
      username-include {
        circuit-type;
        client-id;
        delimiter delimiter-character;
        domain-name domain-name;
        interface-name;
        logical-system-name;
        relay-agent-interface-id;
        relay-agent-remote-id;
        relay-agent-subscriber-id;
        routing-instance-name;
        user-prefix user-prefix;
      }
    }
  }
  dynamic-profile {
    profile-name;
    aggregate-clients {
      merge;
      replace;
    }
  }
  junos-default-profile;
```

```

    use-primary dynamic-profile;
}
interface interface-name {
    dynamic-profile {
        profile-name;
        aggregate-clients {
            merge;
            replace;
        }
        junos-default-profile;
        use-primary dynamic-profile-name;
    }
    exclude;
    overrides {
        delegated-pool pool-name;
        interface-client-limit number;
        process-inform {
            pool pool-name;
        }
        rapid-commit ;
    }
    service-profile service-profile-name
    trace ;
    upto interface-name;
}
liveness-detection {
    failure-action {
        clear-binding;
        clear-binding-if-interface-up;
        log-only;
    }
    method {
        bfd {
            detection-time {
                threshold milliseconds;
            }
            holddown-interval interval;
            minimum-interval milliseconds;
            minimum-receive-interval milliseconds;
            multiplier number;
            no-adaptation;
            session-mode (automatic | multihop | single-hop);
            transmit-interval {
                minimum-interval milliseconds;
                threshold milliseconds;
            }
            version (0 | 1 | automatic);
        }
    }
}
overrides {
    delegated-pool pool-name;
    interface-client-limit number;
    process-inform {
        pool pool-name;
    }
}

```

```
    rapid-commit ;
  }
  reconfigure {
    attempts number;
    clear-on-abort;
    strict;
    timeout number;
    token token-name;
    trigger {
      radius-disconnect;
    }
  }
  service-profile service-profile-name;
}
liveness-detection {
  failure-action {
    clear-binding;
    clear-binding-if-interface-up;
    log-only;
  }
}
method {
  bfd {
    detection-time {
      threshold milliseconds;
    }
    holddown-interval interval;
    minimum-interval milliseconds;
    minimum-receive-interval milliseconds;
    multiplier number;
    no-adaptation;
    session-mode (automatic | multihop | single-hop);
    transmit-interval {
      minimum-interval milliseconds;
      threshold milliseconds;
    }
    version (0 | 1 | automatic);
  }
}
overrides {
  delegated-pool pool-name;
  interface-client-limit number;
  process-inform {
    pool pool-name;
  }
  rapid-commit ;
}
reconfigure {
  attempts number;
  clear-on-abort;
  strict;
  timeout number;
  token token-name;
  trigger {
    radius-disconnect;
  }
}
```

```

    }
    service-profile service-profile-name;
  }
  group group-name {
    interface interface-name {
      exclude;
      upto upto-interface-name;
    }
  }
}

```

Hierarchy Level [edit system services]

Release Information Statement introduced in Junos OS Release 10.4.

Description Configure DHCP Local Server for DHCPv6, forwarding snoop (unicast) packets, and setting traceoptions.



NOTE: SRX Series devices do not support client authentication.

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

- [DHCP Server, Client, and Relay Agent Overview on page 742](#)

disable (802.1X)

Syntax	disable;
Hierarchy Level	[edit protocols dot1x authenticator interface (all [<i>interface-names</i>])]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	Disable 802.1X authentication on a specified interface or all interfaces.
Default	802.1X authentication is disabled on all interfaces.
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">• show dot1x on page 2082• Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch on page 367• Example: Setting Up 802.1X in Conference Rooms to Provide Internet Access to Corporate Visitors on an EX Series Switch on page 361• Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455• Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch on page 509• Configuring 802.1X Interface Settings (CLI Procedure) on page 357• Configuring 802.1X Authentication (J-Web Procedure) on page 358

disable (802.1X)

Syntax	<code>disable;</code>
Hierarchy Level	<code>[edit protocols dot1x authenticator interface (all [<i>interface-names</i>])]</code>
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	Disable 802.1X authentication on a specified interface or all interfaces.
Default	802.1X authentication is disabled on all interfaces.
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"> • show dot1x on page 2082 • Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch on page 367 • Example: Setting Up 802.1X in Conference Rooms to Provide Internet Access to Corporate Visitors on an EX Series Switch on page 361 • Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455 • Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch on page 509 • Configuring 802.1X Interface Settings (CLI Procedure) on page 357 • Configuring 802.1X Authentication (J-Web Procedure) on page 358

disable (LLDP)

Syntax	disable;
Hierarchy Level	[edit protocols lldp], [edit protocols interface lldp]
Release Information	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	Disable the LLDP configuration on the switch or on one or more interfaces.
Default	If you do not configure LLDP, it is disabled on the switch and on specific switch interfaces.
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">• show lldp on page 2109• Configuring LLDP (CLI Procedure) on page 556• Understanding LLDP and LLDP-MED on EX Series Switches on page 562• Understanding LLDP on page 555

disable (LLDP-MED)

Syntax	disable;
Hierarchy Level	[edit protocols lldp-med], [edit protocols lldp-med interface]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Disable the LLDP-MED configuration on the switch or on one or more interfaces.
Default	If you do not configure LLDP-MED, it is disabled on the switch and on specific switch interfaces.
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"> • show lldp on page 2109 • Configuring LLDP (CLI Procedure) on page 556 • Understanding LLDP and LLDP-MED on EX Series Switches on page 562

disable (LLDP Power Negotiation)

Syntax	disable;
Hierarchy Level	[edit protocols lldp interface (all <i>interface-name</i>) power-negotiation]
Release Information	Statement introduced in Junos OS Release 12.2 for EX Series switches.
Description	Disable Link Layer Discovery Protocol (LLDP) power negotiation, which negotiates with Power over Ethernet (PoE)-powered devices to allocate power.
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 LLDP (CLI Procedure) on page 556 • Configuring PoE on EX Series Switches (CLI Procedure)

disable-relay

Syntax	disable-relay;
Hierarchy Level	<p>[edit forwarding-options dhcp-relay overrides], [edit forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay overrides], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides]</p>
Release Information	<p>Statement introduced in Junos OS Release 8.3.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Disable DHCP relay on specific interfaces in a group.
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">• Extended DHCP Relay Agent Overview on page 632

diameter-instance (Diameter Applications)

Syntax	<code>diameter-instance <i>instance-name</i>;</code>
Hierarchy Level	<code>[edit access gx-plus partition <i>partition-name</i>]</code> <code>[edit access ocs partition <i>partition-name</i>],</code> <code>[edit access pcrf partition <i>partition-name</i>]</code>
Release Information	<p>Statement introduced in Junos OS Release 11.2.</p> <p>Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.</p> <p>Support at the <code>[edit access ocs partition <i>partition-name</i>]</code> and <code>[edit access pcrf partition <i>partition-name</i>]</code> hierarchy levels introduced in Junos OS Release 16.2.</p>
Description	Specify the Diameter instance associated with the Gx-Plus, OCS, or PCRF partition.
Options	<i>instance-name</i> —Name of the Diameter instance. Currently, only master is supported.
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"> • <i>Configuring Gx-Plus</i> • <i>Configuring the Gx-Plus Partition</i> • <i>Configuring the OCS Partition</i> • <i>Understanding Gx Interactions Between the Router and the PCRF</i> • <i>Understanding Gy Interactions Between the Router and the OCS</i>

disable (System Services)

Syntax	disable;
Hierarchy Level	[edit system services dns dnssec]
Release Information	Statement introduced in Junos OS Release 10.2 .
Description	Disables DNSSEC in the DNS server.
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">• DHCP Server, Client, and Relay Agent Overview on page 742

dlv

Syntax	<pre>dlv { domain-name <i>domain-name</i> trusted-anchor <i>trusted-anchor</i>; }</pre>
Hierarchy Level	[edit system services dns dnssec]
Release Information	Statement introduced in Junos OS Release 10.2 .
Description	Configure DNSSEC Lookaside Validation (DLV).
Options	<ul style="list-style-type: none">• domain-name <i>domain-name</i>—Specify the secure domain server name.• trusted-anchor <i>trusted-anchor</i>—Specify the trusted DLV anchor.
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">• DHCP Server, Client, and Relay Agent Overview on page 742

domain (Domain Map)

Syntax

```

domain {
  delimiter [delimiter-character];
  map domain-map-name {
    aaa-logical-system logical-system-name {
      aaa-routing-instance routing-instance-name;
    }
    aaa-routing-instance routing-instance-name;
    access-profile profile-name;
    address-pool pool-name;
    dynamic-profile profile-name;
    padn destination-address {
      mask destination-mask;
      metric route-metric;
    }
    strip-domain;
    target-logical-system logical-system-name {
      target-routing-instance routing-instance-name;
    }
    target-routing-instance routing-instance-name;
    tunnel-profile profile-name;
  }
  parse-direction (left-to-right | right-to-left);
  parse-order (domain-first | realm-first);
  realm-delimiter [delimiter-character];
  realm-parse-direction (left-to-right | right-to-left);
}

```

Hierarchy Level [edit access]

Release Information Statement introduced in Junos OS Release 10.4.

Description Configure a domain map, which is used to map access options and session parameters for subscriber sessions.


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 admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.


Related Documentation

- *Configuring a Domain Map*

domain-name-server (Routing Instances and Access Profiles)

Syntax	domain-name-server <i>dns-address</i> ;
Hierarchy Level	[edit access]; [edit access profile]
Release Information	Statement introduced in Junos OS Release 12.3. Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Description	<p>Configure an IPv4 address for a DNS name server. You can configure an address globally for a routing instance at the [edit access] hierarchy level or for an access profile at the [edit access profile <i>profile-name</i>] hierarchy level. You can configure more than one address by including the statement multiple times.</p> <div><p>NOTE: A DNS name server address configured with this statement is less preferred than one configured with the domain-name-server-inet statement. That is, the server with the address configured with the domain-name-server-inet takes precedence over a server configured with this statement.</p></div>
Options	<i>dns-address</i> —IPv4 address of the DNS name server.
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"><i>Configuring DNS Name Server Addresses for Subscriber Management</i><i>DNS Name Server Address Overview</i>

domain-name-server-inet (Routing Instances and Access Profiles)

Syntax	domain-name-server-inet <i>dns-address</i> ;
Hierarchy Level	[edit access], [edit access profile]
Release Information	Statement introduced in Junos OS Release 12.3. Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Description	Configure an IPv4 address for a DNS name server. You can configure an address globally for a routing instance at the [edit access] hierarchy level or for an access profile at the [edit access profile <i>profile-name</i>] hierarchy level. You can configure more than one address by including the statement multiple times.
	<div>  <p>NOTE: A DNS name server address configured with this statement is higher in preference than one configured with the domain-name-server statement. That is, the server with the address configured with the domain-name-server-inet takes precedence over a server configured with the domain-name-server statement.</p> </div>
Options	<i>dns-address</i> —IPv4 address of the DNS name server.
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"> <i>Configuring DNS Name Server Addresses for Subscriber Management</i> <i>DNS Name Server Address Overview</i>

domain-name-server-inet6 (Routing Instances and Access Profiles)

Syntax	<code>domain-name-server-inet6 <i>dns-address</i>;</code>
Hierarchy Level	<code>[edit access],</code> <code>[edit access profile]</code>
Release Information	Statement introduced in Junos OS Release 12.3. Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Description	Configure an IPv6 address for a DNS name server. You can configure an address globally for a routing instance at the [edit access] hierarchy level or for an access profile at the [edit access profile <i>profile-name</i>] hierarchy level. You can configure more than one address by including the statement multiple times.
Options	<i>dns-address</i> —IPv6 address of the DNS name server.
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">• <i>Configuring DNS Name Server Addresses for Subscriber Management</i>• <i>DNS Name Server Address Overview</i>

dot1x

Syntax	<pre> dot1x { authenticator { authentication-profile-name access-profile-name; interface (all [interface-names]) { disable; guest-vlan (vlan-id vlan-name); lldp-med-bypass; mac-radius <restrict>; maximum-requests number; no-reauthentication; quiet-period seconds; reauthentication { interval seconds; } retries number; server-fail (deny permit use-cache vlan-id vlan-name); server-reject-vlan (vlan-id vlan-name) { eapol-block; block-interval block-interval; } server-timeout seconds; supplicant (single single-secure multiple); supplicant-timeout seconds; transmit-period seconds; } no-mac-table-binding; static mac-address { interface interface-names; vlan-assignment (vlan-id vlan-name); } } } </pre>
Hierarchy Level	[edit protocols]
Release Information	<p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.</p>
Description	<p>Configure 802.1X authentication for Port-Based Network Access Control. 802.1X authentication is supported on interfaces that are members of private VLANs (PVLANS).</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Default	802.1X is disabled.
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">• show dot1x on page 2082• Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch on page 367• Example: Setting Up 802.1X in Conference Rooms to Provide Internet Access to Corporate Visitors on an EX Series Switch on page 361• Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455• Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch on page 509• Example: Configuring MAC RADIUS Authentication on an EX Series Switch on page 502• Configuring RADIUS Server Fail Fallback (CLI Procedure) on page 437 |
|------------------------------|---|

domain-name (DHCP)

Syntax	domain-name <i>domain-name</i> ;
Hierarchy Level	[edit system services dhcp [edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
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 name of the domain in which clients search for a DHCP server host. This is the default domain name that is appended to hostnames that are not fully qualified.
Options	<i>domain-name</i> —Name of the domain.
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 a DHCP Server on Switches (CLI Procedure) on page 671

domain-name (DHCP Local Server)

Syntax	<code>domain-name <i>domain-name-string</i>;</code>
Hierarchy Level	<pre> [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server authentication username-include], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 authentication username-include], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group group-name authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include], [edit system services dhcp], [edit system services dhcp-local-server authentication username-include], [edit system services dhcp-local-server dhcpv6 authentication username-include], [edit system services dhcp-local-server dhcpv6 group group-name authentication username-include], [edit system services dhcp-local-server group group-name authentication username-include] </pre>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Specify the domain name that is concatenated with the username during the subscriber authentication or DHCP client authentication process.
Options	<i>domain-name-string</i> —Domain name formatted string.

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">• Using External AAA Authentication Services with DHCP on page 682

domain-name (DHCP Relay Agent)

Syntax	<code>domain-name <i>domain-name-string</i>;</code>
Hierarchy Level	<p>[edit forwarding-options dhcp-relay authentication username-include], [edit forwarding-options dhcp-relay dhcpv6 authentication username-include], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include], [edit forwarding-options dhcp-relay dual-stack-group <i>dual-stack-group-name</i> authentication username-include], [edit forwarding-options dhcp-relay group <i>group-name</i> authentication username-include], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay authentication username-include], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 authentication username-include], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay authentication username-include], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 authentication username-include], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include] [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.1. Statement introduced in Junos OS Release 12.3R2 for EX Series switches. Support at the [edit ... dhcpv6] hierarchy levels introduced in Junos OS Release 11.4. Support at the [edit ... dual-stack-group <i>dual-stack-group-name</i>] hierarchy level introduced in Junos OS Release 15.1.</p>
Description	Specify the domain name that is concatenated with the username during the subscriber authentication or client authentication process. Use the statement at the [edit ... dhcpv6] hierarchy levels to configure DHCPv6 support.
Options	<i>domain-name-string</i> —Domain name formatted string.

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

Related Documentation

- [Using External AAA Authentication Services with DHCP on page 682](#)
- [Creating Unique Usernames for DHCP Clients on page 684](#)

domain-search

Syntax domain-search [*domain-list*];

Hierarchy Level

```
[edit system],  
[edit system services dhcp],  
[edit system services dhcp],  
[edit system services dhcp pool],  
[edit system services dhcp static-binding]
```

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 list of domains to search (in the case where you want to configure access to multiple DNS servers for redundancy, and/or to resolve hosts that the previous server could not).

Options **domain-list**—List of domain servers to search. The list can contain up to six domain names, separated by a space, with a total of up to 256 characters. For example to search **domain1.net**, and if it fails to resolve the host, **domain2.net**, and if fails to resolve the host, **domain3.net**, you would configure the following domain list at the **domain-search** hierarchy level:

```
[edit system]  
set domain-search [domain1.net domain2.net domain3.net]
```

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

Related Documentation

- [Configuring a Domain Name and Domain Search List for a DHCP Server Host on page 580](#)
- [Configuring a DNS Name Server for Resolving a Hostname into Addresses](#)

drop (DHCP Relay Agent Option)

Syntax	<code>drop;</code>
Hierarchy Level	<p>[edit forwarding-options dhcp-relay relay-option (default-action equals starts-with)], [edit forwarding-options dhcp-relay dhcpv6 relay-option (default-action equals starts-with)], [edit forwarding-options dhcp-relay group <i>group-name</i> relay-option (default-action equals starts-with)], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> relay-option (default-action equals starts-with)], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay ...], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...]</p>
Release Information	Statement introduced in Junos OS Release 12.3.
Description	Drop (discard) specified DHCP client packets when you use DHCP relay agent selective processing. You can configure the drop operation globally or for a group of interfaces, and for either DHCP or DHCPv6 relay agent.
Required Privilege Level	<p>interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> <i>Using DHCP Option Information to Selectively Process DHCP Client Traffic</i>

dynamic-pool

```
Syntax address-assignment {
    dynamic-pool <dynamic-pool>{
        family {
            inet6 {
                from-interface <interface>;
                delegated-prefix-length <network-prefix-length>;
                range <range-name> {
                    masked-low <masked-low>;
                    masked-high <masked-high>;
                    prefix-length <prefix-length>;
                }
                dhcp-attributes {
                    dns-server <address>;
                    t1-percentage <t1-percentage>;
                    t2-percentage <t2-percentage>;
                    preferred-lifetime <preferred-lifetime>;
                    valid-lifetime <valid-lifetime>;
                }
            }
        }
    }
}
```

Hierarchy Level [edit access]

Release Information Statement introduced in Junos OS Release 15.1X49-D70.

Description Configure the dynamic pool updated by the client running on the WAN interface.

Options The remaining statements are explained separately.

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

Related Documentation

- [Configuring Address-Assignment Pools on page 769](#)
- [address-assignment \(Access\) on page 1152](#)

dynamic-profile (DHCP Local Server)

Syntax	<pre>dynamic-profile <i>profile-name</i> { aggregate-clients (merge replace); use-primary <i>primary-profile-name</i>; }</pre>
Hierarchy Level	<pre>[edit system services dhcp-local-server], [edit system services dhcp-local-server dual-stack-group <i>dual-stack-group-name</i>], [edit system services dhcp-local-server dhcpv6], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i>], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> interface <i>interface-name</i>], [edit system services dhcp-local-server group <i>group-name</i>], [edit system services dhcp-local-server group <i>group-name</i> interface <i>interface-name</i>], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server ...], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server ...], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server ...]</pre>
Release Information	<p>Statement introduced in Junos OS Release 9.2.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Options aggregate-clients and use-primary introduced in Junos OS Release 9.3.</p> <p>Support at the [edit ... interface] hierarchy levels introduced in Junos OS Release 11.2.</p>
Description	Specify the dynamic profile that is attached to all interfaces, a named group of interfaces, or a specific interface.
Options	<p>profile-name—Name of the dynamic profile.</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>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"> • Attaching Dynamic Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces on page 681 • Configuring a Default Subscriber Service

dynamic-profile (DHCP Relay Agent)

Syntax	<pre>dynamic-profile <i>profile-name</i> { aggregate-clients (merge replace); use-primary <i>primary-profile-name</i>; }</pre>
Hierarchy Level	<pre>[edit forwarding-options dhcp-relay], [edit forwarding-options dhcp-relay dhcpv6], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i>], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> interface <i>interface-name</i>], [edit forwarding-options dhcp-relay dual-stack-group <i>dual-stack-group-name</i>], [edit forwarding-options dhcp-relay group <i>group-name</i>], [edit forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i>], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay ...], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...]</pre>
Release Information	<p>Statement introduced in Junos OS Release 9.2.</p> <p>Support at the [edit ... dhcpv6] hierarchy levels introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.1 for EX Series switches.</p> <p>Support at the [edit ... dual-stack-group <i>dual-stack-group-name</i>] hierarchy level introduced in Junos OS Release 15.1.</p>
Description	<p>Specify the dynamic profile that is attached to all interfaces, to a named group of interfaces, or to a specific interface.</p> <p>M120 and M320 routers do not support DHCPv6.</p>
Options	<p><i>profile-name</i>—Name of the dynamic profile.</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"> • dhcp-relay on page 1294 • Attaching Dynamic Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces on page 681 • Grouping Interfaces with Common DHCP Configurations on page 704 • Configuring a Default Subscriber Service

dynamic-profile-options

Syntax	<pre>dynamic-profile-options { versioning; }</pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 11.4.
Description	<p>Configure global dynamic profile options.</p> <p>The remaining statement is 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>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">• <i>Enabling Dynamic Profiles to Use Multiple Versions</i>

dynamic-server

```
Syntax  dhcpv6 {
        dynamic-server {
            group <group> {
                neighbor-discovery-router-advertisement <ndra-pool>;
                interface <interface> {
                    overrides {
                        delegated-pool <delegated-pool>;
                        ia-na-pool <ia-na-pool>;
                        process-inform {
                            pool <pool>;
                        }
                    }
                }
            }
        }
    }
```

Hierarchy Level [edit system services]

Release Information Statement introduced in Junos OS Release 15.1X49-D70.

Description Configure the server running on a LAN interface.

Options The remaining statements are explained separately.

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

Related Documentation

- [dhcp-local-server \(System Services\) on page 1328](#)
- [dhcp-client on page 1283](#)

group (DHCP Local Server)

```
Syntax  group group-name {
        access-profile profile-name;
        authentication {
            password password-string;
            username-include {
                circuit-type;
                client-id;
                delimiter delimiter-character;
                domain-name domain-name-string;
            }
            interface-description (device-interface | logical-interface);
            logical-system-name;
            mac-address;
            option-60;
            option-82 <circuit-id> <remote-id>;
            relay-agent-interface-id
            relay-agent-remote-id;
            relay-agent-subscriber-id;
            routing-instance-name;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
    dynamic-profile profile-name <aggregate-clients (merge | replace) | use-primary
        primary-profile-name>;
    interface interface-name {
        access-profile profile-name;
        exclude;
        overrides {
            asymmetric-lease-time seconds;
            asymmetric-prefix-lease-time seconds;
            client-discover-match <option60-and-option82>;
            client-negotiation-match incoming-interface;
            delay-advertise {
                based-on (option-15 | option-16 | option-18 | option-37) {
                    equals {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                    not-equals {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                    starts-with {
                        ascii ascii-string;
                        hexadecimal hexadecimal-string;
                    }
                }
            }
            delay-time seconds;
        }
        delay-offer {
            based-on (option-60 | option-77 | option-82) {
```

```

    equals {
        ascii ascii-string;
        hexadecimal hexadecimal-string;
    }
    not-equals {
        ascii ascii-string;
        hexadecimal hexadecimal-string;
    }
    starts-with {
        ascii ascii-string;
        hexadecimal hexadecimal-string;
    }
}
delay-time seconds;
}
dual-stack dual-stack-group-name;
interface-client-limit number;
process-inform {
    pool pool-name;
}
rapid-commit;
}
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
trace;
upto upto-interface-name;
}
liveness-detection {
    failure-action (clear-binding | clear-binding-if-interface-up | log-only);
    method {
        bfd {
            version (0 | 1 | automatic);
            minimum-interval milliseconds;
            minimum-receive-interval milliseconds;
            multiplier number;
            no-adaptation;
            transmit-interval {
                minimum-interval milliseconds;
                threshold milliseconds;
            }
            detection-time {
                threshold milliseconds;
            }
            session-mode (automatic | multihop | singlehop);
            holddown-interval milliseconds;
        }
        layer2-liveness-detection {
            max-consecutive-retries number;
            transmit-interval interval;
        }
    }
}
}
overrides {
    asymmetric-lease-time seconds;
    asymmetric-prefix-lease-time seconds;
}

```



```

client-discover-match <option60-and-option82>;
client-negotiation-match incoming-interface;
delay-advertise {
    based-on (option-15 | option-16 | option-18 | option-37) {
        equals {
            ascii ascii-string;
            hexadecimal hexadecimal-string;
        }
        not-equals {
            ascii ascii-string;
            hexadecimal hexadecimal-string;
        }
        starts-with {
            ascii ascii-string;
            hexadecimal hexadecimal-string;
        }
    }
    delay-time seconds;
}
delay-offer {
    based-on (option-60 | option-77 | option-82) {
        equals {
            ascii ascii-string;
            hexadecimal hexadecimal-string;
        }
        not-equals {
            ascii ascii-string;
            hexadecimal hexadecimal-string;
        }
        starts-with {
            ascii ascii-string;
            hexadecimal hexadecimal-string;
        }
    }
    delay-time seconds;
}
delegated-pool;
delete-binding-on-renegotiation;
dual-stack dual-stack-group-name;
interface-client-limit number;
process-inform {
    pool pool-name;
}
protocol-attributes attribute-set-name;
rapid-commit;
}
reconfigure {
    attempts attempt-count;
    clear-on-abort;
    strict;
    timeout timeout-value;
    token token-value;
    trigger {
        radius-disconnect;
    }
}

```

```

}
route-suppression;
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}

```

Hierarchy Level [edit system services [dhcp-local-server](#)],
 [edit system services [dhcp-local-server dhcpv6](#)],
 [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services [dhcp-local-server](#) ...],
 [edit logical-systems *logical-system-name* system services [dhcp-local-server](#) ...],
 [edit routing-instances *routing-instance-name* system services [dhcp-local-server](#) ...]

Release Information Statement introduced in Junos OS Release 9.0.
 Statement introduced in Junos OS Release 12.1 for EX Series switches.

Description Configure a group of interfaces that have a common configuration, such as authentication parameters. A group must contain at least one interface.

Options *group-name*—Name of the group.

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

- [Extended DHCP Local Server Overview on page 611](#)
- [Grouping Interfaces with Common DHCP Configurations on page 704](#)
- [Using External AAA Authentication Services with DHCP on page 682](#)
- [Attaching Dynamic Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces on page 681](#)
- [DHCP Liveness Detection Using ARP and Neighbor Discovery Packets](#)

group (DHCP Relay Agent)

```
Syntax  group group-name {
        access-profile profile-name;
        active-server-group server-group-name;
        authentication {
            password password-string;
            username-include {
                circuit-type;
                client-id;
                delimiter delimiter-character;
                domain-name domain-name-string;
            }
            interface-description (device-interface | logical-interface);
            interface-name interface-name;
            logical-system-name;
            mac-address mac-address;
            relay-agent-interface-id;
            relay-agent-remote-id;
            relay-agent-subscriber-id;
            routing-instance-name;
            user-prefix user-prefix-string;
            vlan-tags;
        }
    }
    dynamic-profile profile-name {
        aggregate-clients (merge | replace);
        use-primary primary-profile-name;
    }
    forward-only {
        logical-system <current | default | logical-system-name>;
        routing-instance <current | default | routing-instance-name>;
    }
    interface interface-name {
        access-profile profile-name;
        exclude;
        liveness-detection {
            failure-action (clear-binding | clear-binding-if-interface-up | log-only);
            method {
                bfd {
                    version (0 | 1 | automatic);
                    minimum-interval milliseconds;
                    minimum-receive-interval milliseconds;
                    multiplier number;
                    no-adaptation;
                    transmit-interval {
                        minimum-interval milliseconds;
                        threshold milliseconds;
                    }
                }
                detection-time {
                    threshold milliseconds;
                }
            }
            session-mode (automatic | multihop | singlehop);
            holddown-interval milliseconds;
        }
    }
}
```

```

    }
  }
}
overrides {
  allow-no-end-option;
  allow-snooped-clients;
  always-write-giaddr;
  always-write-option-82;
  asymmetric-lease-time seconds;
  asymmetric-prefix-lease-time seconds;
  client-discover-match <option60-and-option82 | incoming-interface>;
  client-negotiation-match incoming-interface;
  delay-authentication;
  delete-binding-on-renegotiation;
  disable-relay;
  dual-stack dual-stack-group-name;
  interface-client-limit number;
  layer2-unicast-replies;
  no-allow-snooped-clients;
  no-bind-on-request;
  proxy-mode;
  relay-source
  replace-ip-source-with;
  send-release-on-delete;
  trust-option-82;
}
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
trace;
upto upto-interface-name;
}
liveness-detection {
  failure-action (clear-binding | clear-binding-if-interface-up | log-only);
  method {
    bfd {
      version (0 | 1 | automatic);
      minimum-interval milliseconds;
      minimum-receive-interval milliseconds;
      multiplier number;
      no-adaptation;
      transmit-interval {
        minimum-interval milliseconds;
        threshold milliseconds;
      }
      detection-time {
        threshold milliseconds;
      }
      session-mode (automatic | multihop | singlehop);
      holddown-interval milliseconds;
    }
    layer2-liveness-detection {
      max-consecutive-retries number;
      transmit-interval interval;
    }
  }
}

```

```

}
overrides {
  allow-snooped-clients;
  always-write-giaddr;
  always-write-option-82;
  asymmetric-lease-time seconds;
  asymmetric-prefix-lease-time seconds;
  client-discover-match <option60-and-option82>;
  client-negotiation-match incoming-interface;
  disable-relay;
  dual-stack dual-stack-group-name;
  interface-client-limit number;
  layer2-unicast-replies;
  no-allow-snooped-clients;
  no-bind-on-request;
  proxy-mode;
  relay-source
  replace-ip-source-with;
  send-release-on-delete;
  trust-option-82;
}
relay-agent-interface-id {
  include-irb-and-l2;
  keep-incoming-interface-id ;
  no-vlan-interface-name;
  prefix prefix;
  use-interface-description (logical | device);
  use-option-82 <strict>;
  use-vlan-id;
}
relay-agent-remote-id {
  include-irb-and-l2;
  keep-incoming-remote-id ;
  no-vlan-interface-name;
  prefix prefix;
  use-interface-description (logical | device);
  use-option-82 <strict>;
  use-vlan-id;
}
relay-option {
  option-number option-number;
  default-action {
    drop;
    forward-only;
    local-server-group local-server-group;
    relay-server-group relay-server-group;
  }
  equals (ascii ascii-string | hexadecimal hexadecimal-string) {
    drop;
    forward-only;
    local-server-group local-server-group;
    relay-server-group relay-server-group;
  }
  starts-with (ascii ascii-string | hexadecimal hexadecimal-string) {
    drop;
  }
}

```

```

forward-only;
local-server-group local-server-group;
relay-server-group relay-server-group;
}
}
relay-option-82 {
circuit-id {
prefix prefix;
use-interface-description (logical | device);
use-option-82;
}
remote-id {
prefix prefix;
use-interface-description (logical | device);
}
server-id-override
}
remote-id-mismatch disconnect;
route-suppression;
service-profile dynamic-profile-name;
short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
}

```

Hierarchy Level [edit forwarding-options [dhcp-relay](#)],
[edit forwarding-options dhcp-relay [dhcpv6](#)],
[edit logical-systems *logical-system-name* forwarding-options [dhcp-relay](#) ...],
[edit logical-systems *logical-system-name* routing-instances *routing-instance-name*
forwarding-options [dhcp-relay](#) ...],
[edit routing-instances *routing-instance-name* forwarding-options dhcp-relay ...]

Release Information Statement introduced in Junos OS Release 8.3.
Support at the [edit ... [dhcpv6](#)] hierarchy levels introduced in Junos OS Release 11.4.
Statement introduced in Junos OS Release 12.1 for EX Series switches.

Description Specify the name of a group of interfaces that have a common DHCP or DHCPv6 relay agent configuration. A group must contain at least one interface. Use the statement at the [edit ... [dhcpv6](#)] hierarchy levels to configure DHCPv6 support.

Options *group-name*—Name of a group of interfaces that have a common DHCP or DHCPv6 relay agent configuration.

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 interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.

- Related Documentation**
- [Extended DHCP Relay Agent Overview on page 632](#)
 - [Understanding the Extended DHCP Relay Agent for EX Series Switches on page 634](#)
 - [Configuring an Extended DHCP Relay Server on EX Series Switches \(CLI Procedure\) on page 626](#)
 - [Configuring Group-Specific DHCP Relay Options on page 706](#)
 - [Grouping Interfaces with Common DHCP Configurations on page 704](#)
 - [Using External AAA Authentication Services with DHCP on page 682](#)
 - [Attaching Dynamic Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces on page 681](#)
 - *DHCP Liveness Detection Using ARP and Neighbor Discovery Packets*

group (System Services DHCP)

Syntax

```
group group-name {
  authentication {
    password password;
    username-include {
      circuit-type;
      client-id;
      delimiter delimiter-character;
      domain-name domain-name;
      interface-name;
      logical-system-name;
      relay-agent-interface-id;
      relay-agent-remote-id;
      relay-agent-subscriber-id;
      routing-instance-name;
      user-prefix user-prefix;
    }
  }
  dynamic-profile {
    profile-name;
    aggregate-clients {
      merge;
      replace;
    }
    junos-default-profile;
    use-primary dynamic-profile;
  }
  interface interface-name {
    dynamic-profile {
      profile-name;
      aggregate-clients {
        merge;
        replace;
      }
      junos-default-profile;
      use-primary dynamic-profile-name;
    }
    exclude;
    overrides {
      delegated-pool pool-name;
      interface-client-limit number;
      process-inform {
        pool pool-name;
      }
      rapid-commit ;
    }
    service-profile service-profile-name
    trace ;
    upto interface-name;
  }
  liveness-detection {
    failure-action {
```



```

clear-binding;
clear-binding-if-interface-up;
log-only;
}
method {
bfd {
detection-time {
threshold milliseconds;
}
holddown-interval interval;
minimum-interval milliseconds;
minimum-receive-interval milliseconds;
multiplier number;
no-adaptation;
session-mode (automatic | multihop | single-hop);
transmit-interval {
minimum-interval milliseconds;
threshold milliseconds;
}
}
version (0 | 1 | automatic);
}
}
overrides {
delegated-pool pool-name;
interface-client-limit number;
process-inform {
pool pool-name;
}
}
rapid-commit ;
}
reconfigure {
attempts number;
clear-on-abort;
strict;
timeout number;
token token-name;
trigger {
radius-disconnect;
}
}
}
service-profile service-profile-name;
}

```

Hierarchy Level [edit system services dhcp-local-server dhcpv6]

Release Information Statement introduced in Junos OS Release 10.4.

Description Configure a group of interfaces that have a common configuration.
The remaining statements are explained separately. See [CLI Explorer](#).

- Options**
- *group-name*—Name of the group.



NOTE: SRX Series devices do not support DHCP client authentication.

The remaining statements are explained separately. See [CLI Explorer](#).

- | | |
|---------------------------------|--|
| Required Privilege Level | access—To view this statement in the configuration.
access-control—To add this statement to the configuration. |
| Related Documentation | <ul style="list-style-type: none">• DHCP Server, Client, and Relay Agent Overview on page 742• DHCP Server Configuration Overview on page 767 |

eapol-block

Syntax	<pre>eapol-block { server-fail { seconds; } mac-radius; captive-portal; }</pre>
Hierarchy Level	<p>[edit protocols dot1x authenticator interface (<i>interface-names</i>)], [edit protocols dot1x authenticator interface (all [<i>interface-names</i>]) server-reject-vlan], [edit protocols dot1x authenticator interface (all [<i>interface-names</i>]) server-reject-vlan (<i>vlan-id</i> <i>vlan-name</i>)]</p>
Release Information	<p>Statement introduced in Junos OS Release 11.2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.</p> <p>Support at the [edit protocols dot1x authenticator interface <i>interface-name</i>] hierarchy level introduced in Junos OS Releases 14.1X53-D40 and 15.1X53-D51 for EX Series switches.</p> <p>Support for options mac-radius and captive-portal introduced in Junos OS Release 17.2R1.</p>
Description	<p>Enable the switch to ignore Extensible Authentication Protocol over LAN (EAPoL)-Start messages received from a client that has been authenticated so that the switch does not trigger re-authentication. The switch typically attempts to restart the authentication procedure by contacting the authentication server when it receives an EAPoL-Start message from a client—even for authenticated clients. You can configure the eapol-block statement to help prevent unnecessary downtime that can occur when the switch waits for a response from the authentication server.</p> <p>If you configure the switch to block EAPoL-Start messages, when the switch receives an EAPoL-Start message from an authenticated client, the switch ignores the message and does not attempt to contact the authentication server for reauthentication. The existing authentication session that was established for the client remains open.</p> <p>The EAPoL-Start messages are blocked only if the client is in the authenticated state. EAPoL-Start messages from new clients are accepted.</p>
Default	<p>If the eapol-block statement is not configured, the switch attempts to contact the authentication server to authenticate the client when it receives an EAPoL-Start message.</p>
Options	<p>server-fail <i>seconds</i>—Configure the switch to ignore EAP-Start messages received from a client that has been authenticated using server fail fallback or server reject VLAN methods. Configure the time interval, in seconds, during which the switch will not attempt to contact the authentication server to re-authenticate a client that has already been authenticated using server fail fallback.</p> <p>Default: 120 seconds.</p>

Range: 120 through 65,535 seconds.

mac-radius (EX4300 and EX9200 switches only)—Configure the switch to ignore EAP-Start messages received from a client that has been authenticated using MAC RADIUS authentication. The **mac-radius** option is also valid for clients authenticated using central Web authentication (CWA).

captive-portal (EX4300 and EX9200 switches only)—Configure the switch to ignore EAP-Start messages received from a client that has been authenticated using captive portal authentication.

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

Related Documentation

- [block-interval on page 1207](#)
- [Example: Configuring Fallback Options on EX Series Switches for EAP-TTLS Authentication and Odyssey Access Clients on page 410](#)

elin

Syntax *elin number;*

Hierarchy Level [edit protocols **lldp-med interface** (all | *interface-name* **location**)]

Release Information Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description For Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED), configure the Emergency Line Identification Number (ELIN) as location information. Location information is advertised from the switch to the MED device and is used during emergency calls to identify the location of the MED device.

Default Disabled.

Options *number*—Configure a 10-digit number (area code and telephone number).

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

Related Documentation

- [show lldp on page 2109](#)
- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
- [Configuring LLDP-MED \(CLI Procedure\) on page 566](#)

encoding

Syntax	encoding (binary pem);
Hierarchy Level	[edit security ike policy <i>ike-peer-address</i>], [edit security certificates certification-authority <i>ca-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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	(Encryption interface on M Series and T Series routers and EX Series switches only) Specify the file format used for the local-certificate and local-key-pair statements.
Options	binary —Binary file format. pem —Privacy-enhanced mail (PEM), an ASCII base 64 encoded format. Default: binary
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"> • <i>Configuring the Type of Encoding Your CA Supports</i> • <i>Configuring the Type of Encoding Your CA Supports</i>

enhanced-accounting

Syntax	enhanced-accounting;
Hierarchy Level	[edit system radius-options] [edit system tacplus-options],
Release Information	Statement introduced in Junos OS Release 14.1.
Description	Configure audit of TACACS+ or RADIUS authentication events such as access method, remote port, and access privileges.
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">• radius-options on page 1663• tacplus-options on page 1810• Configuring RADIUS System Accounting on page 223• Configuring TACACS+ System Accounting on page 242

enhanced-avs-max

Syntax	enhanced-avs-max <number>;
Hierarchy Level	[edit system accounting]
Release Information	Statement introduced in Junos OS Release 14.1.
Description	Configure the number of attribute values to be displayed.
Options	<p><number>—Number of attribute values.</p> <p>Range: 7 through 15</p> <p>Default: 7</p>
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">• accounting on page 1136• enhanced-accounting on page 1370• Configuring RADIUS System Accounting on page 223• Configuring TACACS+ System Accounting on page 242


enrollment-retry

Syntax	<code>enrollment-retry <i>attempts</i>;</code>
Hierarchy Level	[edit security certificates]
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 14.1X53-D20 for the OCX Series.
Description	(Encryption interface on M Series and T Series routers and EX Series switches only) Specify how many times a router or switch can resend a digital certificate request.
Options	<i>attempts</i> —Number of enrollment retries. Range: 0 through 100 Default: 0
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"><i>Configuring the Number of Enrollment Retries</i>

enrollment-url

Syntax	<code>enrollment-url <i>url-name</i>;</code>
Hierarchy Level	[edit security certificates certification-authority <i>ca-profile-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 the OCX Series.</p>
Description	<p>(Encryption interface on M Series and T Series routers and EX Series switches only)</p> <p>Specify where your router or switch sends Simple Certificate Enrollment Protocol-based (SCEP-based) certificate enrollment requests (certificate authority URL).</p>
Options	<i>url-name</i> —Certificate authority URL.
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"> • <i>Specifying an Enrollment URL</i>

ethernet-port-type-virtual

Syntax	ethernet-port-type-virtual;
Hierarchy Level	[edit access profile <i>profile-name</i> radius options]
Release Information	Statement introduced in Junos OS Release 9.1. Statement introduced in Junos OS Release 9.1 for EX Series switches.
Description	Specify the physical port type the router or switch uses to authenticate clients. The router or switch passes a port type of ethernet in RADIUS attribute 61 (NAS-Port-Type) by default. This statement specifies a port type of virtual .
<div> NOTE: This statement takes precedence over the nas-port-type statement if you include both statements in the same access profile.</div>	
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">• <i>Configuring RADIUS Server Options for Subscriber Access</i>• <i>Configuring RADIUS Server Parameters for Subscriber Access</i>

ethernet-switching-options

List of Syntax [EX Series on page 1375](#)
 [QFX Series, QFabric, EX4600 on page 1378](#)

```

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;
                        }
                    }
                }
            }
            bpdv-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">• <i>Understanding Port Mirroring</i>• <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>• Understanding 802.1X and VoIP on EX Series Switches on page 451• <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>

events

Syntax	<code>events [<i>events</i>];</code>
Hierarchy Level	[edit system accounting]
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 types of events to track and log.
Options	<i>events</i> —Event types; can be one or more of the following: <ul style="list-style-type: none">• change-log—Audit configuration changes.• interactive-commands—Audit interactive commands (any command-line input).• login—Audit logins.
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 TACACS+ Auditing and Accounting Events on page 242

exclude (RADIUS Attributes)

Syntax

```
exclude {
  acc-aggr-cir-id-asc [ access-request | accounting-start | accounting-stop ];
  acc-aggr-cir-id-bin [ access-request | accounting-start | accounting-stop ];
  acc-loop-cir-id [ access-request | accounting-start | accounting-stop ];
  acc-loop-encap [ access-request | accounting-start | accounting-stop ];
  acc-loop-remote-id [ access-request | accounting-start | accounting-stop ];
  accounting-authentic [ accounting-off | accounting-on | accounting-start | accounting-stop
  ]
  accounting-delay-time [ accounting-off | accounting-on | accounting-start |
  accounting-stop ];
  accounting-session-id access-request;
  accounting-terminate-cause accounting-off;
  acct-request-reason [ accounting-start | accounting-stop ];
  acct-tunnel-connection [ access-request | accounting-start | accounting-stop ];
  act-data-rate-dn [ access-request | accounting-start | accounting-stop ];
  act-data-rate-up [ access-request | accounting-start | accounting-stop ];
  act-interlv-delay-dn [ access-request | accounting-start | accounting-stop ];
  act-interlv-delay-up [ access-request | accounting-start | accounting-stop ];
  att-data-rate-dn [ access-request | accounting-start | accounting-stop ];
  att-data-rate-up [ access-request | accounting-start | accounting-stop ];
  called-station-id [ access-request | accounting-start | accounting-stop ];
  calling-station-id [ access-request | accounting-start | accounting-stop ];
  chargeable-user-identity access-request;
  class [ accounting-start | accounting-stop ];
  cos-shaping-rate [ accounting-start | accounting-stop ];
  delegated-ipv6-prefix [ accounting-start | accounting-stop ];
  dhcp-gi-address [ access-request | accounting-start | accounting-stop ];
  dhcp-header access-request;
  dhcp-mac-address [ access-request | accounting-start | accounting-stop ];
  dhcp-options [ access-request | accounting-start | accounting-stop ];
  dhcpv6-header access-request;
  dhcpv6-options [ access-request | accounting-start | accounting-stop ];
  downstream-calculated-qos-rate [ access-request | accounting-start | accounting-stop
  ];
  dsl-forum-attributes [ access-request | accounting-start | accounting-stop ];
  dsl-line-state [ access-request | accounting-start | accounting-stop ];
  dsl-type [ access-request | accounting-start | accounting-stop ];
  dynamic-iflset-name [ accounting-start | accounting-stop ];
  event-timestamp [ accounting-off | accounting-on | accounting-start | accounting-stop
  ];
  filter-id [ accounting-start | accounting-stop ];
  first-relay-ipv4-address [ access-request | accounting-start | accounting-stop ];
  first-relay-ipv6-address [ access-request | accounting-start | accounting-stop ];
  framed-interface-id [ access-request | accounting-start | accounting-stop ];
  framed-ip-address [ access-request | accounting-start | accounting-stop ];
  framed-ip-netmask [ access-request | accounting-start | accounting-stop ];
  framed-ip-route [ accounting-start | accounting-stop ];
  framed-ipv6-address [ access-request | accounting-start | accounting-stop ];
  framed-ipv6-pool [ accounting-start | accounting-stop ];
  framed-ipv6-prefix [ accounting-start | accounting-stop ];
  framed-ipv6-route [ accounting-start | accounting-stop ];
```

```

framed-pool [ accounting-start | accounting-stop ]; input-ipv6-gigawords accounting-stop;
input-filter [ accounting-start | accounting-stop ];
input-gigapackets accounting-stop;
input-gigawords accounting-stop;
input-ipv6-octets accounting-stop;
input-ipv6-packets accounting-stop;
interface-description [ access-request | accounting-start | accounting-stop ];
l2c-downstream-data [ access-request | accounting-start | accounting-stop ];
l2c-upstream-data [ access-request | accounting-start | accounting-stop ];
l2tp-rx-connect-speed [ access-request | accounting-start | accounting-stop ];
l2tp-tx-connect-speed [ access-request | accounting-start | accounting-stop ];
max-data-rate-dn [ access-request | accounting-start | accounting-stop ];
max-data-rate-up [ access-request | accounting-start | accounting-stop ];
max-interlv-delay-dn [ access-request | accounting-start | accounting-stop ];
max-interlv-delay-up [ access-request | accounting-start | accounting-stop ];
min-data-rate-dn [ access-request | accounting-start | accounting-stop ];
min-lp-data-rate-dn [ access-request | accounting-start | accounting-stop ];
min-lp-data-rate-up [ access-request | accounting-start | accounting-stop ];
nas-identifier [ access-request | accounting-off | accounting-on | accounting-start |
    accounting-stop ];
nas-port [ access-request | accounting-start | accounting-stop ];
nas-port-id [ access-request | accounting-start | accounting-stop ];
nas-port-type [ access-request | accounting-start | accounting-stop ];
output-filter [ accounting-start | accounting-stop ];
output-gigapackets accounting-stop;
output-gigawords accounting-stop;
output-ipv6-gigawords accounting-stop;
output-ipv6-octets accounting-stop;
output-ipv6-packets accounting-stop;
pppoe-description [ access-request | accounting-start | accounting-stop ];
standard-attribute number {
    packet-type [ access-request | accounting-off | accounting-on | accounting-start |
        accounting-stop ];
}
tunnel-assignment-id [ access-request | accounting-start | accounting-stop ];
tunnel-client-auth-id [ access-request | accounting-start | accounting-stop ];
tunnel-client-endpoint [ access-request | accounting-start | accounting-stop ];
tunnel-medium-type [ access-request | accounting-start | accounting-stop ];
tunnel-server-auth-id [ access-request | accounting-start | accounting-stop ];
tunnel-server-endpoint [ access-request | accounting-start | accounting-stop ];
tunnel-type [ access-request | accounting-start | accounting-stop ];
upstream-calculated-qos-rate [ access-request | accounting-start | accounting-stop ];
vendor-id id-number {
    vendor-attribute vsa-number {
        packet-type [ access-request | accounting-off | accounting-on | accounting-start |
            accounting-stop ];
    }
}
virtual-router [ access-request | accounting-start | accounting-stop ];
}

```

Hierarchy Level [edit access profile *profile-name* radius [attributes](#)]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.
downstream-calculated-qos-rate, **dsl-forum-attributes**, and **upstream-calculated-qos-rate** options added in Junos OS Release 11.4.
cos-shaping-rate and **filter-id** options added in Junos OS Release 13.2.
pppoe-description option added in Junos OS Release 14.2.
virtual-router option added in Junos OS Release 15.1.
first-relay-ipv4-address and **first-relay-ipv6-address** options added in Junos OS Release 16.1.
acc-loop-encap and **acc-loop-remote-id** options added in Junos OS Release 16.1R4.
access-request option support for all tunnel attributes added in Junos OS Release 15.1R7, 16.1R5, 16.2R2, 17.1R2, 17.2R2, and 17.3R1 for MX Series.
packet-type, **standard-attribute**, **vendor-attribute**, and **vendor-id** options added in Junos OS Release 18.1R1.

Description Configure the router or switch to exclude the specified attributes from being sent in the specified type of RADIUS message. Exclusion can be useful, for example, for attributes that do not change values over the lifetime of a subscriber. By not sending these attributes, you reduce the packet size without losing information. Contrast this behavior with that provided by the **ignore** statement.

You can specify attribute exclusion for multiple RADIUS message types by enclosing the message types, separated by spaces, within brackets ([]). You do not need brackets when specifying a single message type.

Starting in Junos OS Release 18.1R1, you can specify standard RADIUS attributes with the attribute number. You can specify VSAs with the IANA-assigned vendor ID and the VSA number. With this flexible configuration method, you can configure any standard attribute and VSA supported by your platform to be excluded. The configuration has no effect if you configure unsupported attributes, vendors, and VSAs.

The legacy method allows you to configure only those attributes and VSAs for which the statement syntax includes a specific option. Consequently, you can use the legacy method to exclude only a subset of all attributes that can be received in Access-Accept messages.

Not all attributes are available in all types of RADIUS messages.



NOTE: If you exclude an attribute from Acct-Off messages, the attributes are then excluded from Interim-Acct messages.



NOTE: VSAs with dedicated option names include Juniper Networks (IANA vendor ID 4874) and DSL Forum (vendor ID 3561) VSAs.

Options RADIUS attribute—RADIUS standard attribute or VSA:

- **acc-aggr-cir-id-asc**—Exclude Juniper Networks VSA 26-112, Acc-Aggr-Cir-Id-Asc.
- **acc-aggr-cir-id-bin**—Exclude Juniper Networks VSA 26-111, Acc-Aggr-Cir-Id-Bin.
- **acc-loop-cir-id**—Exclude Juniper Networks VSA 26-110, Acc-Loop-Cir-Id.
- **acc-loop-encap**—Exclude Juniper Networks VSA 26-183, Acc-Loop-Encap.
- **acc-loop-remote-id**—Exclude Juniper Networks VSA 26-182, Acc-Loop-Remote-Id.
- **accounting-authentic**—Exclude RADIUS attribute 45, Acct-Authentic.
- **accounting-delay-time**—Exclude RADIUS attribute 41, Acct-Delay-Time.
- **accounting-session-id**—Exclude RADIUS attribute 44, Acct-Session-Id.
- **accounting-terminate-cause**—Exclude RADIUS attribute 49, Acct-Terminate-Cause.
- **acct-request-reason**—Exclude Juniper Networks VSA 26-210, Acct-Request-Reason.
- **acct-tunnel-connection**—Exclude RADIUS attribute 68, Acct-Tunnel-Connection.
- **act-data-rate-dn**—Exclude Juniper Networks VSA 26-114, Act-Data-Rate-Dn.
- **act-data-rate-up**—Exclude Juniper Networks VSA 26-113, Act-Data-Rate-Up.
- **act-interlv-delay-dn**—Exclude Juniper Networks VSA 26-126, Act-Interlv-Delay-Dn.
- **act-interlv-delay-up**—Exclude Juniper Networks VSA 26-124, Act-Interlv-Delay-Up.
- **att-data-rate-dn**—Exclude Juniper Networks VSA 26-118, Att-Data-Rate-Dn.
- **att-data-rate-up**—Exclude Juniper Networks VSA 26-117, Att-Data-Rate-Up.
- **called-station-id**—Exclude RADIUS attribute 30, Called-Station-Id.
- **calling-station-id**—Exclude RADIUS attribute 31, Calling-Station-Id.
- **chargeable-user-identity**—Exclude RADIUS attribute 89, Chargeable-User-Identity.
- **class**—Exclude RADIUS attribute 25, Class.
- **cos-shaping-rate**—Exclude Juniper Networks VSA 26-177, Cos-Shaping-Rate.
- **delegated-ipv6-prefix**—Exclude RADIUS attribute 123, Delegated-IPv6-Prefix.
- **dhcp-gi-address**—Exclude Juniper Networks VSA 26-57, DHCP-GI-Address.
- **dhcp-header**—Exclude Juniper Networks VSA 26-208, DHCP-Header.
- **dhcp-mac-address**—Exclude Juniper Networks VSA 26-56, DHCP-MAC-Address.
- **dhcp-options**—Exclude Juniper Networks VSA 26-55, DHCP-Options.
- **dhcpv6-header**—Exclude Juniper Networks VSA 26-209, DHCPv6-Header.
- **dhcpv6-options**—Exclude Juniper Networks VSA 26-207, DHCPv6-Options.
- **dynamic-iflset-name**—Exclude Juniper Networks VSA 26-130, Qos-Set-Name.
- **downstream-calculated-qos-rate**—Exclude Juniper Networks VSA 26-141.

- **dsl-forum-attributes**—Exclude DSL Forum VSA (vendor ID 3561) as described in RFC 4679, *DSL Forum Vendor-Specific RADIUS Attributes*.
- **dsl-line-state**—Exclude Juniper Networks VSA 26-127, DSL-Line-State.
- **dsl-type**—Exclude Juniper Networks VSA 26-128, DSL-Type.
- **event-timestamp**—Exclude RADIUS attribute 55, Event-Timestamp.
- **filter-id**—Exclude RADIUS attribute 11, Filter-Id.
- **first-relay-ipv4-address** —Exclude Juniper Networks VSA 26-189, DHCP-First-Relay-IPv4-Address.
- **first-relay-ipv6-address** —Exclude Juniper Networks VSA 26-190, DHCP-First-Relay-IPv6-Address.
- **framed-interface-id**—Exclude RADIUS attribute 96, Framed-Interface-ID.
- **framed-ip-address**—Exclude RADIUS attribute 8, Framed-IP-Address.
- **framed-ip-netmask**—Exclude RADIUS attribute 9, Framed-IP-Netmask.
- **framed-ip-route**—Exclude RADIUS attribute 22, Framed-Route.
- **framed-ipv6-address**—Exclude RADIUS attribute 168, Framed-IPv6-Address.
- **framed-ipv6-pool**—Exclude RADIUS attribute 100, Framed-IPv6-Pool.
- **framed-ipv6-prefix**—Exclude RADIUS attribute 97, Framed-IPv6-Prefix.
- **framed-ipv6-route**—Exclude RADIUS attribute 99, Framed-IPv6-Route.
- **framed-pool**—Exclude RADIUS attribute 88, Framed-Pool.
- **input-filter**—Exclude Juniper Networks VSA 26-10, Ingress-Policy-Name.
- **input-gigapackets**—Exclude Juniper Networks VSA 26-42, Acct-Input-Gigapackets.
- **input-gigawords**—Exclude RADIUS attribute 52, Acct-Input-Gigawords.
- **input-ipv6-gigawords**—Exclude Juniper Networks VSA 26-155, Acct-Input-IPv6-Gigawords.
- **input-ipv6-octets**—Exclude Juniper Networks VSA 26-151, Acct-Input-IPv6-Octets.
- **input-ipv6-packets**—Exclude Juniper Networks VSA 26-153, Acct-Input-IPv6-Packets.
- **interface-description**—Exclude Juniper Networks VSA 26-53, Interface-Desc.
- **l2c-downstream-data**—Exclude Juniper Networks VSA 26-93, L2C-Down-Stream-Data.
- **l2c-upstream-data**—Exclude Juniper Networks VSA 26-92, L2C-Up-Stream-Data.
- **l2tp-rx-connect-speed**—Exclude Juniper Networks VSA 26-163, Rx-Connect-Speed.
- **l2tp-tx-connect-speed**—Exclude Juniper Networks VSA 26-162, Tx-Connect-Speed.
- **max-data-rate-dn**—Exclude Juniper Networks VSA 26-120, Max-Data-Rate-Dn.
- **max-data-rate-up**—Exclude Juniper Networks VSA 26-119, Max-Data-Rate-Up.
- **max-interlv-delay-dn**—Exclude Juniper Networks VSA 26-125, Max-Interlv-Delay-Dn.

- **max-interlv-delay-up**—Exclude Juniper Networks VSA 26-123, Max-Interlv-Delay-Up.
- **min-data-rate-dn**—Exclude Juniper Networks VSA 26-116, Min-Data-Rate-Dn.
- **min-data-rate-up**—Exclude Juniper Networks VSA 26-115, Min-Data-Rate-Up.
- **min-lp-data-rate-dn**—Exclude Juniper Networks VSA 26-122, Min-Lp-Data-Rate-Dn.
- **min-lp-data-rate-up**—Exclude Juniper Networks VSA 26-121, Min-Lp-Data-Rate-Up.
- **nas-identifier**—Exclude RADIUS attribute 32, NAS-Identifier.
- **nas-port**—Exclude RADIUS attribute 5, NAS-Port.
- **nas-port-id**—Exclude RADIUS attribute 87, NAS-Port-Id.
- **nas-port-type**—Exclude RADIUS attribute 61, NAS-Port-Type.
- **output-filter**—Exclude Juniper Networks VSA 26-11, Egress-Policy-Name.
- **output-gigapackets**—Exclude Juniper Networks VSA 26-43, Acct-Output-Gigapackets.
- **output-gigawords**—Exclude RADIUS attribute 53, Acct-Output-Gigawords.
- **output-ipv6-gigawords**—Exclude Juniper Networks VSA 26-156, Acct-Output-IPv6-Gigawords.
- **output-ipv6-octets**—Exclude Juniper Networks VSA 26-152, Acct-Output-IPv6-Octets.
- **output-ipv6-packets**—Exclude Juniper Networks VSA 26-154, Acct-Output-IPv6-Packets.
- **packet-type**—Specify the RADIUS message type to exclude; term required when excluding a standard attribute or VSA by number rather than name. You can enclose multiple values in square brackets to specify a list of message types. Message types include Access-Request, Accounting-Off, Accounting-Off, Accounting-Start, and Accounting-Stop.
- **pppoe-description**—Exclude Juniper Networks VSA 26-24, PPPoE-Description.
- **standard-attribute *number***—RADIUS standard attribute number supported by your platform. If you configure an unsupported attribute, that configuration has no effect. When you use this option, you must use the **packet-type** term to specify the message from which the attribute is excluded.
- **tunnel-assignment-id**—Exclude RADIUS attribute 82, Tunnel-Assignment-ID.
- **tunnel-client-auth-id**—Exclude RADIUS attribute 90, Tunnel-Client-Auth-ID.
- **tunnel-client-endpoint**—Exclude RADIUS attribute 66, Tunnel-Client-Endpoint.
- **tunnel-medium-type**—Exclude RADIUS attribute 65, Tunnel-Medium-Type.
- **tunnel-server-auth-id**—Exclude RADIUS attribute 91, Tunnel-Server-Auth-ID.
- **tunnel-server-endpoint**—Exclude RADIUS attribute 67, Tunnel-Server-Endpoint.
- **tunnel-type**—Exclude RADIUS attribute 64, Tunnel-Type.
- **upstream-calculated-qos-rate**—Exclude Juniper Networks VSA 26-142

- **vendor-attribute *vsa-number***—Number identifying a VSA belonging to the specified vendor; both must be supported by your platform. If you configure an unsupported VSA, that configuration has no effect. When you use this option, you must use the **packet-type** term to specify the message from which the attribute is excluded.
- **vendor-id *id-number***—IANA vendor ID supported by your platform. If you configure an unsupported vendor ID, that configuration has no effect.
- **virtual-router**—Exclude Juniper Networks VSA 26-1.


RADIUS message type:

- **access-request**—RADIUS Access-Request messages.
- **accounting-off**—RADIUS Accounting-Off messages.
- **accounting-on**—RADIUS Accounting-On messages.
- **accounting-start**—RADIUS Accounting-Start messages.
- **accounting-stop**—RADIUS Accounting-Stop messages.

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">• <i>Filtering RADIUS Attributes and VSAs from RADIUS Messages</i>• <i>Configuring RADIUS Server Parameters for Subscriber Access</i>• <i>AAA Access Messages and Supported RADIUS Attributes and Juniper Networks VSAs for Junos OS</i>• <i>AAA Accounting Messages and Supported RADIUS Attributes and Juniper Networks VSAs for Junos OS</i>
------------------------------	--

excluded-address

Syntax	excluded-address;
Hierarchy Level	[edit access address assignment-address pool]
Release Information	Statement introduced in Junos OS Release 15.1X49-D20.
Description	<p>Allows you to exclude select IPv4 or IPv6 addresses from a DHCP address pool. Within a configured address pool, you can specifically exclude up to 20 addresses. Junos OS will not assign these excluded addresses to any clients. If you configure an excluded address that has already been assigned to a DHCP client, that excluded address will be revoked from the client.</p> <p>.....</p> <div>  <p>NOTE: Excluded addresses must match the address family of the configured address pool. For example, you cannot exclude an IPv4 address within an IPv6 address pool.</p> <p>.....</p> </div>
Required Privilege Level	<p>access—To view this statement in the configuration.</p> <p>access-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • address-assignment (Access) on page 1152

external-authority

Syntax	external-authority;
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server pool-match-order],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server pool-match-order],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server pool-match-order],</p> <p>[edit system services dhcp-local-server pool-match-order]</p>
Release Information	<p>Statement introduced in Junos OS Release 10.0.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Specify that an external authority (for example, RADIUS or Diameter) provides the address assignment.</p> <p>When RADIUS is the external authority, the router uses the Framed-IPv6-Pool attribute (RADIUS attribute 100) to select the pool. When Diameter is the external authority, the router uses the Diameter counterpart of RADIUS Framed-IPv6-Pool attribute.</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">• Configuring How the Extended DHCP Local Server Determines Which Address-Assignment Pool to Use on page 723• Extended DHCP Local Server Overview on page 611• Address-Assignment Pools Overview

failure-action

Syntax	<code>failure-action (clear-binding clear-binding-if-interface-up log-only);</code>
Hierarchy Level	<pre>[edit system services dhcp-local-server liveness-detection], [edit system services dhcp-local-server dhcpv6 liveness-detection], [edit forwarding-options dhcp-relay liveness-detection], [edit forwarding-options dhcp-relay dhcpv6 liveness-detection], [edit system services dhcp-local-server group <i>group-name</i> liveness-detection], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> liveness-detection], [edit forwarding-options dhcp-relay group <i>group-name</i> liveness-detection], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> liveness-detection]</pre>
Release Information	<p>Statement introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Configure the action the router (or switch) takes when a liveness detection failure occurs.
Options	<p>Default: <code>clear-binding</code></p> <p>clear-binding—The DHCP client session is cleared when a liveness detection failure occurs, except when <code>maintain-subscribers interface-delete</code> setting is configured and active.</p> <p>clear-binding-if-interface-up—The DHCP client session is cleared only when a liveness detection failure occurs and the local interface is detected as being up. Use this setting to distinguish failures from between a liveness detection failure due to a local network error, and a host disconnecting from the network. If the client binding is in the maintain-binding Finite State Machine (FSM) state when the liveness detection failure detection occurs, then the binding is not deleted. Not supported for Layer 2 ARP/ND liveness detection on MX Series routers.</p> <p>log-only—A message is logged to indicate the event; no action is taken and DHCP is left to manage the failure and maintain the client binding. Not supported for Layer 2 ARP/ND liveness detection on MX Series routers.</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"> • DHCP Liveness Detection Overview on page 707 • Configuring Detection of DHCP Local Server Client Connectivity with BFD on page 711 • Configuring Detection of DHCP Relay or DHCP Relay Proxy Client Connectivity with BFD on page 709 • <i>Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients</i>

- [Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714](#)

family (Security Forwarding Options)

Syntax

```
family {  
  inet6 {  
    mode (drop | flow-based | packet-based);  
  }  
  iso {  
    mode packet-based;  
  }  
  mpls {  
    mode packet-based;  
  }  
}
```

Hierarchy Level [edit security forwarding-options]

Release Information Statement introduced in Junos OS Release 8.5.

Description Determine the protocol family to be used for packet forwarding.



NOTE: Packet-based processing is not supported on the following SRX Series devices: SRX5400, SRX5600, and SRX5800.

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

- [MPLS Overview](#)

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 1711• <i>Configuring Health Monitoring</i>

fast-start (LLDP-MED)

Syntax	<code>fast-start count;</code>
Hierarchy Level	[edit protocols lldp-med]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure the number of Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED) advertisements sent from the switch in the first second after it has detected an LLDP-MED device (such as an IP telephone).
Options	count —Number of advertisements. Range: 1 through 10 Default: 3
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">• show lldp on page 2109• Configuring LLDP-MED (CLI Procedure) on page 566• Understanding LLDP and LLDP-MED on EX Series Switches on page 562

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"> • <i>Configuring the Interface Profile</i>

file

Syntax	<code>file <i>certificate-filename</i>;</code>
Hierarchy Level	[edit security certificates certification-authority <i>ca-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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	(Encryption interface on M Series and T Series routers and EX Series switches only) Specify the file from which to read the digital certificate.
Options	<i>certificate-filename</i> —File from which to read the digital certificate.
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">• <i>Specifying a File to Read the Digital Certificate</i>

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"> • <i>Configuring the Interface Profile</i> • <i>Configuring the Filter Profile</i> • <i>Configuring the MIB Profile</i> • <i>Configuring the Routing Engine Profile</i>

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	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Specify a log file to be used for accounting data.
Options	<i>filename</i> —Name of the file in which to write accounting data. 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">• <i>Configuring Accounting-Data Log Files</i>• <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>

file (System Logging)

Syntax

```
file filename {
    allow-duplicates;
    any (alert | any | critical | emergency | error | info | none | notice | warning);
    archive {
        archive-sites {
            url password;
        }
        (binary-data | no-binary-data);
        files number;
        size size;
        start-time start-time;
        transfer-interval transfer-interval;
        (world-readable | no-world-readable);
    }
    authorization (alert | any | critical | emergency | error | info | none | notice | warning);
    change-log (alert | any | critical | emergency | error | info | none | notice | warning);
    conflict-log (alert | any | critical | emergency | error | info | none | notice | warning);
    daemon (alert | any | critical | emergency | error | info | none | notice | warning);
    dfc (alert | any | critical | emergency | error | info | none | notice | warning);
    explicit-priority;
    external (alert | any | critical | emergency | error | info | none | notice | warning);
    firewall (alert | any | critical | emergency | error | info | none | notice | warning);
    ftp (alert | any | critical | emergency | error | info | none | notice | warning);
    interactive-commands (alert | any | critical | emergency | error | info | none | notice | warning);
    kernel (alert | any | critical | emergency | error | info | none | notice | warning);
    match "regular-expression";
    ntp (alert | any | critical | emergency | error | info | none | notice | warning);
    pfe (alert | any | critical | emergency | error | info | none | notice | warning);
    security (alert | any | critical | emergency | error | info | none | notice | warning);
    structured-data {
        brief;
    }
    user (alert | any | critical | emergency | error | info | none | notice | warning);
}
```

Hierarchy Level [edit system syslog]

Release Information Statement introduced before Junos OS Release 12.1X47 for SRX Series.

Description Specify the file in which to log data.

- Options**
- *filename*—Specify the name of the file in which to log data.
 - *allow-duplicates*—Do not suppress the repeated messages.
 - *any*—Specify all facilities information.
 - *alert*—Specify the conditions that should be corrected immediately.

- *critical*—Specify the critical conditions.
- *emergency*—Specify the conditions that cause security functions to stop.
- *error*—Specify the general error conditions.
- *info*—Specify the information about normal security operations.
- *none*—Do not specify any messages.
- *notice*—Specify the conditions that should be handled specifically.
- *warning*—Specify the general warning conditions.
- *archive*—Specify the archive file information.
 - *archive-sites*—Specify a list of destination URLs for the archived log files.
 - *url*—Specify the primary and failover URLs to receive archive files.
 - *binary-data*—Mark file such that it contains binary data.
 - *no-binary-data*—Do not mark the file such that it contains binary data.
 - *files*—Specify the number of files to be archived. Range: 1 through 1000 files.
 - *size*—Specify the size of files to be archived. Range: 65,536 through 1,073,741,824 bytes.
 - *world-readable*—Allow any user to read the log file.
 - *no-world-readable*—Do not allow any user to read the log file.
 - *start-time*—Specify the start time for file transmission. Enter the start time in the yyyy-mm-dd.hh:mm format.
 - *transfer-interval*—Specify the frequency at which to transfer the files to archive sites.
- *authorization*—Specify the authorization system.
- *change-log*—Specify the configuration change log.
- *conflict-log*—Specify the configuration conflict log.
- *daemon*—Specify the various system processes.
- *dfc*—Specify the dynamic flow capture.
- *explicit-priority*—Include the priority and facility in messages.
- *external*—Specify the local external applications.
- *firewall*—Specify the firewall filtering system.
- *ftp*—Specify the FTP process.
- *interactive-commands*—Specify the commands executed by the UI.
- *kernel*—Specify the kernel information.
- *match*—Specify the regular expression for lines to be logged.
- *ntp*—Specify the NTP process.

- *pfe*—Specify the Packet Forwarding Engine.
- *security*—Specify the security-related information.
- *structured-data*—Log the messages in structured log format.
 - *brief*—Omit English language text from the end of the logged message.
- *user*—Specify the user processes.
 - *info*—Specify the informational messages.

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

files

Syntax	<code>files <i>number</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 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"> • <i>Configuring Accounting-Data Log Files</i>

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">• <i>Filtering Duplicate SNMP Requests</i>• <i>Understanding the Implementation of SNMP on the QFabric System</i>• <i>Example: Configuring SNMP</i>

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> <i>Configuring the Filter Profile</i>


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	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	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> .
Options	<i>profile-name</i> —Name of the filter 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	<ul style="list-style-type: none"><i>Firewall Filters Overview</i><i>Configuring the Filter Profile</i>

finger

Syntax	<pre>finger { connection-limit <i>limit</i>; rate-limit <i>limit</i>; }</pre>
Hierarchy Level	[edit system services]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	<p>Allow finger requests from remote systems to the local router.</p> <p>The remaining statements are explained separately.</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">• Configuring Finger Service for Remote Access to the Router on page 250

fingerprint-hash

Syntax	fingerprint-hash (md5 sha2-256);
Hierarchy Level	[edit system services ssh]
Release Information	Statement introduced in Junos OS Release 16.1.
Description	Configure the hash algorithm used by the SSH server when it displays key fingerprints.
Options	<p>md5—Enable the SSH server to use the MD5 algorithm.</p> <p>sha2-256—Enable the SSH server to use the sha2-256 algorithm. The default is sha2-256.</p>
	<div> NOTE: The FIPS image does not permit the use of MD5 fingerprints. On systems in FIPS mode, sha2-256 is the only available option.</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">• Configuring SSH Service for Remote Access to the Router or Switch on page 253

flow-tap-dtcp

Syntax	<pre> flow-tap-dtcp { ssh { connection-limit <i>limit</i>; rate-limit <i>limit</i>; } } </pre>
Hierarchy Level	[edit system services]
Release Information	Statement introduced in Junos OS Release 8.1.
Description	<p>Configure Dynamic Tasking Control Protocol (DTCP) sessions to run over SSH in support of the flow-tap, FlowTapLite, or radius-flow-tap services. Note that the flow-tap feature is not supported on outbound, or egress, traffic. Only inbound, or ingress, traffic is supported.</p> <p>This statement is required for DTCP-initiated subscriber secure policy mirroring (radius-flow-tap service).</p>
Options	<p>connection-limit <i>limit</i>—(Optional) Maximum number of connections allowed. Range: 1 through 250 Default: 75</p> <p>rate-limit <i>limit</i>—(Optional) Maximum number of connection attempts allowed per minute. Range: 1 through 250 Default: 150</p>
Required Privilege Level	<p>flow-tap— To view this statement in the configuration.</p> <p>flow-tap-control— To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring a DTCP-over-SSH Connection to the Mediation Device • Configuring Flow-Tap Security Properties on MX, M and T Series Routers • Configuring FlowTapLite on MX Series Routers and M320 Routers with FPCs • Configuring DTCP-over-SSH Service for the Flow-Tap Application on page 261

force-discover (dhcp-client)

Syntax	force-discover ;
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> dhcp-client force-discover]
Release Information	Statement introduced in Junos OS Release 15.1X49-D80.
Description	Forces the DHCP client to send a DHCP discover packet after one to three failed dhcp-request attempts. The force-discover option ensures that the DHCP server will assign the same or a new IP address to the client.
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 Optional DHCP Client Attributes on page 782• Minimum DHCP Client Configuration on page 780

format

Syntax	<code>format (sha1 sha256 sha512);</code>
Hierarchy Level	<code>[edit system login password]</code>
Release Information	Statement introduced in Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure the authentication algorithm for plain-text passwords.
Default	For Junos OS, the default encryption format is sha512 . For Junos-FIPS software, the default encryption format is sha1 .
Options	The hash algorithm that authenticates the password can be one of these algorithms: <ul style="list-style-type: none"> • sha1—Produces a 160-bit digest. The encrypted password starts with \$sha1\$. • sha256—Produces a 256-bit digest. The encrypted password starts with \$5\$. • sha512—Produces a 512-bit digest. The encrypted password starts with \$6\$.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	


forward-snooped-clients (DHCP Local Server)

Syntax	forward-snooped-clients (all-interfaces configured-interfaces non-configured-interfaces);
Hierarchy Level	[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server], [edit system services dhcp-local-server]
Release Information	Statement introduced in Junos OS Release 10.4. Statement introduced in Junos OS Release 12.3R2 for EX Series switches.
Description	Configure how the DHCP local server filters and handles DHCP snooped packets on the specified interfaces.
Options	all-interfaces —Perform the action on all interfaces. configured-interfaces —Perform the action only on interfaces that are configured as part of an interface group. non-configured-interfaces —Perform the action only on interfaces that are not configured as part of a group.
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">• DHCP Snooping Support on page 650• <i>Configuring DHCP Snooped Packets Forwarding Support for DHCP Local Server</i>

forward-snooped-clients (DHCP Relay Agent)

Syntax	<code>forward-snooped-clients (all-interfaces configured-interfaces non-configured-interfaces);</code>
Hierarchy Level	<code>[edit forwarding-options dhcp-relay],</code> <code>[edit forwarding-options dhcp-relay dhcpv6],</code> <code>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i></code> <code>forwarding-options dhcp-relay],</code> <code>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay]</code>
Release Information	<p>Statement introduced in Junos OS Release 10.4.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Support at the <code>[edit forwarding-options dhcp-relay dhcpv6]</code> hierarchy level introduced in Junos OS Release 15.1X53-D56 for EX Series switches and Junos OS Release 17.1R1.</p>
Description	<p>Configure how DHCP relay agent filters and handles DHCP snooped packets on the specified interfaces. The router or switch determines the DHCP snooping action to perform based on a combination of the forward-snooped-clients configuration and the configuration of either the allow-snooped-clients statement or the no-allow-snooped-clients statement.</p> <p>The router (or switch) also uses this statement to determine how to handle snooped BOOTREPLY packets received on non-configured interfaces.</p>
Options	<p>all-interfaces—Perform the action on all interfaces.</p> <p>Default: On EX Series switches, the action is performed on all interfaces by default.</p> <p>configured-interfaces—Perform the action only on interfaces that are configured as part of an interface group.</p> <p>non-configured-interfaces—Perform the action only on interfaces that are not part of a group.</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"> • DHCP Snooping Support on page 650 • Configuring DHCP Snooped Packets Forwarding Support for DHCP Relay Agent on page 655

forwarding-class (VoIP)

Syntax	forwarding-class <assured-forwarding best-effort expedited-forwarding network-control>;
Hierarchy Level	<p>[edit ethernet-switching-options voip interface <all <i>interface-name</i> access-ports]></p> <p>[edit switch-options voip interface <all <i>interface-name</i> access-ports]></p>
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	For EX Series switches, configure the forwarding class used to handle packets on the VoIP interface.
	<p> NOTE: The forwarding-class statement at the [edit ethernet-switching-options voip interface <i>interface-name</i>] hierarchy level is used only by LLDP-MED for advertising capabilities VoIP phones. It is not used to classify VoIP traffic.</p>
Default	Disabled.
Options	<p>class—Forwarding class:</p> <ul style="list-style-type: none"> • assured-forwarding— Assured forwarding (AF)—Provides a group of values you can define and includes four subclasses: AF1, AF2, AF3, and AF4, each with three drop probabilities: low, medium, and high. • best-effort—Provides no service profile. For the best effort forwarding class, loss priority is typically not carried in a class-of-service (CoS) value, and random early detection (RED) drop profiles are more aggressive. • expedited-forwarding—Provides a low loss, low latency, low jitter, assured bandwidth, end-to-end service. • network-control—Provides a typically high priority because it supports protocol control.
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: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455 • Example: Configuring VoIP on an EX Series Switch Without Including 802.1X Authentication on page 468

forwarding-options (Security)

Syntax

```
forwarding-options {
  family {
    inet6 {
      mode (drop | flow-based | packet-based);
    }
    iso {
      mode packet-based;
    }
    mpls {
      mode packet-based;
    }
  }
}
```

Hierarchy Level [edit security]

Release Information Statement introduced in Junos OS Release 8.5 .

Description Determine how the **inet6**, **iso**, and **mpls** protocol families manage security forwarding options.



NOTE:

- Packet-based processing is not supported on the following SRX Series devices: SRX5400, SRX5600, and SRX5800.
- On SRX Series devices, the default mode for processing traffic is flow mode. To configure an SRX Series device as a border router, you must change the mode from flow-based processing to packet-based processing. Use the `set security forwarding-options family mpls mode packet-based` statement to configure the SRX device to packet mode. You must reboot the device for the configuration to take effect.

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

- *MPLS Overview*
- *Understanding Packet-Based Processing*
- *Understanding Traffic Processing on Security Devices*

ftp

Syntax	<pre>ftp { authentication-order [authentication-methods]; connection-limit limit; rate-limit limit; }</pre>
Hierarchy Level	[edit system services]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Allow FTP requests from remote systems to the local router or switch.
Options	The remaining statements are explained separately.
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 FTP Service for Remote Access to the Router or Switch on page 249

full-name

Syntax	<code>full-name <i>complete-name</i>;</code>
Hierarchy Level	[edit system login user]
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 OCX Series switches.
Description	Configure the complete name of a user.
Options	<i>complete-name</i> —Full name of the user. If the name contains spaces, enclose it in quotation marks.
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 Junos OS User Accounts by Using a Configuration Group on page 84• user on page 1883

global (Gx-Plus)

Syntax	<pre>global { include-ipv6; max-outstanding-requests <i>number</i>; }</pre>
Hierarchy Level	[edit access gx-plus]
Release Information	Statement introduced in Junos OS Release 11.2. Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Description	<p>Configure global attributes for the Gx-Plus application.</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	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">• <i>Configuring Gx-Plus</i>

gx-plus (Gx-Plus)

Syntax	<pre> gx-plus { global { include-ipv6; max-outstanding-requests <i>number</i>; } partition <i>partition-name</i> { diameter-instance <i>instance-name</i>; destination-host <i>hostname</i>; destination-realm <i>realm</i>; } } </pre>
Hierarchy Level	[edit access]
Release Information	<p>Statement introduced in Junos OS Release 11.2.</p> <p>Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.</p>
Description	<p>Configure the Gx-Plus application to interact with a PCRF to authorize and provision subscribers.</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>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"> <i>Configuring Gx-Plus</i>

guest-vlan

Syntax	<code>guest-vlan (vlan-id vlan-name);</code>
Hierarchy Level	[edit protocols dot1x authenticator interface (all [<i>interface-names</i>])]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	Specify the VLAN to which an interface is moved when no 802.1X supplicants are connected on the interface. The VLAN specified must already exist on the switch.
Default	None
Options	<i>vlan-id</i> —VLAN tag identifier of the guest VLAN. <i>vlan-name</i> —Name of the guest VLAN.
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: Setting Up 802.1X in Conference Rooms to Provide Internet Access to Corporate Visitors on an EX Series Switch on page 361• Understanding Guest VLANs for 802.1X on Switches on page 375

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">• <i>Configuring Health Monitoring</i>• <i>Understanding Health Monitoring</i>

hold-multiplier

Syntax	hold-multiplier <i>number</i> ;
Hierarchy Level	[edit protocols lldp]
Release Information	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 QFX Series.
Description	Specify the multiplier used in combination with the advertisement-interval value to determine the length of time LLDP information is held before it is discarded. The default value is 4 (or 120 seconds).
Default	Disabled.
Options	<i>number</i> —A number used as a multiplier. Range: 2 through 10 Default: 4 (or 120 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">• show lldp on page 2109• Configuring LLDP (CLI Procedure) on page 556• Understanding LLDP and LLDP-MED on EX Series Switches on page 562• Understanding LLDP on page 555

holddown-interval

Syntax	<code>holddown-interval <i>milliseconds</i>;</code>
Hierarchy Level	<p>[edit system services dhcp-local-server liveness-detection method bfd], [edit system services dhcp-local-server dhcpv6 liveness-detection method bfd], [edit forwarding-options dhcp-relay liveness-detection method bfd], [edit forwarding-options dhcp-relay dhcpv6 liveness-detection method bfd], [edit system services dhcp-local-server group <i>group-name</i> liveness-detection method bfd], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> liveness-detection method bfd], [edit forwarding-options dhcp-relay group <i>group-name</i> liveness-detection method bfd], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> liveness-detection method bfd]</p>
Release Information	<p>Statement introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Configure the time (in milliseconds) for which Bidirectional Forwarding Detection (BFD) holds a session up notification.
Options	<p><i>milliseconds</i>—Interval specifying how long a BFD session must remain up before a state change notification is sent.</p> <p>Range: 0 through 255,000</p> <p>Default: 0</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"> • Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients • Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714

host (SSH Known Hosts)

Syntax	<pre> host <i>hostname</i> { dsa-key <i>dsa-key</i>; ecdsa-sha2-nistp256-key <i>ecdsa-sha2-nistp256-key</i>; ecdsa-sha2-nistp384-key <i>ecdsa-sha2-nistp384-key</i>; ecdsa-sha2-nistp521-key <i>ecdsa-sha2-nistp521-key</i>; ed25519-key <i>ed25519-key</i> rsa-key <i>rsa-key</i>; rsa1-key <i>rsa1-key</i>; } </pre>
Hierarchy Level	[edit security ssh-known-hosts]
Release Information	Statement modified in Junos OS Release 8.5.
Description	Configure the type of base-64 encoded host key.
Options	<ul style="list-style-type: none"> • <i>hostname</i>—Name of the SSH known host. • <i>dsa-key dsa-key</i>—Digital Signature Algorithm (DSA) for SSH version 2 • <i>ecdsa-sha2-nistp256-key ecdsa-sha2-nistp256-key</i>—Elliptic Curve Digital Signature Algorithm (ECDSA) • <i>ecdsa-sha2-nistp384-key ecdsa-sha2-nistp384-key</i>—Elliptic Curve Digital Signature Algorithm (ECDSA) • <i>ecdsa-sha2-nistp521-key ecdsa-sha2-nistp521-key</i>—Elliptic Curve Digital Signature Algorithm (ECDSA) • <i>ed25519-key ed25519-key</i>—Elliptic Curve Digital Signature Algorithm (ed25519 for ECDSA) • <i>rsa-key rsa-key</i>—RSA public key algorithm, which supports encryption and digital signatures for SSH version 1 and SSH version 2 • <i>rsa1-key rsa1-key</i>—RSA public key algorithm, which supports encryption and digital signatures for SSH version 1
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"> • Generating SSL Certificates for Secure Web Access (SRX Series Devices) on page 330 • Generating a Self-Signed SSL Certificate Automatically on page 331

hostkey-algorithm

Syntax

```
hostkey-algorithm {
  (no-ssh-dss | ssh-dss);
  (no-ssh-rsa | ssh-rsa);
  (no-ssh-ecdsa | ssh-ecdsa);
  (no-ssh-ed25519 | ssh-ed25519);
}
```

Hierarchy Level [edit system services ssh]

Release Information Statement introduced in Junos OS Release 11.2.

Description Allow or disallow a host-key algorithm to authenticate another host through SSH protocol. The host-key uses RSA, ECDSA, ED25519, and DSS algorithms.

The following are the behaviors when the **hostkey-algorithm** option is configured with SSH client and SSH server:

- On SSH client the host-key algorithms that are supported when talking to a server are:
 - a. RSA: Equal or greater-than to 1024 bit
 - b. ECDSA: 256, 384, or 521 bit
 - c. ED25519: 256 bit
 - d. DSS: 1024 bit
- On SSH server the host-key algorithms that are generated and stored are:
 - a. RSA: 2048 bit
 - b. ECDSA: 256 bit
 - c. ED25519: 256 bit
 - d. DSS: 1024 bit

- Options**
- **ssh-ecdsa**—Allow generation of an ECDSA host-key. Key pair sizes of 256, 384, or 521 bits are compatible with ECDSA.
 - **ssh-dss**—Allow generation of a 1024-bit DSA host-key.



NOTE: DSA keys are not supported in FIPS, so the **ssh-dss** option is not available on systems operating in FIPS mode.

- **ssh-rsa**—Allow generation of RSA host-key. Key pair sizes greater than or equal to 1024 are compatible with RSA.

- **no-ssh-dss**—Do not allow generation of a 1024-bit Digital Signature Algorithm (DSA) host-key.
- **no-ssh-ecdsa**—Do not allow generation of an Elliptic Curve Digital Signature Algorithm (ECDSA) host-key.
- **no-ssh-rsa**—Do not allow generation of an RSA host-key.

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

Related Documentation

- [Generating SSL Certificates for Secure Web Access \(SRX Series Devices\) on page 330](#)
- [Generating a Self-Signed SSL Certificate Automatically on page 331](#)

http

Syntax

```
http {  
    interfaces [ interface-names ];  
    port port;  
}
```

Hierarchy Level [edit [system services web-management](#)]

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 port and interfaces for HTTP service, which is unencrypted.

Options **interfaces [*interface-names*]**—Name of one or more interfaces on which to allow the HTTP service. By default, HTTP access is allowed through built-in Fast Ethernet or Gigabit Ethernet interfaces only.

The remaining statement is 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

- [Configuring Management Access for the EX Series Switch \(J-Web Procedure\)](#)
- [J-Web Interface User Guide](#)
- [https on page 1425](#)
- [port on page 1621](#)
- [web-management on page 1908](#)

https

Syntax	<pre>https { interfaces [<i>interface-names</i>]; local-certificate <i>name</i>; port <i>port</i>; }</pre>
Hierarchy Level	[edit system services web-management]
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 secure version of HTTP (HTTPS) service, which is encrypted.
Options	<p>interfaces [<i>interface-names</i>]—Name of one or more interfaces on which to allow the HTTPS service. By default, HTTPS access is allowed through any ingress interface, but HTTP access is allowed through built-in Fast Ethernet or Gigabit Ethernet interfaces only.</p> <p>local-certificate <i>name</i>—Name of the X.509 certificate for a Secure Sockets Layer (SSL) connection. An SSL connection is configured at the [edit security certificates local] hierarchy.</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"> • <i>Configuring Management Access for the EX Series Switch (J-Web Procedure)</i> • <i>J-Web Interface User Guide</i> • http on page 1424 • port on page 1621 • web-management on page 1908



icmpv4-rate-limit

Syntax	<pre>icmpv4-rate-limit { bucket-size <i>seconds</i>; packet-rate <i>pps</i>; }</pre>
Hierarchy Level	[edit system internet-options]
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 rate-limiting parameters for ICMPv4 messages sent.
Options	<p>bucket-size <i>seconds</i>—Number of seconds in the rate-limiting bucket. Range: 0 through 4294967295 seconds Default: 5</p> <p>packet-rate <i>pps</i>—Rate-limiting packets earned per second. Range: 0 through 4294967295 pps Default: 1000</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">• <i>Configuring Junos OS ICMPv4 Rate Limit for ICMPv4 Routing Engine Messages</i>• <i>Configuring Junos OS ICMPv6 Rate Limit for ICMPv6 Routing Engine Messages</i>


icmpv4-rate-limit

Syntax	<pre>icmpv4-rate-limit { bucket-size <i>seconds</i>; packet-rate <i>pps</i>; }</pre>
Hierarchy Level	[edit system internet-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	Configure rate-limiting parameters for ICMPv4 messages sent.
Options	<p>bucket-size <i>seconds</i>—Number of seconds in the rate-limiting bucket. Range: 0 through 4294967295 seconds Default: 5</p> <p>packet-rate <i>pps</i>—Rate-limiting packets earned per second. Range: 0 through 4294967295 pps Default: 1000</p>
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"> <i>Configuring Junos OS ICMPv4 Rate Limit for ICMPv4 Routing Engine Messages</i>

idle-timeout (System-Login)

Syntax	<code>idle-timeout <i>minutes</i>;</code>
Hierarchy Level	[edit system login class <i>class-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	For a login class, configure the maximum time that a session can be idle before the user is logged out of the router or switch. The session times out after remaining at the CLI operational mode prompt for the specified time.
Default	If you omit this statement, a user is never forced off the system after extended idle times.
	<div>  <p>NOTE: After you log in to a device from a shell prompt such as <code>csch</code>, if you start another program to run in the foreground of the CLI, the idle timer control is stopped from being computed. The calculation of idle time of the CLI session is restarted only after the foreground process exits and the control is returned to the shell prompt. When the restart of the idle-timer occurs, if no interaction from the user occurs on the shell, the user is automatically logged out after the expiry of the idle timeout value.</p> </div>
Options	<p><i>minutes</i>—Maximum idle time.</p> <p>Range: 0 through 4294967295 minutes</p>
	<div>  <p>NOTE: The timeout feature is disabled if the value of <i>minutes</i> is set to 0.</p> </div>
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 the Timeout Value for Idle Login Sessions on page 54 • user on page 1883

idle-timeout (Access)

Syntax	<code>idle-timeout <i>seconds</i>;</code>
Hierarchy Level	<code>[edit access group-profile <i>profile-name</i> ppp],</code> <code>[edit access profile <i>profile-name</i> client <i>client-name</i> ppp]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.
Description	<p>Configure the idle timeout for a user. The router might consider a PPP session to be idle because of the following reasons:</p> <ul style="list-style-type: none"> • There is no ingress traffic on the PPP session. • There is no egress traffic. • There is neither ingress or egress traffic on the PPP session. • There is no ingress or egress PPP control traffic. This is applicable only if keepalives are enabled.
Options	<p><i>seconds</i>—Number of seconds a user can remain idle before the session is terminated.</p> <p>Range: 0 through 4,294,967,295 seconds</p> <p>Default: 0</p>
<div>  NOTE: The [edit access] hierarchy is not available on QFabric systems. </div>	
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"> • <i>Configuring the PPP Attributes for a Group Profile</i> • <i>Configuring PPP Properties for a Client-Specific Profile</i> • <i>Applying PPP Attributes to L2TP LNS Subscribers with a User Group Profile</i>



idle-timeout

Syntax	<code>idle-timeout <i>minutes</i>;</code>
Hierarchy Level	<code>[edit system login class <i>class-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	For a login class, configure the maximum time that a session can be idle before the user is logged off the switch. The session times out after remaining at the CLI operational mode prompt for the specified time.
Default	If you omit this statement, a user is never forced off the system after extended idle times.
Options	<i>minutes</i> —Maximum idle time. Range: 0 through 4294967295 minutes
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 the Timeout Value for Idle Login Sessions on page 54

idle-timeout (System)

Syntax	<code>idle-timeout <i>idle-timeout</i>;</code>
Hierarchy Level	[edit system login]
Release Information	<p>Statement introduced in Junos OS Release 16.1 for the M Series, MX Series, and PTX Series.</p> <p>Statement introduced in Junos OS Release 15.1X49-D70 for the vSRX, SRX4100, SRX4200 and SRX1500 devices.</p>
Description	<p>Configure the maximum time for which the C shell or CLI console session can be idle. The user (including the root user) is logged out after the expiry of idle-timeout.</p>
Options	<p><i>idle-timeout</i>— Maximum idle time before logout.</p> <p>Range: 1 through 60 minutes</p>
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>

idle-timeout (System-Login)

Syntax	<code>idle-timeout <i>minutes</i>;</code>
Hierarchy Level	[edit system login class <i>class-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	For a login class, configure the maximum time that a session can be idle before the user is logged out of the router or switch. The session times out after remaining at the CLI operational mode prompt for the specified time.
Default	If you omit this statement, a user is never forced off the system after extended idle times.
<div>  <p>NOTE: After you log in to a device from a shell prompt such as <code>csch</code>, if you start another program to run in the foreground of the CLI, the idle timer control is stopped from being computed. The calculation of idle time of the CLI session is restarted only after the foreground process exits and the control is returned to the shell prompt. When the restart of the idle-timer occurs, if no interaction from the user occurs on the shell, the user is automatically logged out after the expiry of the idle timeout value.</p> </div>	
Options	<i>minutes</i> —Maximum idle time. Range: 0 through 4294967295 minutes
<div>  <p>NOTE: The timeout feature is disabled if the value of <i>minutes</i> is set to 0.</p> </div>	
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 the Timeout Value for Idle Login Sessions on page 54 • user on page 1883

ignore (RADIUS Attributes)

Syntax

```
ignore {
  dynamic-iflset-name;
  framed-ip-netmask;
  idle-timeout;
  input-filter;
  logical-system-routing-instance;
  output-filter;
  session-timeout;
  standard-attribute number;
  vendor-id id-number {
    vendor-attribute vsa-number;
  }
}
```

Hierarchy Level [edit access profile *profile-name* radius **attributes**]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.
idle-timeout, **session-timeout**, **standard-attribute**, **vendor-attribute**, and **vendor-id** options added in Junos OS Release 18.1R1.

Description Configure the router or switch to ignore the specified attributes in RADIUS Access-Accept messages. Standard attributes and VSAs received in RADIUS messages take precedence over internally provisioned attribute values. Ignoring the attributes enables your internally provisioned values to be used instead. Contrast this behavior with that provided by the **exclude** statement.

Starting in Junos OS Release 18.1R1, you can specify RADIUS standard attributes with the attribute number. You can specify vendor-specific attributes (VSAs) with the IANA-assigned vendor ID and the VSA number. With this flexible configuration method, you can configure any standard attribute and VSA supported by your platform to be ignored. The configuration has no effect if you can configure unsupported attributes, vendors, and VSAs.

The legacy method allows you to configure only those attributes and VSAs for which the statement syntax includes a specific option. Consequently, you can use the legacy method to ignore only a subset of all attributes that can be received in Access-Accept messages.

Options **dynamic-iflset-name**—Ignore Juniper Networks VSA 26-130, Qos-Set-Name.

framed-ip-netmask—Ignore RADIUS attribute 9, Framed-IP-Netmask.

idle-timeout—Ignore RADIUS attribute 28, Idle-Timeout.

input-filter—Ignore Juniper Networks VSA 26-10, Ingress-Policy-Name.

logical-system-routing-instance—Ignore Juniper Networks VSA 26-1.

output-filter—Ignore Juniper Networks VSA 26-11, Egress-Policy-Name.

session-timeout—Ignore RADIUS attribute 27, Session-Timeout.

standard-attribute *number*—RADIUS standard attribute number supported by your platform. You can enclose multiple values in square brackets to specify a list of attributes. If you configure an unsupported attribute, that configuration has no effect.

Range: 1 through 255

vendor-attribute *vsa-number*—Number identifying a VSA belonging to the specified vendor; both must be supported by your platform. You can enclose multiple values in square brackets to specify a list of VSAs. If you configure an unsupported VSA, that configuration has no effect.

Range: 1 through 255

vendor-id *id-number*—IANA vendor ID supported by your platform. If you configure an unsupported vendor ID, that configuration has no effect.

Range: 1 through 16777215

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">• <i>Filtering RADIUS Attributes and VSAs from RADIUS Messages</i>• <i>Configuring RADIUS Server Parameters for Subscriber Access</i>• <i>AAA Access Messages and Supported RADIUS Attributes and Juniper Networks VSAs for Junos OS</i>• <i>AAA Accounting Messages and Supported RADIUS Attributes and Juniper Networks VSAs for Junos OS</i>
------------------------------	--

ignore (RADIUS Attributes)

Syntax

```
ignore {
  dynamic-iflset-name;
  framed-ip-netmask;
  idle-timeout;
  input-filter;
  logical-system-routing-instance;
  output-filter;
  session-timeout;
  standard-attribute number;
  vendor-id id-number {
    vendor-attribute vsa-number;
  }
}
```

Hierarchy Level [edit access profile *profile-name* radius **attributes**]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.
idle-timeout, **session-timeout**, **standard-attribute**, **vendor-attribute**, and **vendor-id** options added in Junos OS Release 18.1R1.

Description Configure the router or switch to ignore the specified attributes in RADIUS Access-Accept messages. Standard attributes and VSAs received in RADIUS messages take precedence over internally provisioned attribute values. Ignoring the attributes enables your internally provisioned values to be used instead. Contrast this behavior with that provided by the **exclude** statement.

Starting in Junos OS Release 18.1R1, you can specify RADIUS standard attributes with the attribute number. You can specify vendor-specific attributes (VSAs) with the IANA-assigned vendor ID and the VSA number. With this flexible configuration method, you can configure any standard attribute and VSA supported by your platform to be ignored. The configuration has no effect if you can configure unsupported attributes, vendors, and VSAs.

The legacy method allows you to configure only those attributes and VSAs for which the statement syntax includes a specific option. Consequently, you can use the legacy method to ignore only a subset of all attributes that can be received in Access-Accept messages.

Options **dynamic-iflset-name**—Ignore Juniper Networks VSA 26-130, Qos-Set-Name.

framed-ip-netmask—Ignore RADIUS attribute 9, Framed-IP-Netmask.

idle-timeout—Ignore RADIUS attribute 28, Idle-Timeout.

input-filter—Ignore Juniper Networks VSA 26-10, Ingress-Policy-Name.

logical-system-routing-instance—Ignore Juniper Networks VSA 26-1.

output-filter—Ignore Juniper Networks VSA 26-11, Egress-Policy-Name.

session-timeout—Ignore RADIUS attribute 27, Session-Timeout.

standard-attribute *number*—RADIUS standard attribute number supported by your platform. You can enclose multiple values in square brackets to specify a list of attributes. If you configure an unsupported attribute, that configuration has no effect.

Range: 1 through 255

vendor-attribute *vsa-number*—Number identifying a VSA belonging to the specified vendor; both must be supported by your platform. You can enclose multiple values in square brackets to specify a list of VSAs. If you configure an unsupported VSA, that configuration has no effect.

Range: 1 through 255

vendor-id *id-number*—IANA vendor ID supported by your platform. If you configure an unsupported vendor ID, that configuration has no effect.

Range: 1 through 16777215

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">• <i>Filtering RADIUS Attributes and VSAs from RADIUS Messages</i>• <i>Configuring RADIUS Server Parameters for Subscriber Access</i>• <i>AAA Access Messages and Supported RADIUS Attributes and Juniper Networks VSAs for Junos OS</i>• <i>AAA Accounting Messages and Supported RADIUS Attributes and Juniper Networks VSAs for Junos OS</i>
------------------------------	--

ignore-port-bounce

Syntax	<code>ignore-port-bounce;</code>
Hierarchy Level	<code>[edit protocols dot1x authenticator interface <i>interface-name</i> mac-radius]</code>
Release Information	Statement introduced in Junos OS Release 17.3R1 for EX Series switches.
Description	Ignore the port-bounce command contained in a Change of Authorization (CoA) request. CoA requests are RADIUS messages that are used to dynamically modify an authenticated user session already in progress. CoA requests are sent from the authentication, authorization, and accounting (AAA) server to the switch, and are typically used to change the VLAN for the host based on device profiling. End devices such as printers do not have a mechanism to detect the VLAN change, so they do not renew the lease for their DHCP address in the new VLAN. The port bounce feature is used to force the end device to initiate DHCP re-negotiation by causing a link flap on the authenticated port. There is no configuration required to enable the port bounce feature.
Default	The port bounce feature is supported by default. If you do not configure the ignore-port-bounce statement, the switch responds to a port-bounce command by flapping the link to re-initiate DHCP negotiation for the end device.
Required Privilege Level	routing
Related Documentation	<ul style="list-style-type: none"> • Understanding RADIUS-Initiated Changes to an Authorized User Session on page 382

ip-address-first

Syntax	ip-address-first;
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server pool-match-order],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server pool-match-order],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server pool-match-order],</p> <p>[edit system services dhcp-local-server pool-match-order]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.0.</p> <p>Statement introduced in Junos OS Release 12.1 for EX Series switches.</p>
Description	<p>Configure the extended DHCP local server to use the IP address method to determine which address-assignment pool to use. The local server uses the IP address in the gateway IP address if one is present in the DHCP client PDU. If no gateway IP address is present, the local server uses the IP address of the receiving interface to find the address-assignment pool. The DHCP local server uses this method by default when no method is explicitly specified.</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">• Configuring How the Extended DHCP Local Server Determines Which Address-Assignment Pool to Use on page 723• Extended DHCP Local Server Overview on page 611• Address-Assignment Pools Overview

immediate-update

Syntax	<code>immediate-update;</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</i> accounting]</code>
Release Information	Statement introduced in Junos OS Release 9.1. Statement introduced in Junos OS Release 9.1 for EX Series switches.
Description	Configure the router or switch to send an Acct-Update message to the RADIUS accounting server on receipt of a response (for example, an ACK or timeout) to the Acct-Start message.
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"> • <i>Configuring RADIUS Server Parameters for Subscriber Access</i> • <i>Configuring Per-Subscriber Session Accounting</i>

include-ipv6 (Gx-Plus)

Syntax	<code>include-ipv6;</code>
Hierarchy Level	<code>[edit access gx-plus global]</code>
Release Information	Statement introduced in Junos OS Release 12.3. Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Description	Include IPv6 subscribers in Gx-Plus provisioning requests.
Default	By default, IPv6 subscribers are not included.
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"> • <i>Configuring Gx-Plus Global Attributes</i> • <i>Configuring Gx-Plus</i>

include-irb-and-l2

Syntax	include-irb-and-l2;
Hierarchy Level	<pre>[edit forwarding-options dhcp-relay dhcpv6 (relay-agent-interface-id relay-agent-remote-id)], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> (relay-agent-interface-id relay-agent-remote-id)], [edit forwarding-options dhcp-relay relay-option-82 (circuit-id remote-id)], [edit forwarding-options dhcp-relay group <i>group-name</i> relay-option-82 (circuit-id remote-id)], [edit logical-systems <i>logical-system-name</i> ... forwarding-options dhcp-relay dhcpv6 (relay-agent-interface-id relay-agent-remote-id)], [edit logical-systems <i>logical-system-name</i> ... forwarding-options dhcp-relay ... relay-option-82 (circuit-id remote-id)], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 (relay-agent-interface-id relay-agent-remote-id)], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ... relay-option-82 (circuit-id remote-id)], [edit vlans <i>vlan-name</i> forwarding-options dhcp-security dhcpv6-options option-18], [edit vlans <i>vlan-name</i> forwarding-options dhcp-security dhcpv6-options option-37]</pre>
Release Information	Statement introduced in Junos OS Release 14.1.



NOTE: The EX Series switches that support the `include-irb-and-l2` statement are the EX4300, EX4600, and EX9200 switches.

Description Include both the integrated routing and bridging (IRB) interface name and Layer 2 interface name in the **circuit-id** or **remote-id** value in the DHCP option 82 information. VLAN tags are global.

For leasequery and bulk leasequery operations that involve integrated routing and bridging (IRB) interfaces, you must configure DHCP relay agent to include the layer 2 interface name along with IRB name in the circuit ID of option 82. DHCP relay agent uses the layer 2 interface name when using leasequery or bulk leasequery to restore the lease database.

When you configure the **include-irb-and-l2** statement without including the **no-vlan-interface** statement, the format is as follows:

- Bridge domain:

```
(fe | ge)-fpc/pic/port.subunit:bridge-domain-name+irb.subunit
```

- VLAN:

```
(fe | ge)-fpc/pic/port.subunit:vlan-name+irb.subunit
```



NOTE: For remote systems, the *subunit* is required and is used to differentiate an interface.

When you configure both the **include-irb-and-l2** statement and the **use-vlan-id** statement, the format is as follows:

```
(fe | ge)-fpc/pic/port.subunit:svlan-id-vlan-id+irb.subunit
```



NOTE: The *svlan-id-vlan-id* represents the VLANs associated with the bridge domain.

When you configure both the **include-irb-and-l2** and **no-vlan-interface-name** statements, the format is as follows:

```
(fe | ge)-fpc/pic/port.subunit+irb.subunit
```

When you configure both the **include-irb-and-l2** and **use-interface-description** statements, the format displays the description for the Layer 2 interface:

```
l2_descr:vlan-name+irb.subunit
```

If you configure both the **include-irb-and-l2** and **use-interface-description** statements, and no description for the Layer 2 interface is found, the format displays the Layer 2 logical interface name:

```
(fe | ge)-fpc/pic/port.subunit:vlan-name+irb.subunit
```

When you configure the **include-irb-and-l2** statement with both the **no-vlan-interface-name** and **use-interface-description** statements, the format displays as follows:

```
l2_descr+irb.subunit
```

If you configure the **include-irb-and-l2** statement with both the **no-vlan-interface-name** and **use-interface-description** statements, and no description is found for the Layer 2 interface, the format displays as follows:

```
(fe | ge)-fpc/pic/port.subunit+irb.subunit
```

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

- Related Documentation**
- [Including a Textual Description in DHCP Options](#)
 - [Using DHCP Relay Agent Option 82 Information on page 657](#)
 - [Configuring DHCPv6 Relay Agent Options](#)

infranet-controller

Syntax

```
infranet-controller hostname {  
  address ip-address;  
  interface interface-name;  
  password password;  
  port port-number;  
}
```

Hierarchy Level [edit services [unified-access-control](#)]

Release Information Statement introduced in Junos OS Release 12.2 for EX Series switches.

Description Configure the switch's connection to the Junos Pulse Access Control Service network access control (NAC) device.

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 an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control \(CLI Procedure\) on page 519](#)
 - [Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service \(CLI Procedure\) on page 522](#)

interface (802.1X)

Syntax

```
interface (all | [ interface-names ]) {
  disable;
  guest-vlan (vlan-name | vlan-id);
  lldp-med-bypass;
  mac-radius <restrict>;
  maximum-requests number;
  no-reauthentication;
  quiet-period seconds;
  reauthentication {
    interval seconds;
  }
  retries number;
  server-fail (deny | permit | use-cache | vlan-id | vlan-name);
  server-reject-vlan (vlan-id | vlan-name) {
    eapol-block;
    block-interval block-interval;
  }
  server-timeout seconds;
  supplicant (single | single-secure | multiple);
  supplicant-timeout seconds;
  transmit-period seconds;
}
```

Hierarchy Level [edit protocols [dot1x authenticator](#)]

Release Information Statement introduced in Junos OS Release 9.0 for EX Series switches.
Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.

Description Configure 802.1X authentication for Port-Based Network Access Control for all interfaces or for specific interfaces.

Options **all**—Configure all interfaces for 802.1X authentication.

[*interface-names*]— List of names of interfaces to configure for 802.1X authentication.

The remaining statements are explained separately.

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

Related Documentation

- [show dot1x on page 2082](#)
- [Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch on page 367](#)
- [Example: Setting Up 802.1X in Conference Rooms to Provide Internet Access to Corporate Visitors on an EX Series Switch on page 361](#)

- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
- [Example: Configuring MAC RADIUS Authentication on an EX Series Switch on page 502](#)
- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)
- [Configuring 802.1X Authentication \(J-Web Procedure\) on page 358](#)

interface (802.1X)

Syntax

```
interface (all | [ interface-names ]) {
  disable;
  guest-vlan (vlan-name | vlan-id);
  lldp-med-bypass;
  mac-radius <restrict>;
  maximum-requests number;
  no-reauthentication;
  quiet-period seconds;
  reauthentication {
    interval seconds;
  }
  retries number;
  server-fail (deny | permit | use-cache | vlan-id | vlan-name);
  server-reject-vlan (vlan-id | vlan-name) {
    eapol-block;
    block-interval block-interval;
  }
  server-timeout seconds;
  supplicant (single | single-secure | multiple);
  supplicant-timeout seconds;
  transmit-period seconds;
}
```

Hierarchy Level [edit protocols [dot1x authenticator](#)]

Release Information Statement introduced in Junos OS Release 9.0 for EX Series switches.
Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.

Description Configure 802.1X authentication for Port-Based Network Access Control for all interfaces or for specific interfaces.

Options **all**—Configure all interfaces for 802.1X authentication.

[*interface-names*]— List of names of interfaces to configure for 802.1X authentication.

The remaining statements are explained separately.

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

Related Documentation

- [show dot1x on page 2082](#)
- [Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch on page 367](#)
- [Example: Setting Up 802.1X in Conference Rooms to Provide Internet Access to Corporate Visitors on an EX Series Switch on page 361](#)

- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
- [Example: Configuring MAC RADIUS Authentication on an EX Series Switch on page 502](#)
- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)
- [Configuring 802.1X Authentication \(J-Web Procedure\) on page 358](#)

interface (Access Control Service)


Syntax	<code>interface <i>interface-name</i>;</code>
Hierarchy Level	[edit services unified-access-control infranet-controller]
Release Information	Statement introduced in Junos OS Release 12.2 for EX Series switches.
Description	Specify the interface through which the switch will connect to the Junos Pulse Access Control Service.
Options	<i>interface-name</i> —Name of the interface that will connect the switch to the Access Control Service.
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 an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control (CLI Procedure) on page 519• Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service (CLI Procedure) on page 522

interface (Captive Portal)

Syntax	<pre>interface (all [<i>interface-names</i>]) { quiet-period <i>seconds</i>; retries <i>number-of-retries</i>; server-timeout <i>seconds</i>; session-expiry <i>seconds</i>; supplicant (multiple single single-secure); }</pre>
Hierarchy Level	[edit services captive-portal]
Release Information	Statement introduced in Junos OS Release 10.1 for EX Series switches.
Description	Configure captive portal authentication for all interfaces or for specific interfaces.
Options	<p>all—All interfaces to be configured for captive portal authentication.</p> <p>[<i>interface-names</i>]—List of names of interfaces to be configured for captive portal authentication.</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"> • Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527 • Configuring Captive Portal Authentication (CLI Procedure) on page 532

interface (DHCP Local Server)

```
Syntax interface interface-name {
    access-profile profile-name;
    exclude;
    overrides {
        asymmetric-lease-time seconds;
        asymmetric-prefix-lease-time seconds;
        client-discover-match <option60-and-option82 | incoming-interface>;
        client-negotiation-match incoming-interface;
        delay-advertise {
            based-on (option-15 | option-16 | option-18 | option-37) {
                equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                not-equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                starts-with {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
            }
            delay-time seconds;
        }
        delay-offer {
            based-on (option-60 | option-77 | option-82) {
                equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                not-equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                starts-with {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
            }
            delay-time seconds;
        }
        dual-stack dual-stack-group-name;
        interface-client-limit number;
        rapid-commit;
    }
    service-profile dynamic-profile-name;
    short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
    trace;
    upto upto-interface-name;
}
```

Hierarchy Level	<pre>[edit system services dhcp-local-server group <i>group-name</i>], [edit system services dhcp-local-server dhcpv6 <i>group</i> <i>group-name</i>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server ...], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server ...], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server ...]</pre>
Release Information	<p>Statement introduced in Junos OS Release 9.0.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Options upto and exclude introduced in Junos OS Release 9.1.</p>
Description	<p>Specify one or more interfaces, or a range of interfaces, that are within a specified group on which the DHCP local server is enabled. You can repeat the interface <i>interface-name</i> statement to specify multiple interfaces within a group, but you cannot specify the same interface in more than one group. Also, you cannot use an interface that is being used by the DHCP relay agent.</p>
<div data-bbox="477 890 542 953"></div>	
<p>NOTE: DHCP values are supported in integrated routing and bridging (IRB) configurations. When you configure an IRB interface in a network that is using DHCP, the DHCP information (for example, authentication, address assignment, and so on) is propagated in the associated bridge domain. This enables the DHCP server to configure client IP addresses residing within the bridge domain. IRB currently supports only static DHCP configurations.</p>	
Options	<p>exclude—Exclude an interface or a range of interfaces from the group. This option and the overrides option are mutually exclusive.</p> <p>interface-name—Name of the interface. You can repeat this option multiple times.</p> <p>upto-interface-name—Upper end of the range of interfaces; the lower end of the range is the interface-name entry. The interface device name of the upto-interface-name must be the same as the device name of the interface-name.</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>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"> • Extended DHCP Local Server Overview on page 611 • Grouping Interfaces with Common DHCP Configurations on page 704 • Using External AAA Authentication Services with DHCP on page 682

interface (DHCP Relay Agent)

Syntax

```

interface dhcp-interface-name {
    access-profile profile-name;
    exclude;
    overrides {
        allow-no-end-option
        allow-snooped-clients;
        always-write-giaddr;
        always-write-option-82;
        asymmetric-lease-time seconds;
        asymmetric-prefix-lease-time seconds;
        client-discover-match <option60-and-option82 | incoming-interface>;
        client-negotiation-match incoming-interface;
        disable-relay;
        dual-stack dual-stack-group-name;
        interface-client-limit number;
        layer2-unicast-replies;
        no-allow-snooped-clients;
        proxy-mode;
        relay-source
        replace-ip-source-with;
        send-release-on-delete;
        trust-option-82;
    }
    service-profile dynamic-profile-name;
    short-cycle-protection <lockout-min-time seconds> <lockout-max-time seconds>;
    trace;
    upto upto-interface-name;
}

```

Hierarchy Level

```

[edit forwarding-options dhcp-relay dhcpv6 group group-name],
[edit forwarding-options dhcp-relay group group-name],
[edit logical-systems logical-system-name forwarding-options dhcp-relay ...],
[edit logical-systems logical-system-name routing-instances routing-instance-name
 forwarding-options dhcp-relay ...],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay ...]

```

Release Information

Statement introduced in Junos OS Release 8.3.

Options **upto** and **exclude** introduced in Junos OS Release 9.1.

Support at the **[edit ... dhcpv6]** hierarchy levels introduced in Junos OS Release 11.4.

Statement introduced in Junos OS Release 12.1 for EX Series switches.

Description

Specify one or more interfaces, or a range of interfaces, that are within a specified group on which the DHCP or DHCPv6 relay agent is enabled. You can repeat the **interface** *interface-name* statement to specify multiple interfaces within a group, but you cannot specify the same interface in more than one group. Also, you cannot use an interface that is being used by the DHCP local server. Use the statement at the **[edit ... dhcpv6]** hierarchy levels to configure DHCPv6 support.

EX Series switches do not support DHCPv6.



NOTE: DHCP values are supported in integrated routing and bridging (IRB) configurations. When you configure an IRB interface in a network that is using DHCP, the DHCP information (for example, authentication, address assignment, and so on) is propagated in the associated bridge domain. This enables the DHCP server to configure client IP addresses residing within the bridge domain. IRB currently only supports static DHCP configurations. .

Options **exclude**—Exclude an interface or a range of interfaces from the group. This option and the **overrides** option are mutually exclusive.

interface-name—Name of the interface. You can repeat this option multiple times.

overrides—Override the specified default configuration settings for the interface. The **overrides** statement is described separately.

upto-interface-name—Upper end of the range of interfaces; the lower end of the range is the interface-name entry. The interface device name of the **upto-interface-name** must be the same as the device name of the **interface-name**.

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 interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.

Related Documentation

- [Extended DHCP Relay Agent Overview on page 632](#)
- [Grouping Interfaces with Common DHCP Configurations on page 704](#)
- [Using External AAA Authentication Services with DHCP on page 682](#)

interface (LLDP)

Syntax `interface (all | interface-name) {
 disable;
 power-negotiation {
 disable;
 }
}`

Hierarchy Level [edit protocols [lldp](#)]

Release Information 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 Link Layer Discovery Protocol (LLDP) on all interfaces or on a specific interface.



NOTE: On EX4300 switches, LLDP cannot be configured on the me0 or vme interface. Issuing the command `set protocols lldp interface me0` generates the following error message:

```
error: name: 'me0': Invalid interface
error: statement creation failed: interface
```

Issuing the command `set protocols lldp interface vme` generates the following error message:

```
error: name: 'vme': Invalid interface
error: statement creation failed: interface
```

Default None

Options `all`—All interfaces on the switch.

`interface-name`—Name of a specific interface.

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 LLDP \(CLI Procedure\) on page 556](#)
 - [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)
 - [Understanding LLDP on page 555](#)

interface (LLDP-MED)

Syntax

```
interface (all | interface-name) {
  disable;
  location {
    elin number;
    civic-based {
      what number;
      country-code code;
      ca-type {
        number {
          ca-value value;
        }
      }
    }
  }
}
```

Hierarchy Level [edit protocols [lldp-med](#)]

Release Information Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED) on all interfaces or on a specific interface.

Default Not enabled

Options **all**—All interfaces on the switch.

interface-name—Name of a specific interface.

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

- [show lldp on page 2109](#)
- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
- [Configuring LLDP-MED \(CLI Procedure\) on page 566](#)
- [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)

interface (Static MAC Bypass)

Syntax	<code>interface [<i>interface-names</i>];</code>
Hierarchy Level	[edit protocols dot1x authenticator authentication-profile-name static mac-address], [edit ethernet-switching-options authentication-whitelist mac-address], [edit switch-options authentication-whitelist mac-address]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement added to the [edit ethernet-switching-options authentication-whitelist] hierarchy in Junos OS Release 10.1 for EX Series switches. Statement added to the [edit switch-options authentication-whitelist] hierarchy in Junos OS Release 13.2X50-D10 for EX Series switches (ELS). Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	Configure interfaces on which the specified MAC addresses are allowed to bypass RADIUS authentication and allowed to connect to the LAN without authentication.
Options	<i>interface-names</i> —List of interfaces.
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"> • show dot1x static-mac-address on page 2094 • Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch on page 509 • Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527 • Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527 • Configuring Captive Portal Authentication (CLI Procedure) on page 532

interface (VoIP)

Syntax	<pre>interface (all [<i>interface-name</i>] access-ports) { vlan <i>vlan-name</i> ; forwarding-class <assured-forwarding best-effort expedited-forwarding network-control>; }</pre>
Hierarchy Level	<ul style="list-style-type: none">For platforms with ELS: <pre>[edit switch-options voip]</pre>For platforms without ELS: <pre>[edit ethernet-switching-options voip],</pre>
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Hierarchy level [edit switch-options] introduced in Junos OS Release 13.2X50-D10. (See <i>Using the Enhanced Layer 2 Software CLI</i> for information about ELS.)
Description	Enable voice over IP (VoIP) on interfaces.
Options	<p>all—Enable VoIP on all interfaces.</p> <p><i>interface-name</i>—Enable VoIP on a specific interface.</p> <p>all—(Switches without ELS only) Enable VoIP on all access ports.</p> <p>The remaining statements are explained separately.</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">Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455Example: Configuring VoIP on an EX Series Switch Without Including 802.1X Authentication on page 468Example: Configuring VoIP on an EX Series Switch Without Including LLDP-MED Support on page 463

interface (System Services DHCP)

Syntax	<pre> interface <i>interface-name</i> { exclude; overrides { interface-client-limit <i>number</i>; } trace; upto <i>upto-interface-name</i>; } </pre>
Hierarchy Level	[edit system services dhcp-local-server dhcpv6 group <i>group-name</i>]
Release Information	Statement introduced in Junos OS Release 10.4.
Description	Specify one or more interfaces, or a range of interfaces, that are within a specified group on which the DHCP local server is enabled. You can repeat the interface <i>interface-name</i> statement to specify multiple interfaces within a group, but you cannot specify the same interface in more than one group.
Options	<ul style="list-style-type: none"> • <i>interface-name</i>—Name of the interface. • trace—Enable tracing of the interface specified by the <i>interface-name</i> argument. • upto <i>upto-interface-name</i>—The upper end of the range of interfaces; the lower end of the range is the <i>interface-name</i> entry. The interface device name of the <i>upto-interface-name</i> must be the same as the device name of the <i>interface-name</i>.
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"> • DHCP Server, Client, and Relay Agent Overview on page 742 • DHCP Server Configuration Overview on page 767

interface-client-limit (DHCP Local Server)

Syntax	<code>interface-client-limit <i>number</i>;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group group-name overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group <i>group-name</i> overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> overrides],</p> <p>[edit system services dhcp-local-server overrides],</p> <p>[edit system services dhcp-local-server dhcpv6 overrides],</p> <p>[edit system services dhcp-local-server dhcpv6 group group-name overrides],</p> <p>[edit system services dhcp-local-server dhcpv6 group interface <i>interface-name</i> <i>group-name</i> overrides],</p> <p>[edit system services dhcp-local-server group <i>group-name</i> overrides],</p> <p>[edit system services dhcp-local-server group <i>group-name</i> interface <i>interface-name</i> overrides]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.2.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Set the maximum number of DHCP subscribers or DHCP clients per interface allowed for a specific group or for all groups. A group specification takes precedence over a global specification for the members of that group.
Default	No limit

Options *number*—Maximum number of clients allowed.

Range: 1 through 500,000

Required Privilege system—To view this statement in the configuration.

Level system-control—To add this statement to the configuration.

- Related Documentation**
- [Specifying the Maximum Number of DHCP Clients Per Interface on page 687](#)
 - [Overriding the Default DHCP Local Server Configuration Settings Overview on page 617](#)

interface-client-limit (DHCP Relay Agent)

Syntax	<code>interface-client-limit <i>number</i>;</code>
Hierarchy Level	<p> <code>[edit forwarding-options dhcp-relay dhcpv6 overrides],</code> <code>[edit forwarding-options dhcp-relay overrides],</code> <code>[edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> overrides],</code> <code>[edit forwarding-options dhcp-relay group <i>group-name</i> overrides],</code> <code>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 overrides],</code> <code>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay overrides],</code> <code>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> overrides],</code> <code>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 overrides],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> overrides],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</code> <code>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 overrides],</code> <code>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides],</code> <code>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> overrides],</code> <code>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</code> <code>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides]</code> </p>
Release Information	<p>Statement introduced in Junos OS Release 9.2.</p> <p>Support at the <code>[edit ... dhcpv6]</code> hierarchy levels introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.1 for EX Series switches.</p>
Description	<p>Set the maximum number of DHCP (or DHCPv6) subscribers or clients per interface allowed for a specific group or for all groups. A group specification takes precedence over a global specification for the members of that group. Use the statement at the <code>[edit ... dhcpv6]</code> hierarchy levels to configure DHCPv6 support.</p> <p>M120 and M320 routers do not support DHCPv6.</p>
Default	No limit
Options	<p><i>number</i>—Maximum number of clients allowed.</p> <p>Range: 1 through 500,000</p>

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

Related Documentation

- [dhcp-relay on page 1294](#)
- [Extended DHCP Relay Agent Overview on page 632](#)
- [Configuring Group-Specific DHCP Relay Options on page 706](#)
- [Overriding the Default DHCP Relay Configuration Settings on page 638](#)

interface-delete (Subscriber Management or DHCP Client Management)

Syntax interface-delete;

Hierarchy Level [edit system services subscriber-management maintain-subscriber]

Release Information Statement introduced in Junos OS Release 11.1.
 Statement introduced in Junos OS Release 12.3R2 for EX Series switches.

Description On router—Configure the router to maintain, rather than log out, subscribers when the subscriber interface is deleted. By default, the router logs out subscribers when the subscriber interface is deleted.

On switch—Configure the switch to maintain rather than log out DHCP clients when the client interface is deleted. By default, the switch logs out DHCP clients when the client interface is deleted.

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

Related Documentation

- *Configuring the Router to Maintain DHCP Subscribers During Interface Delete Events*

interface-description-format

Syntax	<pre>interface-description-format { exclude-adapter; exclude-channel; exclude-sub-interface; }</pre>
Hierarchy Level	[edit access profile <i>profile-name</i> radius options]
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 9.1 for EX Series switches.</p> <p>exclude-adapter and exclude-sub-interface options added in Junos OS Release 10.4.</p> <p>exclude-channel option added in Junos OS Release 17.3R1.</p>
Description	<p>Specify the information that is excluded from the interface description that the device passes to RADIUS for inclusion in the RADIUS attributes such as NAS-Port-ID (87) or Calling-Station-ID (31).</p> <p>The default format for nonchannelized interfaces is as follows:</p> <p><i>interface-type-slot/adapter/port.subinterface[:svlan-vlan]</i></p> <p>For example, consider physical interface ge-1/2/0, with a subinterface of 100 and SVLAN identifier of 100. The interface description used in the NAS-Port-ID is ge-1/2/0.100:100. If you exclude the subinterface, the description becomes ge-1/2/0:100.</p> <p>The default format for channelized interfaces is as follows:</p> <p><i>interface-type-slot/adapter/channel.subinterface[:svlan-vlan]</i></p> <p>The channel information (logical port number) is determined by this formula:</p> <p>Logical port number = 100 + (<i>actual-port-number</i> x 20) + <i>channel-number</i>.</p> <p>For example, consider a channelized interface 3 on port 2 where the:</p> <ul style="list-style-type: none"> Physical interface is xe-0/1/2:3. Subinterface is 4. SVLAN is 5. VLAN is 6. <p>Using the formula, the logical port number = 100 + (2 x 20) + 3 = 143. Consequently, the default interface description is xe-0/1/143.4-5.6. If you exclude the channel information, the description becomes xe-0/1/2.4-5.6.</p>
Options	exclude-adapter —(Optional) Exclude the adapter from the interface description.

exclude-channel—(Optional) Exclude the channel information from the interface description.

exclude-sub-interface—(Optional) Exclude the subinterface from the interface description.

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

Related Documentation

- *Interface Text Descriptions for Inclusion in RADIUS Attributes*
- *Configuring RADIUS Server Options for Subscriber Access*
- *RADIUS Server Options for Subscriber Access*

interface-name (DHCP Local Server)

Syntax interface-name;

Hierarchy Level [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services **dhcp-local-server** ...],
[edit logical-systems *logical-system-name* system services **dhcp-local-server** ...],
[edit routing-instances *routing-instance-name* system services **dhcp-local-server** ...],
[edit system services **dhcp-local-server authentication username-include**],
[edit system services dhcp-local-server **dhcpv6 authentication username-include**],
[edit system services dhcp-local-server dhcpv6 **group group-name authentication username-include**],
[edit system services dhcp-local-server **group group-name authentication username-include**]

Release Information Statement introduced in Junos OS Release 11.4.
Statement introduced in Junos OS Release 12.3R2 for EX Series switches.

Description Specify that the interface name is concatenated with the username during the subscriber authentication or DHCP client authentication process. Use the statement at the **[edit ... dhcpv6]** hierarchy levels to configure DHCPv6 support.

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

Related Documentation

- [Creating Unique Usernames for DHCP Clients on page 684](#)

interface-name (DHCP Relay Agent)

Syntax	interface-name;
Hierarchy Level	<p>[edit forwarding-options dhcp-relay authentication username-include],</p> <p>[edit forwarding-options dhcp-relay dhcpv6 authentication username-include],</p> <p>[edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit forwarding-options dhcp-relay dual-stack-group <i>dual-stack-group-name</i> authentication username-include],</p> <p>[edit forwarding-options dhcp-relay group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay ...],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...]</p>
Release Information	<p>Statement introduced in Junos OS Release 11.4</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Support at the [edit ... dual-stack-group <i>dual-stack-group-name</i>] hierarchy level introduced in Junos OS Release 15.1.</p>
Description	Specify that the interface name is concatenated with the username during the subscriber authentication or client authentication process. Use the statement at the [edit ... dhcpv6] hierarchy levels to configure DHCPv6 support.
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"> • Creating Unique Usernames for DHCP Clients on page 684

interface-profile

Syntax	<pre>interface-profile <i>profile-name</i> { allow-clear; 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 on EX Series switches.</p>
Description	Create a profile to filter and collect error and packet statistics and write them to a file in the <code>/var/log</code> directory. You can specify an interface profile for either a physical or a logical interface.
Options	<p><i>profile-name</i>—Name of the interface 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>Configuring the Interface Profile</i> • <i>Accounting Options Configuration</i>

interface-traceoptions (System Services DHCP)

Syntax	<pre> interface-traceoptions { file { filename ; files number; match regular-expression; size maximum-file-size; (world-readable no-world-readable); } flag flag; level (all error info notice verbose warning); no-remote-trace; } </pre>
Hierarchy Level	<pre> [edit routing-instances routing-instance-name system services dhcp-local-server], [edit system services dhcp-local-server] </pre>
Release Information	Statement introduced in Junos OS Release 10.4.
Description	<p>Configure extended DHCP local server tracing operations that can be enabled on a specific interface or group of interfaces. You use the interface <i>interface-name</i> trace statement at the [edit system services group <i>group-name</i>] hierarchy level to enable the tracing operation on the specific interfaces.</p>
Options	<p>file-name—Name of the file to receive the output of the tracing operation. Enclose the name in quotation marks (" "). All files are placed in a file named jdhcpd in the directory /var/log. If you include the file statement, you must specify a filename.</p> <p>files number—(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 size option.</p> <p>Range: 2 through 1000</p> <p>Default: 3 files</p> <p>flag flag—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 events dhcpv6-packet—Trace DHCPv6 packet decoding operations. dhcpv6-packet-option—Trace DHCPv6 option decoding operations. dhcpv6-state—Trace changes in state for DHCPv6 operations. packet—Trace packet decoding operations

- **packet-option**—Trace DHCP option decoding operations
- **state**—Trace changes in state

match *regular-expression*—(Optional) Refine the output to include lines that contain the regular expression.

no-remote-trace—Disable remote tracing.

no-world-readable—(Optional) Disable unrestricted file access.

size *size*—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

Syntax: **xk** to specify KB, **xm** to specify MB, or **xg** to specify GB

Range: 10 KB through 1 GB

Default: 128 KB

world-readable—(Optional) Enable unrestricted file access.

Required Privilege Level	interface—To view this statement in the configuration.
	interface-control—To add this statement to the configuration.
Related Documentation	• DHCP Server, Client, and Relay Agent Overview on page 742
	• DHCP Server Configuration Overview on page 767

interfaces (ARP)

Syntax	<pre>interfaces { <i>interface-name</i> { aging-timer <i>minutes</i>; } }</pre>
Hierarchy Level	[edit system arp]
Release Information	Statement introduced before Junos OS Release 9.4.
Description	Specify the Address Resolution Protocol (ARP) aging timer in minutes for a logical interface.
Options	<p>aging-timer <i>minutes</i>—Time between ARP updates, in minutes.</p> <p>Range: 1 through 240</p> <p>Default: 20</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">• DHCP Server, Client, and Relay Agent Overview on page 742• DHCP Server Configuration Overview on page 767

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"> • <i>Configuring the Interface Profile</i> • <i>Configuring the Filter Profile</i> • <i>Configuring the MIB Profile</i> • <i>Configuring the Routing Engine Profile</i>

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">• <i>Configuring Health Monitoring</i>

interfaces (Security Zones)

Syntax	<pre> interfaces <i>interface-name</i> { host-inbound-traffic { protocols <i>protocol-name</i> { except; } system-services <i>service-name</i> { except; } } } </pre>
Hierarchy Level	[edit security zones functional-zone management], [edit security zones security-zone <i>zone-name</i>]
Release Information	Statement introduced in Junos OS Release 8.5.
Description	Specify the set of interfaces that are part of the zone.
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	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 Security Zones</i>

interface (Static MAC Bypass)

Syntax	<code>interface [<i>interface-names</i>];</code>
Hierarchy Level	[edit protocols dot1x authenticator authentication-profile-name static mac-address], [edit ethernet-switching-options authentication-whitelist mac-address], [edit switch-options authentication-whitelist mac-address]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement added to the [edit ethernet-switching-options authentication-whitelist] hierarchy in Junos OS Release 10.1 for EX Series switches. Statement added to the [edit switch-options authentication-whitelist] hierarchy in Junos OS Release 13.2X50-D10 for EX Series switches (ELS). Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	Configure interfaces on which the specified MAC addresses are allowed to bypass RADIUS authentication and allowed to connect to the LAN without authentication.
Options	<i>interface-names</i> —List of interfaces.
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">• show dot1x static-mac-address on page 2094• Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch on page 509• Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527• Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527• Configuring Captive Portal Authentication (CLI Procedure) on page 532

interface (VoIP)

Syntax	<pre>interface (all [<i>interface-name</i>] access-ports) { vlan <i>vlan-name</i> ; forwarding-class <assured-forwarding best-effort expedited-forwarding network-control>; }</pre>
Hierarchy Level	<ul style="list-style-type: none"> For platforms with ELS: <pre>[edit switch-options voip]</pre> For platforms without ELS: <pre>[edit ethernet-switching-options voip],</pre>
Release Information	<p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Hierarchy level <code>[edit switch-options]</code> introduced in Junos OS Release 13.2X50-D10. (See <i>Using the Enhanced Layer 2 Software CLI</i> for information about ELS.)</p>
Description	Enable voice over IP (VoIP) on interfaces.
Options	<p>all—Enable VoIP on all interfaces.</p> <p><i>interface-name</i>—Enable VoIP on a specific interface.</p> <p>all—(Switches without ELS only) Enable VoIP on all access ports.</p> <p>The remaining statements are explained separately.</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"> Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455 Example: Configuring VoIP on an EX Series Switch Without Including 802.1X Authentication on page 468 Example: Configuring VoIP on an EX Series Switch Without Including LLDP-MED Support on page 463

interface-description-format

Syntax	<pre>interface-description-format { exclude-adapter; exclude-channel; exclude-sub-interface; }</pre>
Hierarchy Level	[edit access profile <i>profile-name</i> radius options]
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 9.1 for EX Series switches.</p> <p>exclude-adapter and exclude-sub-interface options added in Junos OS Release 10.4.</p> <p>exclude-channel option added in Junos OS Release 17.3R1.</p>
Description	<p>Specify the information that is excluded from the interface description that the device passes to RADIUS for inclusion in the RADIUS attributes such as NAS-Port-ID (87) or Calling-Station-ID (31).</p> <p>The default format for nonchannelized interfaces is as follows:</p> <p><i>interface-type-slot/adapter/port.subinterface[:svlan-vlan]</i></p> <p>For example, consider physical interface ge-1/2/0, with a subinterface of 100 and SVLAN identifier of 100. The interface description used in the NAS-Port-ID is ge-1/2/0.100:100. If you exclude the subinterface, the description becomes ge-1/2/0:100.</p> <p>The default format for channelized interfaces is as follows:</p> <p><i>interface-type-slot/adapter/channel.subinterface[:svlan-vlan]</i></p> <p>The channel information (logical port number) is determined by this formula:</p> <p>Logical port number = $100 + (\text{actual-port-number} \times 20) + \text{channel-number}$.</p> <p>For example, consider a channelized interface 3 on port 2 where the:</p> <ul style="list-style-type: none"> Physical interface is xe-0/1/2:3. Subinterface is 4. SVLAN is 5. VLAN is 6. <p>Using the formula, the logical port number = $100 + (2 \times 20) + 3 = 143$. Consequently, the default interface description is xe-0/1/143.4-5.6. If you exclude the channel information, the description becomes xe-0/1/2.4-5.6.</p>
Options	exclude-adapter —(Optional) Exclude the adapter from the interface description.

exclude-channel—(Optional) Exclude the channel information from the interface description.

exclude-sub-interface—(Optional) Exclude the subinterface from the interface description.

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

Related Documentation	<ul style="list-style-type: none">• <i>Interface Text Descriptions for Inclusion in RADIUS Attributes</i>• <i>Configuring RADIUS Server Options for Subscriber Access</i>• <i>RADIUS Server Options for Subscriber Access</i>
------------------------------	---

internet-options

Syntax	<pre> internet-options { (gre-path-mtu-discovery no-gre-path-mtu-discovery); icmpv4-rate-limit bucket-size <i>bucket-size</i> packet-rate <i>packet-rate</i>; icmpv6-rate-limit bucket-size <i>bucket-size</i> packet-rate <i>packet-rate</i>; (ipip-path-mtu-discovery no-ipip-path-mtu-discovery); ipv6-duplicate-addr-detection-transmits; (ipv6-reject-zero-hop-limit no-ipv6-reject-zero-hop-limit); (ipv6-path-mtu-discovery no-ipv6-path-mtu-discovery); ipv6-path-mtu-discovery-timeout; no-tcp-reset no-tcp-rfc1323; no-tcp-rfc1323-paws; (path-mtu-discovery no-path-mtu-discovery); source-port upper-limit <<i>upper-limit</i>>; (source-quench no-source-quench); tcp-drop-synfin-set; tcp-mss <i>mss-value</i>; } </pre>
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 SRX Series devices.</p>
Description	<p>Configure system IP options to protect against certain types of DoS attacks.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
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"> • <i>Configuring Junos OS ICMPv4 Rate Limit for ICMPv4 Routing Engine Messages</i> • <i>Configuring Junos OS ICMPv6 Rate Limit for ICMPv6 Routing Engine Messages</i> • <i>Configuring Junos OS for IP-IP Path MTU Discovery on IP-IP Tunnel Connections</i> • <i>Configuring Junos OS for Path MTU Discovery on Outgoing GRE Tunnel Connections</i> • <i>Configuring Junos OS for Path MTU Discovery on Outgoing TCP Connections</i> • <i>Configuring Junos OS for IPv6 Duplicate Address Detection Attempts</i> • <i>Configuring Junos OS for Acceptance of IPv6 Packets with a Zero Hop Limit</i> • <i>Configuring Junos OS to Ignore ICMP Source Quench Messages</i> • <i>Configuring Junos OS to Enable the Router or Switch to Drop Packets with the SYN and FIN Bits Set</i>

- *Configuring Junos OS to Disable TCP RFC 1323 Extensions*
- *Configuring Junos OS to Disable the TCP RFC 1323 PAWS Extension*
- *Configuring Junos OS to Extend the Default Port Address Range*
- *Configuring TCP MSS for Session Negotiation*

interval (Access Control Service)

Syntax	<code>interval seconds;</code>
Hierarchy Level	<code>[edit services unified-access-control]</code>
Release Information	Statement introduced in Junos OS Release 12.2 for EX Series switches.
Description	Configure the time between continuity check messages for the switch's connection with the Junos Pulse Access Control Service. The specified value must be less than the value specified for timeout .
Options	<p>seconds—Time between continuity check messages, in seconds.</p> <p>Range: 1 through 9999 seconds</p> <p>Default: 30 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 an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control (CLI Procedure) on page 519 • Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service (CLI Procedure) on page 522

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">• <i>Configuring Health Monitoring</i>

juniper-dsl-attributes

Syntax	juniper-dsl-attributes;
Hierarchy Level	[edit access profile <i>profile-name</i> radius options]
Release Information	Statement introduced in Junos OS Release 11.4.
Description	<p>Configure AAA to add Juniper Networks DSL VSAs to the RADIUS authentication and accounting request messages for subscribers. If the router has not received and processed the corresponding ANCP attributes from the access node, then AAA provides only the following in these RADIUS messages:</p> <ul style="list-style-type: none"> Downstream-Calculated-QoS-Rate (IANA 4874, 26-141)—Default configured advisory transmit speed. Upstream-Calculated-QoS-Rate (IANA 4874, 26-142)—Default configured advisory receive speed.
Default	The Juniper Networks DSL VSAs are not added to the RADIUS authentication and accounting request messages. However, the DSL Forum VSA—if available—is added to RADIUS messages by default.
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"> <i>Configuring AAA to Include Juniper Networks DSL VSAs in RADIUS Messages</i> <i>Configuring the ANCP Agent</i>

kernel-replication (System)

Syntax	kernel-replication;
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 11.1.
Description	Configure kernel replication.
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>

key (Authentication Keychain)

Syntax	<pre>key key { algorithm (md5 hmac-sha-1); options (basic isis-enhanced); key-name authentication-key-name; secret secret-data; start-time yyyy-mm-dd.hh:mm:ss; }</pre>
Hierarchy Level	[edit security authentication-key-chains key-chain <i>key-chain-name</i>]
Release Information	<p>Statement introduced in Junos OS Release 7.6.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the BFD protocol introduced in Junos OS Release 9.6.</p> <p>Support for the BFD protocol introduced in Junos OS Release 9.6 for EX Series switches.</p> <p>Support for IS-IS introduced in Junos OS Release 11.2.</p> <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 17.4.</p>
Description	Configure the authentication element.
Options	<p>key—Each key within a keychain is identified by a unique integer value.</p> <p>Range: 0 through 63</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
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 Authentication Key Updates on page 284 • <i>Example: Configuring BFD Authentication for Securing Static Routes</i> • <i>Example: Configuring Hitless Authentication Key Rollover for IS-IS</i>

key-chain (Security)

Syntax	<pre> key-chain <i>key-chain-name</i> { description <i>text-string</i>; key <i>key</i> { algorithm (md5 hmac-sha-1); options (basic isis-enhanced); key-name <i>authentication-key-name</i>; secret <i>secret-data</i>; start-time <i>yyyy-mm-dd.hh:mm:ss</i>; } tolerance <i>seconds</i>; } </pre>
Hierarchy Level	[edit security authentication-key-chains]
Release Information	<p>Statement introduced in Junos OS Release 7.6.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the BFD protocol introduced in Junos OS Release 9.6.</p> <p>Support for the BFD protocol introduced in Junos OS Release 9.6 for EX Series switches.</p> <p>Support for IS-IS introduced in Junos OS Release 11.2.</p> <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 17.4.</p>
Description	Create the key-chain configuration for the Border Gateway Protocol (BGP), the Label Distribution Protocol (LDP) routing protocols, the Bidirectional Forwarding Detection (BFD) protocol, and the Intermediate System-to-Intermediate System (IS-IS) protocol.
Options	<p>key-chain-name—Authentication keychain name. It can be up to 126 characters. Characters can include any ASCII strings. If you include spaces, enclose all characters in quotation marks (" ").</p>
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"> • authentication-key-chains on page 1187 • Configuring Authentication Key Updates on page 284 • <i>Example: Configuring BFD Authentication for Securing Static Routes</i> • <i>Example: Configuring Hitless Authentication Key Rollover for IS-IS</i>

key-exchange

Syntax	<code>key-exchange [algorithm1 algorithm2...];</code>
Hierarchy Level	<code>[edit system services ssh]</code>
Release Information	Statement introduced in Junos OS Release 11.2. Support for curve25519-sha256 added in Junos OS Release 12.1X47-D10.
Description	Specify the set of Diffie-Hellman key exchange methods that the SSH server can use.
Options	<p>One or more of the following Diffie-Hellman key exchange methods:</p> <ul style="list-style-type: none"> • curve25519-sha256—The EC Diffie-Hellman key exchange method on Curve25519 with SHA2-256. • dh-group1-sha1—The Diffie-Hellman group1 algorithm using SHA-1. • dh-group14-sha1—The Diffie-Hellman group14 algorithm using SHA-1. • ecdh-sha2-nistp256—The ECDH key exchange method with ephemeral keys generated on the nistp256 curve. • ecdh-sha2-nistp384—The ECDH key exchange method with ephemeral keys generated on the nistp384 curve. • ecdh-sha2-nistp521—The ECDH key exchange method with ephemeral keys generated on the nistp521 curve. • group-exchange-sha1—The group exchange algorithm using SHA-1. • group-exchange-sha2—The group exchange algorithm using SHA-2.



NOTE: The key-exchange represents a set. To configure key-exchange:

```
user@host#set system services ssh key-exchange [ecdh-sha2-nistp256
group-exchange-sha1]
```



NOTE: [Table 62 on page 1483](#) shows the supportability of Diffie-Hellman key exchange methods on FIPS mode.

Table 62: Supportability of Diffie-Hellman key exchange methods on FIPS mode

Diffie-Hellman key exchange methods	Supported on FIPS mode
curve25519-sha256	No
dh-group1-sha1	No
dh-group14-sha1	Yes
ecdh-sha2-nistp256	Yes
ecdh-sha2-nistp384	Yes
ecdh-sha2-nistp521	Yes
group-exchange-sha1	No
group-exchange-sha2	No

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

Related Documentation

- [Configuring SSH Service for Remote Access to the Router or Switch on page 253](#)
- [ciphers on page 1224](#)
- [macs on page 1511](#)

layer2-unicast-replies

Syntax	layer2-unicast-replies;
Hierarchy Level	<p>[edit forwarding-options dhcp-relay overrides],</p> <p>[edit forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides]</p>
Release Information	<p>Statement introduced in Junos OS Release 8.3.</p> <p>Statement introduced in Junos OS Release 12.1 for EX Series switches.</p>
Description	Override the setting of the broadcast bit in DHCP request packets and instead use the Layer 2 unicast transmission method to transmit DHCP Offer reply packets and DHCP ACK reply packets from the DHCP server to DHCP clients during the discovery process.
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"> • Extended DHCP Relay Agent Overview on page 632 • dhcp-relay on page 1294

ldap-url

Syntax	<code><ldap-url <i>url-name</i>>;</code>
Hierarchy Level	[edit security certificates certification-authority <i>ca-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 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series,
Description	(Encryption interface on M Series and T Series routers and EX Series switches only) (Optional) Specify the Lightweight Directory Access Protocol (LDAP) URL for digital certificates.
Options	<i>url-name</i> —Name of the LDAP URL.
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>Specifying an LDAP URL</i>

lease-time

Syntax	<code>lease-time (<i>length</i> infinite);</code>
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet dhcp]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 9.2 for SRX Series devices. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Request a specific lease time for the IP address. The lease time is the length of time in seconds that a client holds the lease for an IP address assigned by a DHCP server.
Default	If no lease time is requested by client, then the server sends the lease time. The default lease time on a Junos OS DHCP server is one day.
Options	<i>seconds</i> —Request a lease time of a specific duration. Range: 60 through 2147483647 seconds <i>infinite</i> —Request that the lease never expire.
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 DHCP Client (CLI Procedure) on page 677• <i>interfaces</i>• <i>unit</i>• <i>family</i>

lease-time (dhcp-client)

Syntax	<code>lease-time <i>seconds</i>;</code>
Hierarchy Level	<code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcp-client]</code>
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Specify the time to negotiate and exchange Dynamic Host Configuration Protocol (DHCP) information.
Options	seconds — Request time to negotiate and exchange information.
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">• DHCP Server, Client, and Relay Agent Overview on page 742

liveness-detection

Syntax	<pre> liveness-detection { failure-action (clear-binding clear-binding-if-interface-up log-only); method { bfd { version (0 1 automatic); minimum-interval <i>milliseconds</i>; minimum-receive-interval <i>milliseconds</i>; multiplier <i>number</i>; no-adaptation; transmit-interval { minimum-interval <i>milliseconds</i>; threshold <i>milliseconds</i>; } detection-time { threshold <i>milliseconds</i>; } session-mode (automatic multihop singlehop); holddown-interval <i>milliseconds</i>; } layer2-liveness-detection { max-consecutive-retries <i>number</i>; transmit-interval <i>interval</i>; } } } </pre>
Hierarchy Level	<pre> [edit forwarding-options dhcp-relay], [edit forwarding-options dhcp-relay dhcpv6], [edit forwarding-options dhcp-relay dhcpv6 group group-name], [edit forwarding-options dhcp-relay dual-stack-group <i>dual-stack-group-name</i>], [edit forwarding-options dhcp-relay group group-name], [edit system services dhcp-local-server], [edit system services dhcp-local-server dhcpv6], [edit system services dhcp-local-server dhcpv6 group group-name], [edit system services dhcp-local-server dual-stack-group <i>dual-stack-group-name</i>], [edit system services dhcp-local-server group group-name] </pre>
Release Information	<p>Statement introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Configure bidirectional failure detection timers and authentication criteria for static routes.</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>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>

- Related Documentation**
- [DHCP Liveness Detection Overview on page 707](#)
 - [Configuring Detection of DHCP Local Server Client Connectivity with BFD on page 711](#)
 - [Configuring Detection of DHCP Relay or DHCP Relay Proxy Client Connectivity with BFD on page 709](#)
 - [*Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients*](#)
 - [*Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714*](#)
 - [*DHCP Liveness Detection Using ARP and Neighbor Discovery Packets*](#)

lldp

Syntax

```
lldp {
  advertisement-interval seconds;
  disable;
  hold-multiplier number;
  interface (all | [interface-name]) {
    disable;
    power-negotiation {
      disable;
    }
  }
  lldp-configuration-notification-interval seconds;
  management-address ip-management-address;
  mau-type
  netbios-snooping;
  no-tagging;
  ptopo-configuration-maximum-hold-time seconds;
  ptopo-configuration-trap-interval seconds;
  traceoptions {
    file filename <files number> <size size> <world-readable | no-world-readable>
      <no-stamp> <replace>;
    flag flag <disable>;
  }
  transmit-delay seconds;
  vlan-name-tlv-option (name | vlan-id);
}
```

Hierarchy Level [edit protocols]

Release Information 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 QFX Series.

Description Configure Link Layer Discovery Protocol (LLDP). The switch uses LLDP to advertise its identity and capabilities on a LAN, as well as to receive information about other network devices. LLDP is defined in the IEEE standard 802.1AB-2005.

The remaining statements are explained separately. See [CLI Explorer](#).



NOTE: The `transmit-delay` and `netbios-snooping` options are not available on QFabric systems.



NOTE: On EX4300 switches, LLDP cannot be configured on the `me0` or `vme` interface. Issuing the command `set protocols lldp interface me0` generates the following error message:

```
error: name: 'me0': Invalid interface
error: statement creation failed: interface
```

Issuing the command `set protocols lldp interface vme` generates the following error message:

```
error: name: 'vme': Invalid interface
error: statement creation failed: interface
```

Default LLDP is enabled.

The following statements have default values:

- **advertisement-interval**—The default value is 30 seconds. The allowable range is from 5 through 32768 seconds.
- **hold-multiplier**—The default values is 4. The allowable range is from 2 through 10.
- **ptopo-configuration-maximum-hold-time**—The default value is 300 seconds. The allowable range is from 1 through 2147483647 seconds.
- **transmit-delay**—The default values is 2 seconds. The allowable range is from 1 through 8192 seconds.

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

Related Documentation

- [show lldp on page 2109](#)
- [Configuring LLDP \(CLI Procedure\) on page 556](#)
- [Understanding LLDP on page 555](#)
- [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)

lldp-configuration-notification-interval

Syntax	lldp-configuration-notification-interval <i>seconds</i> ;
Hierarchy Level	[edit protocols lldp]
Release Information	Statement introduced in Junos OS Release 9.6 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	Specify how often SNMP trap notifications are generated as a result of LLDP database changes. If the interval value is 0, trap notifications of database changes are disabled.
Default	SNMP trap notifications of LLDP database changes are disabled.
Options	<i>seconds</i> —Interval between trap notifications about LLDP database changes. Range: 0 through 3600
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>trap-notification</i>• show lldp on page 2109

lldp-med (Ethernet Switching)

Syntax

```
lldp-med {
  disable;
  fast-start number;
  interface (all | interface-name) {
    disable;
    location {
      elin number;
      civic-based {
        what number;
        country-code code;
        ca-type {
          number {
            ca-value value;
          }
        }
      }
    }
  }
}
```

Hierarchy Level [edit protocols]

Release Information Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure Link Layer Discovery Protocol–Media Endpoint Discovery. LLDP-MED is an extension of LLDP. The switch uses LLDP-MED to support device discovery of VoIP telephones and to create location databases for these telephone locations for emergency services. LLDP-MED is defined in the standard ANSI/TIA-1057 by the Telecommunications Industry Association (TIA).

The remaining statements are explained separately. See [CLI Explorer](#).

Default Disabled.

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

Related Documentation

- [show lldp on page 2109](#)
- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
- [Configuring LLDP-MED \(CLI Procedure\) on page 566](#)

lldp-med-bypass

Syntax	lldp-med-bypass;
Hierarchy Level	[edit protocols dot1x authenticator interface (all <i>interface-name</i>)]
Release Information	Statement introduced in Junos OS Release 12.3 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	Bypass the 802.1X authentication procedure for connecting multiple LLDP-MED end devices. Automatically add the learned MAC addresses of the end devices to the switch's static MAC bypass list, and allow the devices to access the network. You can enable lldp-med-bypass only when the interface is also configured for 802.1X authentication of <i>multiple</i> supplicants.
Default	Disabled
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">• supplicant on page 1799• Understanding Authentication on Switches on page 348


lldp-priority

Syntax	lldp-priority;
Hierarchy Level	[edit poe], [edit poe fpc (all <i>slot-number</i>)]
Release Information	Statement introduced in Junos OS Release 12.2 for EX Series switches.
Description	Configure the switch to assign interfaces the power priority provided by the powered device by using Link Layer Discovery Protocol (LLDP) power negotiation rather than the power priority configured on the switch 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">• Configuring PoE on EX Series Switches (CLI Procedure)


lldp-tx-fast-init

Syntax	<code>lldp-tx-fast-init seconds;</code>
Hierarchy Level	[edit protocols lldp],
Release Information	Statement introduced in Junos OS Release 15.1R5 for EX Series switches.
Description	Configure the interval between transmissions to be made during a fast transmission period. A device that is enabled with Link Layer Discovery Protocol (LLDP) transmits LLDP packets to neighboring nodes at a specified time interval. Fast transmission periods are initiated when a new neighbor is detected, and cause LLDP packets to be transmitted at a shorter time interval than during normal operation of the protocol. The fast transmission period ensures that more than one LLDP packet is transmitted when a new neighbor is detected. The first transmission is immediate, and the subsequent transmissions occur at the specified fast transmission (TX) interval.
Options	<p>seconds—Specify the number of seconds between transmissions that occur during the fast transmission period.</p> <p>Range: 1 through 8 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"> • show lldp on page 2109 • Configuring LLDP (CLI Procedure) on page 556 • Understanding LLDP and LLDP-MED on EX Series Switches on page 562 • Understanding LLDP on page 555

load-key-file

Syntax	load-key-file <i>URL filename</i> ;
Hierarchy Level	[edit system root-authentication], [edit system login user <i>username</i> authentication]
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	<div> NOTE: ECDSA is not supported on the QFabric system.</div> <p>Load RSA (SSH version 2) and DSA or ECDSA (SSH version 2) public keys from a previously-generated named file at a specified URL location or local path. The file contains one or more SSH keys that are copied into the configuration when the command is issued.</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 the Root Password on page 160• Configuring the Root Password on page 162• Configuring Junos OS User Accounts by Using a Configuration Group on page 84

local

Syntax	<pre>local <i>certificate-name</i> { <i>certificate-key-string</i>; load-key-file <i>URL filename</i>; }</pre>
Hierarchy Level	[edit security certificates]
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>Import a paired X.509 private key and authentication certificate, to enable Junos XML protocol client applications to establish Secure Sockets Layer (SSL) connections to the router or switch.</p>
	<p> NOTE: For FIPS mode, the digital security certificates must be compliant with the National Institute of Standards and Technology (NIST) SP 800-131A standard.</p>
Options	<p><i>certificate-key-string</i>—String of alphanumeric characters that constitute the private key and certificate.</p> <p><i>certificate-name</i>—Name that uniquely identifies the certificate.</p> <p><i>load-key-file URL filename</i>—File that contains the private key and certificate. It can be one of two types of values:</p> <ul style="list-style-type: none"> • Pathname of a file on the local disk (assuming you have already used another method to copy the certificate file to the router's or switch's local disk) • URL to the certificate file location (for instance, on the computer where the Junos XML protocol client application runs)
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>Importing SSL Certificates for Junos XML Protocol Support</i>

local-certificate

Syntax	<code>local-certificate <i>name</i>;</code>
Hierarchy Level	<code>[edit system services service-deployment],</code> <code>[edit system services web-management https],</code> <code>[edit system services xnm-ssl],</code> <code>[edit system services extension-service request-response thrift]</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 for the [edit system services extension-service request-response thrift] hierarchy level in Junos OS Release 16.1 for MX80, MX480, MX960, MX2010, MX2020, vMX, and PTX Series
Description	Import or reference an SSL certificate. Specify the name of the local certificate to use. There is no default for local-certificate . The value for local-certificate should be the same as the name provided during the import of the certificate using the CLI configuration statement local at the [edit security certificates] hierarchy level.
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 clear-text or SSL Service for Junos XML Protocol Client Applications on page 263• <i>Importing SSL Certificates for Junos XML Protocol Support</i>• local on page 1497

local-server-group (DHCP Relay Agent Option)

Syntax	<code>local-server-group <i>local-server-group</i>;</code>
Hierarchy Level	<p>[edit forwarding-options dhcp-relay relay-option (default-action equals starts-with)], [edit forwarding-options dhcp-relay group <i>group-name</i> relay-option (default-action equals starts-with)], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay ...], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...]</p>
Release Information	<p>Statement introduced in Junos OS Release 12.3. Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Forward DHCP client packets to the specified group of DHCP local servers when you use the DHCP relay selective processing feature. You can configure the forwarding operation globally or for a group of interfaces.</p> <p>The local-server-group option is not supported for DHCPv6 relay agent.</p>
Options	local-server-group —Name of DHCP local server group.
Required Privilege Level	<p>interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • <i>Using DHCP Option Information to Selectively Process DHCP Client Traffic</i>

location

Syntax	<pre>location { altitude <i>feet</i>; building <i>name</i>; country-code <i>code</i>; floor <i>number</i>; hcoord <i>horizontal-coordinate</i>; lata <i>service-area</i>; latitude <i>degrees</i>; longitude <i>degrees</i>; npa-nxx <i>number</i>; postal-code <i>postal-code</i>; rack <i>number</i>; vcoord <i>vertical-coordinate</i>; }</pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 8.5.
Description	Configure the physical location of the device.
Options	<ul style="list-style-type: none"> • altitude <i>feet</i>—Number of feet above sea level. • building <i>name</i>—Name of building. The name of the building can be 1 to 28 characters in length. If the string contains spaces, enclose it in quotation marks (" "). • country-code <i>code</i>—Two-letter country code. • floor <i>number</i>—Floor number in the building. • hcoord <i>horizontal-coordinate</i>—Bellcore Horizontal Coordinate. • lata <i>service-area</i>—Long-distance service area. • latitude <i>degrees</i>—Latitude in degree format. • longitude <i>degrees</i>—Longitude in degree format. • npa-nxx <i>number</i>—First six digits of the phone number (area code and exchange). • postal-code <i>postal-code</i>—Zip code or Postal code. • rack <i>number</i>—Rack number. • vcoord <i>vertical-coordinate</i>—Bellcore Vertical Coordinate.
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>

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"> <i>Configuring the System Location for a Device Running Junos OS</i>

location (LLDP-MED)

Syntax

```
location {
  elin number;
  civic-based {
    what number;
    country-code code;
    ca-type{
      number {
        ca-value value;
      }
    }
  }
}
```

Hierarchy Level [edit protocols [lldp-med interface](#) (all | *interface-name*)]

Release Information Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description For Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED), configure the location information. Location information is advertised from the switch to the MED. This information is used during emergency calls to identify the location of the MED.

The remaining statements are explained separately. See [CLI Explorer](#).

Default Disabled.

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

Related Documentation

- [show lldp on page 2109](#)
- [Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455](#)
- [Configuring LLDP-MED \(CLI Procedure\) on page 566](#)

lockout-period

Syntax	<code>lockout-period <i>minutes</i>;</code>
Hierarchy Level	<code>[edit system login retry-options]</code>
Release Information	Statement introduced in Junos OS Release 11.2.
Description	Configure the amount of time before the user can attempt to log in to the router after being locked out due to the number of failed login attempts specified in the <code>tries-before-disconnect</code> statement.
Options	<p><i>minutes</i>—Amount of time before the user can attempt to log in after being locked out.</p> <p>Default: Off</p> <p>Range: 1 through 43200</p>
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"> • Limiting the Number of User Login Attempts for SSH and Telnet Sessions • Login Retry Options on page 98 • Example: Configuring Login Retry Options on page 99 • retry-options on page 1707 • clear system login lockout on page 1952 • show system login lockout on page 2241

logical-system-name (DHCP Local Server)

Syntax	logical-system-name;
Hierarchy Level	<p>[edit system services dhcp-local-server authentication username-include], [edit system services dhcp-local-server dhcpv6 authentication username-include], [edit system services dhcp-local-server dhcpv6 group group-name authentication username-include], [edit system services dhcp-local-server group group-name authentication username-include] [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server ...] [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server ...], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server ...]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Specify that the logical system name be concatenated with the username during the subscriber authentication or DHCP client process. No logical system name is concatenated if the configuration is in the default logical system.
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 External AAA Authentication Services with DHCP on page 682

login

Syntax

```
login {
  announcement text;
  class class-name {
    allow-commands "regular-expression";
    allow-configuration-regexps "regular expression 1" "regular expression 2";
    cli {
      prompt name;
    }
    configuration-breadcrumbs;
    deny-commands "regular-expression";
    ( deny-configuration | deny-configuration-regexps ) "regular expression 1" "regular
      expression 2 ";
    idle-timeout minutes;
    login-script filename;
    login-tip;
    permissions [ permissions ];
  }
  message text;
  password {
    change-type (set-transitions | character-set);
    format (md5 | sha1 | des);
    maximum-length length;
    minimum-changes number;
    minimum-length length;
  }
  retry-options {
    backoff-threshold number;
    backoff-factor seconds;
    minimum-time seconds;
    tries-before-disconnect number;
  }
  user username {
    authentication {
      cli {
        prompt name;
      }
      class class-name;
      (encrypted-password "password" | plain-text-password);
      full-name complete-name;
      load-key-file URL filename;
      ssh-dsa "public-key" <from hostname>;
      ssh-rsa "public-key" <from hostname>;
      uid uid-value;
    }
  }
}
```

Hierarchy Level [edit system]

Release Information Statement introduced before Junos OS Release 7.4.

Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure user access to the router or switch.

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 admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- [Defining Junos OS Login Classes on page 52](#)

login-alarms

Syntax login-alarms;

Hierarchy Level [edit system login class *class-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.
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

Description Show system alarms automatically when an **admin** user logs in to the router or switch.

Options *class-name*—Login class name.

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

Related Documentation

- [Configuring System Alarms to Appear Automatically Upon Login on page 60](#)

login-script (Op Scripts)

Syntax	<code>login-script <i>filename</i>;</code>
Hierarchy Level	<code>[edit system login class <i>class-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 9.5.
Description	Execute the specified op script when a user belonging to the class logs in to the CLI. The script must be enabled in the configuration.
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"> • Executing an Op Script

login-tip

Syntax	<code>login-tip;</code>
Hierarchy Level	<code>[edit system login class <i>class-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	Enable CLI tips at login.
Default	Disabled.
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 Login Tips on page 60

log-key-changes

Syntax	<code>log-key-changes log-key-changes;</code>
Hierarchy Level	[edit system services ssh]
Release Information	Statement introduced in Junos OS Release 17.4R1.
Description	Enable the log-key-changes to log the authorised SSH keys. When the log-key-changes configuration statement is enabled and committed, Junos OS logs the changes to the set of authorized SSH keys for each user (including the keys that were added or removed). Junos OS logs the differences since the last time the log-key-changes configuration statement was enabled. If the log-key-changes configuration statement was never enabled, then Junos OS logs all the authorized SSH keys.
Required Privilege Level	admin
Related Documentation	<ul style="list-style-type: none">• Configuring SSH Service for Remote Access to the Router or Switch on page 253

mac-radius

Syntax	<code>mac-radius <flap-on-disconnect> <restrict>;</code>
Hierarchy Level	[edit protocols dot1x authenticator interface <i>interface-name</i>]
Release Information	<p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Option flap-on-disconnect introduced in Junos OS Release 9.4 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.</p>
Description	<p>Configure MAC RADIUS authentication for specific interfaces. MAC RADIUS authentication allows LAN access to permitted MAC addresses. When a new MAC address appears on an interface, the switch consults the RADIUS server to check whether the MAC address is a permitted address. If the MAC address is configured on the RADIUS server, the device is allowed access to the LAN.</p> <p>If MAC RADIUS is configured, the switch first tries to get a response from the host for 802.1X authentication. If the host is unresponsive, the switch attempts to authenticate using MAC RADIUS.</p> <p>To restrict authentication to MAC RADIUS only, use the restrict option. In restrictive mode, all 802.1X packets are eliminated and the attached device on the interface is considered a nonresponsive host.</p>
Options	<p>flap-on-disconnect—(Optional) When the RADIUS server sends a disconnect message to a supplicant, the switch resets the interface on which the supplicant is authenticated. If the interface is configured for multiple supplicant mode, the switch resets all the supplicants on the specified interface. This option takes effect only when the restrict option is also set.</p> <p>restrict—(Optional) Restricts authentication to MAC RADIUS only. When mac-radius restrict is configured the switch drops all 802.1X packets. This option is useful when no other 802.1X authentication methods, such as guest VLAN, are needed on the interface, and eliminates the delay that occurs while the switch determines that a connected device is a non-802.1X-enabled host.</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"> • show dot1x on page 2082 • Example: Configuring MAC RADIUS Authentication on an EX Series Switch on page 502 • Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch on page 367 • Configuring MAC RADIUS Authentication (CLI Procedure) on page 501

- [Configuring 802.1X Interface Settings \(CLI Procedure\) on page 357](#)
- [Understanding Authentication on Switches on page 348](#)

macs

Syntax	<code>macs [algorithm1 algorithm2...]</code>
Hierarchy Level	<code>[edit system services ssh]</code>
Release Information	Statement introduced in Junos OS Release 11.2. SHA-2 options introduced in Junos OS Release 12.1.
Description	Specify the set of message authentication code (MAC) algorithms that the SSH server can use to authenticate messages.
Options	<p>Specify one or more of the following MAC algorithms to authenticate messages:</p> <ul style="list-style-type: none"> • hmac-md5—Hash-based MAC using Message-Digest 5 (MD5) • hmac-md5-96—96-bits of hash-based MAC using MD5 • hmac-md5-96-etm@openssh.com—96-bits of hash-based Encrypt-then-MAC using MD5 • hmac-md5-etm@openssh.com—Hash-based Encrypt-then-MAC using MMD5 • hmac-ripemd160—Hash-based MAC using RIPEMD • hmac-ripemd160-etm@openssh.com—Hash-based Encrypt-then-MAC using RIPEMD • hmac-sha1—Hash-based MAC using secure hash algorithm-1 (SHA-1) • hmac-sha1-96—96-bits of hash-based MAC using SHA-1 • hmac-sha1-96-etm@openssh.com—96-bits of hash-based Encrypt-then-MAC using SHA-1 • hmac-sha1-etm@openssh.com—Hash-based Encrypt-then-MAC using SHA-1 • hmac-sha2-256—256-bits of hash-based MAC using secure hash algorithm-2 (SHA-2) • hmac-sha2-256-etm@openssh.com—Hash-based Encrypt-then-Mac using SHA-2 • hmac-sha2-512—512-bits of hash-based MAC using SHA-2 • hmac-sha2-512-etm@openssh.com—Hash-based Encrypt-then-Mac using SHA-2 • umac-128-etm@openssh.com—Encrypt-then-MAC using UMAC-128 algorithm specified in RFC4418 • umac-128@openssh.com—UMAC-128 algorithm specified in RFC4418 • umac-64-etm@openssh.com—Encrypt-then-MAC using UMAC-64 algorithm specified in RFC4418 • umac-64@openssh.com—UMAC-64 algorithm specified in RFC4418



NOTE: The *macs* configuration statement represents a set. Therefore, it must be configured as shown in the following example.

```
user@host#set system services ssh macs [hmac-md5 hmac-sha1]
```

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

Related Documentation

- [key-exchange on page 1482](#)
- [ciphers on page 1224](#)

mac-address (DHCP Local Server)

Syntax	mac-address;
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit system services dhcp-local-server authentication username-include],</p> <p>[edit system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit system services dhcp-local-server group group-name authentication username-include]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Support for DHCPv6 added in Junos OS Release 17.2 for MX Series Routers.</p>
Description	<p>Specify that the MAC address from the client PDU be concatenated with the username during the subscriber authentication or DHCP client authentication process.</p> <p>For DHCPv6 clients, because the DHCPv6 packet format has no specific field for the client MAC address, the MAC address is derived from among several sources with the following priority:</p> <ul style="list-style-type: none"> • Client DUID Type 1 or Type 3. • Option 79 (client link-layer address), if present. • The packet source address if the client is directly connected. • The link local address.
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 External AAA Authentication Services with DHCP on page 682

mac-address (DHCP Relay Agent)

Syntax	<code>mac-address;</code>
Hierarchy Level	<pre>[edit forwarding-options dhcp-relay authentication username-include], [edit forwarding-options dhcp-relay dhcpv6 authentication username-include], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include], [edit forwarding-options dhcp-relay group <i>group-name</i> authentication username-include], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay ...], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...]</pre>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Support for DHCPv6 added in Junos OS Release 17.2 for MX Series Routers.</p>
Description	<p>Specify that the MAC address from the client PDU be concatenated with the username during the subscriber authentication or client authentication process.</p> <p>For DHCPv6 clients, because the DHCPv6 packet format has no specific field for the client MAC address, the MAC address is derived from among several sources with the following priority:</p> <ul style="list-style-type: none"> • Client DUID Type 1 or Type 3. • Option 79 (client link-layer address), if present. • The packet source address if the client is directly connected. • The link local 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"> • Using External AAA Authentication Services with DHCP on page 682

management-address

Syntax	<code>management-address <i>ip-management-address</i>;</code>
Hierarchy Level	[edit protocols lldp]
Release Information	Statement introduced in Junos OS Release 9.5 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	Specify the management address to be used in LLDP Management Address type, length, and value (TLV) messages. The Management Address TLV typically contains the IPv4 or IPv6 management addresses of the local system. Only out-of-band management addresses must be used for the management-address. Other remote managers can use this address to obtain information related to the local device.
Default	The LLDP Management Address TLV uses the IP address of the switch's management Ethernet interface (me0), or the IP address of the virtual management Ethernet (VME) interface if the switch is a Virtual Chassis member.
Options	<i>ip-management-address</i> —You can specify either an IPv4 or an IPv6 management address for the switch.
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"> • show lldp on page 2109 • Understanding LLDP and LLDP-MED on EX Series Switches on page 562 • Interfaces Overview for Switches • Understanding LLDP on page 555

master-password

Syntax	<pre>master-password { plain-text-password iteration-count <i>iteration-count</i>; pseudorandom-function (hmac-sha1 hmac-sha2-256 hmac-sha2-512); }</pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 16.2.
Description	<p>Master password for \$8\$-based password-encryption. The master password is used as input to the password based key derivation function (PBKDF2) to generate an encryption key. The key is used as input to the Advanced Encryption Standard in Galois/Counter Mode (AES256-GCM). The plain text that the user enters is processed by the encryption algorithm (with key) to produce the encrypted text (cipher text).</p>
Options	<p>plain-text-password—Set the master password with plain text. The password quality is evaluated for strength, and the device gives feedback if weak passwords are used.</p> <p>iteration-count—The number of iterations to use for the PBKDF2 hash function. The iteration count slows the hashing count, thus slowing attacker guesses.</p> <p>Default: 100</p> <p>Range: 10-10000</p> <p>pseudorandom-function—Choose the algorithm to use for unpredictable number generation</p> <p>Values:</p> <ul style="list-style-type: none">• hmac-sha1—Hash-based MAC using secure hash algorithm-1 (SHA-1)• hmac-sha2-256—256-bits of hash-based MAC using SHA-2• hmac-sha2-512—512-bits of hash-based MAC using SHA-2
Required Privilege Level	admin
Related Documentation	<ul style="list-style-type: none">• Hardening Shared Secrets in Junos OS on page 305• request system decrypt password on page 1977

max-outstanding-requests (Diameter Applications)

Syntax	<code>max-outstanding-requests <i>number</i>;</code>
Hierarchy Level	<code>[edit access gx-plus global],</code> <code>[edit access ocs partition <i>partition-name</i>],</code> <code>[edit access pcrf partition <i>partition-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 11.2. Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches. Support for OCS and PCRF partitions introduced in Junos OS Release 16.2 for MX Series routers.
Description	<p>Limit the number of outstanding requests that the Diameter-based application (function) can retry to a remote server when the requests are improperly answered. Too many requests risks overloading the server and increases the chance of losing messages.</p> <p>The gx-plus statement limits retries from the Gx-Plus function to the Gx-Plus server using the Gx and JSRC protocols. The ocs statement limits retries from the OCS function to the OCS server using the Gy protocol. The pcrf statement limits retries from the PCRF function to the PCRF server using the Gx protocol.</p>
Options	<p><i>number</i>—Number of outstanding requests from the function to the server that can exist at any time.</p> <p>Default: 40</p> <p>Range: 2 through 40</p>
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"> • <i>Configuring Gx-Plus Global Attributes</i> • <i>Configuring Gx-Plus</i> • <i>Configuring the OCS Partition</i> • <i>Configuring the PCRF Partition</i> • <i>Understanding Gx Interactions Between the Router and the PCRF</i> • <i>Understanding Gy Interactions Between the Router and the OCS</i>

max-pre-authentication-packets

Syntax	max-pre-authentication-packets <i>value</i> ;
Hierarchy Level	[edit system services ssh]
Release Information	Statement introduced in Junos OS Release 12.3X48-D10.
Description	Define the number of pre-authentication SSH packets that the SSH server will accept prior to user authentication.
Options	value —Maximum number of pre-authentication SSH packets that the server will accept. Range: 20 through 2147483647. Default: 128
Required Privilege Level	admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• The ssh Command on page 278

max-sessions-per-connection

Syntax	max-sessions-per-connection <i>number</i>
Hierarchy Level	[edit system services ssh]
Release Information	Statement introduced in Release 11.4 of Junos OS.
Description	Specify the maximum number of ssh sessions allowed per single SSH connection.
Options	Default: 10
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 SSH Service for Remote Access to the Router or Switch on page 253• ssh on page 1781• <i>Junos OS Security Configuration Guide</i>

mau-type

Syntax	<code>mau-type;</code>
Hierarchy Level	<code>[edit protocols lldp]</code>
Release Information	Statement introduced in Junos OS Release 15.1 for EX Series switches.
Description	<p>Configure the switch to advertise information about the medium attachment unit (MAU) type. The MAU is a transceiver that interconnects the attachment unit interface (AUI) port on an attached host computer to an Ethernet cable. MAU types are defined in the IEEE 802.3 standard.</p> <p>The MAU type is included in the MAC/PHY Configuration Status type, length, and value (TLV) message. TLVs are used by LLDP-capable devices to transmit information to neighbor devices. The MAC/PHY Configuration Status TLV is an organizationally defined TLV that advertises information about the physical interface. In addition to the MAU type, the MAC/PHY Configuration Status TLV also includes information such as autonegotiation status, support and advertised capabilities.</p> <p>The MAU type cannot be changed by configuration; however, you must configure the mau-type statement to include the MAU type value in the MAC/PHY Configuration Status TLV.</p>
Default	If the mau-type statement is not configured, the MAU type field of the MAC/PHY Configuration Status TLV contains the value Unknown .
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 LLDP and LLDP-MED on EX Series Switches on page 562 • Configuring LLDP

maximum-certificates

Syntax	<code>maximum-certificates <i>number</i>;</code>
Hierarchy Level	[edit security certificates]
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	(Encryption interface on M Series and T Series routers and EX Series switches only) Configure the maximum number of peer digital certificates to be cached.
Options	<i>number</i> —Maximum number of peer digital certificates to be cached. Range: 64 through 4,294,967,295 peer certificates Default: 1024 peer certificates
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 the Maximum Number of Peer Certificates</i>

maximum-hop-count

Syntax	<code>maximum-hop-count <i>number</i>;</code>
Hierarchy Level	<code>[edit forwarding-options helpers bootp],</code> <code>[edit forwarding-options helpers bootp interface (<i>interface-name</i> <i>interface-group</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 11.3 for QFX Series switches.
Description	Set the maximum allowed number of hops. This value is compared against the hops field in the BOOTP request message. BOOTP request messages that have a number in the hops field that exceeds maximum-hop-count are not forwarded. If you omit the maximum-hop-count statement, the default value is four hops.
Options	<i>number</i> —Maximum number of hops for BOOTP request messages. Range: 1 through 16 Default: 4
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 Routers, Switches, and Interfaces as DHCP and BOOTP Relay Agents</i>

maximum-lease-time (DHCP)

Syntax	<code>maximum-lease-time <i>seconds</i>;</code>
Hierarchy Level	<code>[edit system services <i>dhcp</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	For J Series Services Routers and EX Series switches only. Specify the maximum length of time in seconds for which a client can request and hold a lease on a DHCP server. An exception is that the dynamic BOOTP lease length can exceed the maximum lease length specified.
Options	<i>seconds</i> —The maximum number of seconds the lease can be held.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration


maximum-lease-time (DHCP)

Syntax	<code>maximum-lease-time <i>seconds</i>;</code>
Hierarchy Level	<code>[edit system services <i>dhcp</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	For J Series Services Routers and EX Series switches only. Specify the maximum length of time in seconds for which a client can request and hold a lease on a DHCP server. An exception is that the dynamic BOOTP lease length can exceed the maximum lease length specified.
Options	<i>seconds</i> —The maximum number of seconds the lease can be held.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration

maximum-length

Syntax	<code>maximum-length <i>length</i>;</code>
Hierarchy Level	<code>[edit system login passwords]</code>
Release Information	Statement introduced in Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Specify the maximum number of characters allowed in plain-text passwords. Newly created passwords must meet this requirement.
Default	For Junos-FIPS software, the maximum number of characters for plain-text passwords is 20. For Junos OS, no maximum is set.
Options	length —The maximum number of characters the password can include. Range: 1 to 64 characters
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: Changing the Requirements for Junos OS Plain-Text Passwords on page 181 • password (Login) on page 1610

maximum-lifetime

Syntax	<code>maximum-lifetime <i>days</i>;</code>
Hierarchy Level	<code>[edit system login passwords]</code>
Release Information	Statement introduced in Junos OS Release 18.4R1 for ACX Series, EX Series, QFX Series, MX Series, PTX Series.
Description	<p>Specify the maximum password lifetime in days. A user who has the required permissions is able to control the maximum lifetime of a password. If the age of the password reaches the maximum lifetime configured, the password expires and has to be changed. If your password has expired after logging into the device, you cannot commit the configuration until the password is changed. Password expiry is applicable only for local user accounts.</p> <hr/> <div>  <p>NOTE: You cannot configure the same password every time the password expires. Older passwords cannot be configured on password expiry. Therefore, <code>maximum-lifetime</code> can be committed only after configuring <code>minimum-reuse</code>, else commit fails and error is displayed on commit.</p> <p>If <code>maximum-lifetime</code> is configured, password expiry validation check is performed at the time of login and at the time of commit for those passwords configured after <code>minimum-reuse</code> is configured.</p> </div> <hr/>
Options	<p>days—The maximum duration of a password where the password expires after the maximum duration is reached.</p> <p>Range: 30-365</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"> • Example: Changing the Requirements for Junos OS Plain-Text Passwords on page 181 • password (Login) on page 1610

maximum-requests

Syntax	<code>maximum-requests <i>number</i>;</code>
Hierarchy Level	<code>[edit protocols dot1x authenticator interface (all [<i>interface-names</i>])]</code>
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	For 802.1X authentication, configure the maximum number of times an EAPOL request packet is retransmitted to the supplicant before the authentication session times out.
Default	Two retransmission attempts
Options	<i>number</i> —Number of retransmission attempts. Range: 1 through 10 Default: 2
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 802.1X Interface Settings (CLI Procedure) on page 357 • Configuring 802.1X Authentication (J-Web Procedure) on page 358

maximum-time

Syntax	<code>maximum-time <i>seconds</i>;</code>
Hierarchy Level	<code>[edit system login retry-options]</code>
Release Information	Statement introduced in Junos OS Release 9.6.
Description	Configure the maximum time available for the user to enter the username and password for logging on to a router before the connection is closed.
Options	<p><i>seconds</i>—Maximum length of time that the connection remains open for the user to enter a username and password to log in. If the user remains idle and does not enter a username and password within the configured maximum-time, the connection is closed.</p> <p>Range: 20 through 300</p> <p>Default: 120</p>
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">• Limiting the Number of User Login Attempts for SSH and Telnet Sessions on page 87• retry-options on page 1707

method

Syntax

```
method {
  bfd {
    version (0 | 1 | automatic);
    minimum-interval milliseconds;
    minimum-receive-interval milliseconds;
    multiplier number;
    no-adaptation;
    transmit-interval {
      minimum-interval milliseconds;
      threshold milliseconds;
    }
    detection-time {
      threshold milliseconds;
    }
    session-mode (automatic | multihop | singlehop);
    holddown-interval milliseconds;
  }
  layer2-liveness-detection {
    max-consecutive-retries number;
    transmit-interval interval;
  }
}
```

Hierarchy Level

```
[edit forwarding-options dhcp-relay dhcpv6 group group-name liveness-detection],
[edit forwarding-options dhcp-relay dhcpv6 liveness-detection],
[edit forwarding-options dhcp-relay dual-stack-group dual-stack-group-name
liveness-detection],
[edit forwarding-options dhcp-relay group group-name liveness-detection],
[edit forwarding-options dhcp-relay liveness-detection],
[edit system services dhcp-local-server dhcpv6 group group-name liveness-detection],
[edit system services dhcp-local-server dhcpv6 liveness-detection],
[edit system services dhcp-local-server dual-stack-group dual-stack-group-name
liveness-detection],
[edit system services dhcp-local-server group group-name liveness-detection],
[edit system services dhcp-local-server liveness-detection]
```

Release Information Statement introduced in Junos OS Release 12.1.
Statement introduced in Junos OS Release 12.3R2 for EX Series switches.

Description Configure the liveness detection method.



NOTE: The **bfd** stanza is not available at the [edit forwarding-options dhcp-relay dual-stack-group dual-stack-group-name liveness-detection **method**] or [edit system services dhcp-local-server dual-stack-group dual-stack-group-name liveness-detection] hierarchy levels.

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 routing—To view this statement in the configuration.
routing-control—To add this statement to the configuration.

Related Documentation

- [DHCP Liveness Detection Overview on page 707](#)
- *Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients*
- [Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714](#)
- *DHCP Liveness Detection Using ARP and Neighbor Discovery Packets*

message

Syntax `message text;`

Hierarchy Level [edit system login]

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 system login message. This message appears before a user logs in.

You can format the message using the following special characters:

- \n—New line
- \t—Horizontal tab
- \'—Single quotation mark
- \"—Double quotation mark
- \\—Backslash

Options *text*—Text of the message.

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

Related Documentation

- [Configuring Junos OS to Display a System Login Message on page 55](#)
- [announcement on page 1174](#)

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*

minimum-changes

Syntax	<code>minimum-changes <i>number</i>;</code>
Hierarchy Level	[edit system login passwords]
Release Information	Statement introduced in Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	<p>Specify the minimum number of character sets (or character set changes) required in plain-text passwords. Newly created passwords must meet this requirement.</p> <p>This statement is used in combination with the change-type statement. If the change-type is character-sets, then the number of character sets included in the password is checked against the specified minimum. If change-type is set-transitions, then the number of character set changes in the password is checked against the specified minimum.</p>
Default	For Junos OS, the minimum number of changes is 1. For Junos-FIPS Software, the minimum number of changes is 3.
Options	<i>number</i> —The minimum number of character sets (or character set changes) required for the password.
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">• change-type on page 1222

minimum-character-changes

Syntax	<code>minimum-character-changes <i>number</i>;</code>
Hierarchy Level	[edit system login passwords]
Release Information	Statement introduced in Junos OS Release 18.3R1.
Description	Specify the minimum number of character changes between old and new passwords. Newly created passwords must meet this requirement. A user who has the required permissions is able to configure the number of character changes between passwords. If the number of character changes between the old password and new password is greater than or equal to the configured value for minimum number of character changes, new password is accepted and if it is less, new password is rejected.
Options	number —The minimum number of character changes between old and new passwords. Range: 4 to 15 characters
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: Changing the Requirements for Junos OS Plain-Text Passwords on page 181 • password (Login) on page 1610

minimum-interval


Syntax	<code>minimum-interval <i>milliseconds</i>;</code>
Hierarchy Level	<p>[edit system services dhcp-local-server liveness-detection method <code>bfd</code>], [edit system services dhcp-local-server liveness-detection method bfd <code>transmit-interval</code>], [edit system services dhcp-local-server dhcpv6 liveness-detection method <code>bfd</code>], [edit system services dhcp-local-server dhcpv6 liveness-detection method bfd <code>transmit-interval</code>], [edit forwarding-options dhcp-relay liveness-detection method <code>bfd</code>], [edit forwarding-options dhcp-relay liveness-detection method bfd <code>transmit-interval</code>], [edit forwarding-options dhcp-relay dhcpv6 liveness-detection method <code>bfd</code>], [edit forwarding-options dhcp-relay dhcpv6 liveness-detection method bfd <code>transmit-interval</code>], [edit system services dhcp-local-server group <i>group-name</i> liveness-detection method <code>bfd</code>], [edit system services dhcp-local-server group <i>group-name</i> liveness-detection method bfd <code>transmit-interval</code>], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> liveness-detection method <code>bfd</code>], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> liveness-detection method bfd <code>transmit-interval</code>], [edit forwarding-options dhcp-relay group <i>group-name</i> liveness-detection method <code>bfd</code>], [edit forwarding-options dhcp-relay group <i>group-name</i> liveness-detection method bfd <code>transmit-interval</code>], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> liveness-detection method <code>bfd</code>], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> liveness-detection method bfd <code>transmit-interval</code>]</p>
Release Information	<p>Statement introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Configure the minimum intervals at which the local routing device transmits hello packets and then expects to receive a reply from a neighbor with which it has established a BFD session. This value represents the minimum interval at which the local routing device transmits hello packets as well as the minimum interval that the routing device expects to receive a reply from a neighbor with which it has established a BFD session. Optionally, instead of using this statement, you can specify the minimum transmit and receive intervals separately using the <code>transmit-interval</code> <code>minimal-interval</code> and <code>minimum-receive-interval</code> statements.</p>
Options	<p><i>milliseconds</i> — Specify the minimum interval value for BFD liveliness detection.</p> <p>Range: 1 through 255,000</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**
- [Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients](#)
 - [Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714](#)

minimum-length

Syntax	<code>minimum-length <i>length</i>;</code>
Hierarchy Level	[edit system login passwords]
Release Information	Statement introduced in Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	<p>Specify the minimum number of characters required in plain-text passwords. Newly created passwords must meet this requirement.</p> <p>This statement can be used in combination with all of the other requirement options for plain-text passwords, such as minimum-upper-cases, minimum-punctuations, minimum-lower-cases, and so on.</p> <p>Using several password minimum requirement options will cause the minimum-length to be reset if the total sum of the required minimums exceeds the minimum-length setting.</p>
Default	For Junos OS, the minimum number of characters for plain-text passwords is six. For Junos-FIPS software, the minimum number of characters for plain-text passwords is 10.
Options	<p>length—The minimum number of characters the password must include.</p> <p>Range: 6 to 20 characters</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"> • Example: Changing the Requirements for Junos OS Plain-Text Passwords on page 181 • maximum-length on page 1523

minimum-lifetime

Syntax	<code>minimum-lifetime days;</code>
Hierarchy Level	<code>[edit system login passwords]</code>
Release Information	Statement introduced in Junos OS Release 18.4R1 for ACX Series, EX Series, QFX Series, MX Series, PTX Series.
Description	<p>Specify the minimum password lifetime in days. A user who has the required permissions is able to control the minimum lifetime of a password. You cannot change the password if the age of the password does not exceed the minimum lifetime value configured. When you change a password, the age of the existing password is retrieved based on the time at which the password was configured and the current time is fetched. If the age of the password is less than or equal to the configured value for minimum-lifetime, the new password is not accepted and error message is displayed. If the age of the password is more than the configured value for minimum-lifetime, the new password is accepted. .</p>
	<p> NOTE: minimum-lifetime can be committed only after configuring minimum-reuse as minimum lifetime works in coordination with password history requirements, else commit fails and error is displayed on commit.</p>
Options	<p>days—The minimum duration of a password. You cannot change the password until the minimum duration is reached.</p> <p>Range: 1-30 days</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"> • Example: Changing the Requirements for Junos OS Plain-Text Passwords on page 181 • password (Login) on page 1610

minimum-lower-cases

Syntax	<code>minimum-lower-cases <i>number</i>;</code>
Hierarchy Level	[edit system login password]
Release Information	Statement introduced in Junos OS Release 12.1. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	<p>Specify the minimum number of lower-case letters required in plain-text passwords. Newly created passwords must meet this requirement.</p> <p>This statement can be used in combination with all of the other requirement options for plain-text passwords, such as minimum-length, minimum-punctuations, minimum-upper-cases, and so on.</p> <p>Using several password minimum requirement options will cause the minimum-length to be reset if the total sum of the required minimums exceeds the minimum-length setting.</p>
Options	<i>number</i> —The minimum number of lower-case letters required for the password.
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: Changing the Requirements for Junos OS Plain-Text Passwords on page 181 • password (Login) on page 1610

minimum-numeric

Syntax	<code>minimum-numeric <i>number</i>;</code>
Hierarchy Level	[edit system login password]
Release Information	Statement introduced in Junos OS Release 12.1. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	<p>Specify the minimum number of numeric class characters required in plain-text passwords. Newly created passwords must meet this requirement.</p> <p>This statement can be used in combination with all of the other requirement options for plain-text passwords, such as minimum-length, minimum-punctuations, minimum-lower-cases, and so on.</p> <p>Using several password minimum requirement options will cause the minimum-length to be reset if the total sum of the required minimums exceeds the minimum-length setting.</p>
Options	<i>number</i> —The minimum number of numeric class characters required for the password.
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: Changing the Requirements for Junos OS Plain-Text Passwords on page 181• password (Login) on page 1610

minimum-reuse

Syntax	<code>minimum-reuse <i>number</i>;</code>
Hierarchy Level	[edit system login passwords]
Release Information	Statement introduced in Junos OS Release 18.3R1.
Description	Specify the the number of old passwords which should not match the new password. Newly created passwords must meet this requirement. A user who has the required permissions is able to control the number of old passwords that need to be compared. The number of old passwords to compare with the new password depends on the value configured. If a match is found between the new password and any of the old passwords, Junos OS device rejects the new password and aborts. If the new password is different from the configured number of old passwords, new password is accepted.
Options	<p>number—The minimum number of old passwords which should not match the new password.</p> <p>Range: 1 to 20 passwords</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"> • Example: Changing the Requirements for Junos OS Plain-Text Passwords on page 181 • password (Login) on page 1610

minimum-punctuations

Syntax	<code>minimum-punctuations <i>number</i>;</code>
Hierarchy Level	[edit system login password]
Release Information	Statement introduced in Junos OS Release 12.1. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	<p>Specify the minimum number of punctuation class characters required in plain-text passwords. Newly created passwords must meet this requirement.</p> <p>This statement can be used in combination with all of the other requirement options for plain-text passwords, such as minimum-length, minimum-upper-cases, minimum-lower-cases, and so on.</p> <p>Using several password minimum requirement options will cause the minimum-length to be reset if the total sum of the required minimums exceeds the minimum-length setting.</p>
Options	<i>number</i> —The minimum number of punctuation class characters required for the password.
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: Changing the Requirements for Junos OS Plain-Text Passwords on page 181• password (Login) on page 1610

minimum-receive-interval

Syntax	<code>minimum-receive-interval <i>milliseconds</i>;</code>
Hierarchy Level	<p>[edit system services dhcp-local-server liveness-detection method bfd], [edit system services dhcp-local-server dhcpv6 liveness-detection method bfd], [edit forwarding-options dhcp-relay liveness-detection method bfd], [edit forwarding-options dhcp-relay dhcpv6 liveness-detection method bfd], [edit system services dhcp-local-server group <i>group-name</i> liveness-detection method bfd], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> liveness-detection method bfd], [edit forwarding-options dhcp-relay group <i>group-name</i> liveness-detection method bfd], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> liveness-detection method bfd]</p>
Release Information	<p>Statement introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Configure the minimum interval at which the local routing device (or switch) must receive a reply from a neighbor with which it has established a BFD session.
Options	<p><i>milliseconds</i> — Specify the minimum receive interval value.</p> <p>Range: 1 through 255,000</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"> • Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients • Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714

minimum-time

Syntax	minimum-time <i>seconds</i> ;
Hierarchy Level	[edit system login retry-options]
Release Information	Statement introduced in Junos OS Release 8.0.
Description	Configure the minimum time available for the user to enter a password to log on to a router before the connection is closed.
Options	<p><i>seconds</i>—Minimum length of time that the connection remains open while the user is attempting to enter a password to log in.</p> <p>Range: 20 through 60</p> <p>Default: 20</p>
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">• Limiting the Number of User Login Attempts for SSH and Telnet Sessions on page 87• retry-options on page 1707

minimum-upper-cases

Syntax	<code>minimum-upper-cases <i>number</i>;</code>
Hierarchy Level	[edit system login password]
Release Information	Statement introduced in Junos OS Release 12.1. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	<p>Specify the minimum number of upper-case letters required in plain-text passwords. Newly created passwords must meet this requirement.</p> <p>This statement can be used in combination with all of the other requirement options for plain-text passwords, such as minimum-length, minimum-punctuations, minimum-lower-cases, and so on.</p> <p>Using several password minimum requirement options will cause the minimum-length to be reset if the total sum of the required minimums exceeds the minimum-length setting.</p>
Options	<i>number</i> —The minimum number of upper-case letters required for the password.
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: Changing the Requirements for Junos OS Plain-Text Passwords on page 181 • password (Login) on page 1610

minimum-wait-time

Syntax	<code>minimum-wait-time seconds;</code>
Hierarchy Level	<code>[edit forwarding-options helpers bootp],</code> <code>[edit forwarding-options helpers bootp interface (<i>interface-name</i> <i>interface-group</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 11.3 for QFX Series switches.
Description	<p>To set the minimum allowed number of seconds in the secs field of the BOOTP message, include the minimum-wait-time statement. This setting configures a minimum number of seconds since the client sent its first BOOTP request. BOOTP messages that have a smaller number in the secs field than the allowed minimum are not forwarded. The default value for the minimum wait time is zero (0).</p> <p>The default value for the minimum wait time is zero (0) seconds. If the minimum wait time is 0 and the secs field in the BOOTP request message is 0, the device forwards the packet.</p>
Options	seconds —Minimum wait time the BOOTP client has waited before packets are forwarded. Range: 0 to 30,000 Default: 0
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 Routers, Switches, and Interfaces as DHCP and BOOTP Relay Agents</i>

multi-domain

Syntax

```
multi-domain {
  max-data-session max-data-sessions;
  packet-action (drop-and-log | shutdown);
  recovery-timeout seconds;
}
```

Hierarchy Level [edit protocols dot1x authenticator interface *interface-name*]

Release Information Statement introduced in Junos OS Release 18.3R1.

Description Configure multi-domain authentication to restrict the number of authenticated data and VoIP sessions on the port. Multi-domain authentication is an extension of multiple supplicant mode for 802.1X authentication, and is designed to support VoIP and data clients on the same interface. The interface is divided into two domains; one is the data domain and the other is the voice domain.

In multiple supplicant mode, any number of VoIP or data sessions can be authenticated; the number of sessions can be restricted using MAC limiting, but there is no way to apply the limit specifically to either data or VoIP sessions. Multi-domain authentication maintains separate session counts based on the domain type.

The data device can be authenticated using 802.1X authentication or MAC RADIUS authentication. Multi-domain authentication does not enforce the order of authentication. For best results, the VoIP device should be authenticated before the data device.

You can configure the maximum number of authenticated data sessions allowed on the interface using the **max-data-session** statement. The number of VoIP sessions is not configurable; only one authenticated VoIP session is allowed.

If a new client attempts to authenticate on the interface after the maximum session count has been reached, the default action is to drop the packet and generate an error log message. You can also configure the action to shut down the interface. The port can be manually recovered from the down state by issuing the **clear dot1x recovery-timeout** command, or can recover automatically after a recovery timeout period. To configure automatic recovery, use the **recovery-timeout** option.

Options **max-data-session *max-data-sessions***—The number of authenticated data sessions are allowed in the data domain on the 802.1X interface.

Range: 1 through 1,000 sessions

Default: 1

packet-action (drop-and-log | shutdown)—Define the action the switch should take on packets that exceed the limit of authenticated sessions allowed on the interface. The number of data sessions is configured using the **max-data-session** option. The

number of VoIP sessions is not configurable; only one authenticated VoIP session is allowed.

- **drop-and-log**—Drop the packet and generate an error syslog message.
- **shutdown**—Shut down the interface.

Default: The default packet action is to drop the packet and generate an error syslog message.

recovery-timeout seconds—If you configure the packet action with the shutdown option and you enable the recovery timeout, the interface is temporarily disabled when the maximum number of authenticated sessions is reached. The interface will recover automatically after the number of seconds specified.

Range: 60 through 3600 seconds

Default: none

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

Related Documentation

- *authenticator*
- *dot1x*
- *interface (IEEE 802.1x)*

multicast-client

Syntax multicast-client <address>;

Hierarchy Level [edit system ntp]

Release Information Statement introduced before Junos OS Release 7.4.

Description For NTP, configure the SRX Series device to listen for multicast messages on the local network to discover other servers on the same subnet.

Options **address**—(Optional) One or more IP addresses. If you specify addresses, the SRX Series device joins those multicast groups.
Default: 224.0.1.1.

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

Related Documentation

- [ntp on page 1573](#)

multiplier

Syntax	<code>multiplier <i>number</i>;</code>
Hierarchy Level	<pre>[edit system services dhcp-local-server liveness-detection method bfd], [edit system services dhcp-local-server dhcpv6 liveness-detection method bfd], [edit forwarding-options dhcp-relay liveness-detection method bfd], [edit forwarding-options dhcp-relay dhcpv6 liveness-detection method bfd], [edit system services dhcp-local-server group <i>group-name</i> liveness-detection method bfd], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> liveness-detection method bfd], [edit forwarding-options dhcp-relay group <i>group-name</i> liveness-detection method bfd], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> liveness-detection method bfd]</pre>
Release Information	<p>Statement introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Configure the number of hello packets not received by the neighbor before Bidirectional Forwarding Detection (BFD) declares the neighbor down.
Options	<p>number—Maximum allowable number of hello packets missed by the neighbor.</p> <p>Range: 1 through 255</p> <p>Default: 3</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"> • <i>Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients</i> • Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714

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">• <i>Configuring a Different System Name</i>

name-server

Syntax	<pre>name-server { address; }</pre>
Hierarchy Level	[edit system], [edit system services dhcp], [edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure one or more Domain Name System (DNS) name servers.
Options	address —Address of the name server. To configure multiple name servers, include a maximum of three address options.
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 a DNS Name Server for Resolving a Hostname into Addresses</i>

name-server (Access)

Syntax	<pre>name-server address</pre>
Hierarchy Level	[edit access address-assignment pool <name> family (inet inet6) xauth-attributes]
Release Information	Statement introduced in Junos OS Release 10.4.
Description	Specify the DNS server IP address for an address-assignment pool.
Required Privilege Level	access—To view this statement in the configuration. access-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • address-assignment (Access) on page 1152

nas-identifier

Syntax	<code>nas-identifier <i>identifier-value</i>;</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</i> radius options]</code>
Release Information	Statement introduced in Junos OS Release 9.1. Statement introduced in Junos OS Release 9.1 for EX Series switches. Statement introduced in Junos OS Release 15.1X49-D110 for SRX300, SRX320, SRX340, SRX345, and SRX550M Series devices.
Description	Configure the value for the client RADIUS attribute 32 (NAS-Identifier). This attribute is used for authentication and accounting requests.
Options	<i>identifier-value</i> —String to use for authentication and accounting requests. Range: 1 through 64 characters
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">• <i>Configuring RADIUS Server Options for Subscriber Access</i>• <i>Configuring RADIUS Server Parameters for Subscriber Access</i>

nas-ip-address

Syntax	<code>nas-ip-address <i>ip-address</i>;</code>
Hierarchy Level	[edit system]
Release Information	<p>Statement introduced in Junos OS Release 8.3.</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 the NAS-IP address for outgoing RADIUS packets.
Options	ip-address —IP address of the network access server (NAS) that requests user authentication.
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"> • Configuring RADIUS Server Authentication on page 203 • Configuring RADIUS Authentication (QFX Series or OCX Series) on page 213

nas-port-extended-format

Syntax

```
nas-port-extended-format {
  adapter-width width;
  ae-width width;
  port-width width;
  pw-width width;
  slot-width width;
  stacked-vlan-width width;
  vlan-width width;
  atm {
    adapter-width width;
    port-width width;
    slot-width width;
    vci-width width;
    vpi-width width;
  }
}
```

Hierarchy Level [edit access profile *profile-name* radius [options](#)]

Release Information

Statement introduced in Junos OS Release 9.1.
 Statement introduced in Junos OS Release 9.1 for EX Series switches.
ae-width option added in Junos OS Release 12.1.
atm option added in Junos OS Release 12.3R3 and supported in later 12.3Rx releases.
atm option supported in Junos OS Release 13.2 and later releases. (Not supported in Junos OS Release 13.1.)
pw-width option added in Junos OS Release 15.1.

Description Configure the RADIUS client to use the extended format for RADIUS attribute 5 (NAS-Port) and specify the width of the fields in the NAS-Port attribute.

Options

adapter-width *width*—Number of bits in the adapter field.

ae-width *width*—Number of bits in the aggregated Ethernet identifier field.

port-width *width*—Number of bits in the port field.

pw-width *width*—Number of bits in the pseudowire field. Appears in the Cisco NAS-Port-Info AVP (100).

slot-width *width*—Number of bits in the slot field.

stacked-vlan-width *width*—Number of bits in the SVLAN ID field.

vlan-width *width*—Number of bits in the VLAN ID field.



NOTE: The total of the widths must not exceed 32 bits, or the configuration will fail.

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

Related Documentation	<ul style="list-style-type: none">• <i>Configuring RADIUS Server Options for Subscriber Access</i>• <i>Configuring RADIUS Server Parameters for Subscriber Access</i>
------------------------------	--

nas-port-extended-format

Syntax

```
nas-port-extended-format {
  adapter-width width;
  ae-width width;
  port-width width;
  pw-width width;
  slot-width width;
  stacked-vlan-width width;
  vlan-width width;
  atm {
    adapter-width width;
    port-width width;
    slot-width width;
    vci-width width;
    vpi-width width;
  }
}
```

Hierarchy Level [edit access profile *profile-name* radius [options](#)]

Release Information

Statement introduced in Junos OS Release 9.1.
 Statement introduced in Junos OS Release 9.1 for EX Series switches.
ae-width option added in Junos OS Release 12.1.
atm option added in Junos OS Release 12.3R3 and supported in later 12.3Rx releases.
atm option supported in Junos OS Release 13.2 and later releases. (Not supported in Junos OS Release 13.1.)
pw-width option added in Junos OS Release 15.1.

Description Configure the RADIUS client to use the extended format for RADIUS attribute 5 (NAS-Port) and specify the width of the fields in the NAS-Port attribute.

Options

adapter-width *width*—Number of bits in the adapter field.

ae-width *width*—Number of bits in the aggregated Ethernet identifier field.

port-width *width*—Number of bits in the port field.

pw-width *width*—Number of bits in the pseudowire field. Appears in the Cisco NAS-Port-Info AVP (100).

slot-width *width*—Number of bits in the slot field.

stacked-vlan-width *width*—Number of bits in the SVLAN ID field.

vlan-width *width*—Number of bits in the VLAN ID field.



NOTE: The total of the widths must not exceed 32 bits, or the configuration will fail.

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"> • <i>Configuring RADIUS Server Options for Subscriber Access</i> • <i>Configuring RADIUS Server Parameters for Subscriber Access</i>

nas-port-id-delimiter (Subscriber Management)

Syntax	<code>nas-port-id-delimiter <i>delimiter-character</i>;</code>
Hierarchy Level	[edit access profile <i>profile-name</i> radius options]
Release Information	Statement introduced in Junos OS Release 11.4. Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Description	Specify the character that the router uses as a separator between the concatenated values in the NAS-Port-ID string. The router uses the delimiter when you configure more than one value in the nas-port-id-format statement.
Default	The hash (#) character.
Options	<i>delimiter-character</i> —Character used for the delimiter.
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"> • <i>Configuring RADIUS Server Options for Subscriber Access</i> • <i>Configuring RADIUS Server Parameters for Subscriber Access</i> • <i>Configuring a NAS-Port-ID with Additional Options</i>

nas-port-id-format (Subscriber Management)

Syntax

```
nas-port-id-format {
  agent-circuit-id;
  agent-remote-id;
  interface-description;
  interface-text-description;
  nas-identifier;
  order {
    agent-circuit-id;
    agent-remote-id;
    interface-description;
    interface-text-description;
    nas-identifier;
    postpend-vlan-tags;
  }
  postpend-vlan-tags;
}
```

Hierarchy Level [edit access profile *profile-name* radius [options](#)]

Release Information Statement introduced in Junos OS Release 11.4.
Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Options **interface-text-description**, **order**, and **postpend-vlan-tags** introduced in Junos OS Release 15.1.

Description Specify the optional information that the router includes in the NAS-Port-ID (RADIUS attribute 87) that is passed to the RADIUS server during authentication and accounting. You can include any combination of the optional values.

When you specify the values for the NAS-Port-ID, you can configure the values to appear in either the default order or a custom order of your choice.



NOTE: The default and custom order methods are mutually exclusive. The configuration fails if you attempt to configure a NAS-Port-ID that includes values in both types of orders.

To specify that the optional values appear in the default order in the NAS-Port-ID, configure the values directly under the **nas-port-id-format** statement. The default order is as follows, in which the # character is the delimiter:

```
nas-identifier # interface-description # interface-text-description # agent-circuit-id #
agent-remote-id # postpend-vlan-tags
```

To specify a custom order for the NAS-Port-ID string, you use the **order** option. Include the **order** option before each optional value you want to include in the string, in the order

in which you want the options to appear. For example, the configuration, **order interface-text-description order nas-identifier order agent-remote-id** produces the following NAS-Port-ID, in which the **#** character is the delimiter:

```
interface-text-description # nas-identifier # agent-remote-id
```

Default	The router includes the interface description in the NAS-Port-ID when no optional values are specified.
Options	<p>agent-circuit-id—Include the agent circuit ID from either DHCP option 82 or the DSL forum VSAs.</p> <p>agent-remote-id—Include the agent remote ID from either DHCP option 82 or the DSL forum VSAs.</p> <p>interface-description—Include the interface description (interface identifier).</p> <p>interface-text-description—Include the textual interface description (the text description that is statically configured in the CLI).</p> <p>nas-identifier—Include the NAS identifier value (RADIUS attribute 32).</p> <p>order—Specify the optional values you want to include in the NAS-Port-ID and the customized order in which you want the values to appear. You must include the order option before each optional value (for example, order agent-circuit-id order interface-description).</p> <p>postpend-vlan-tags—Include the VLAN tags. The router includes the tags in the format :<outer-tag>-<inner-tag> for a double-tagged VLAN, or :<outer-tag> for a single-tagged VLAN.</p>
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"> • <i>Configuring RADIUS Server Options for Subscriber Access</i> • <i>Configuring RADIUS Server Parameters for Subscriber Access</i> • <i>Configuring a NAS-Port-ID with Additional Options</i>

nas-port-type (Subscriber Management)

Syntax

```
nas-port-type {
  ethernet {
    port-type;
  }
}
```

Hierarchy Level [edit access profile *profile-name* radius [options](#)]

Release Information Statement introduced in Junos OS Release 11.4.
Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.

Description Specify the port type used to authenticate subscribers. The router includes the port type in RADIUS attribute 61 (NAS-Port-Type attribute).



NOTE: This statement is ignored if the [ethernet-port-type-virtual](#) statement is included in the same access profile.

Default The router uses a port type of **ethernet**.

Options *port-type*—One of the following port types:

- *value*—A value from 0-65535
- **adsl-cap**—Asymmetric DSL, carrierless amplitude phase (CAP) modulation
- **adsl-dmt**—Asymmetric DSL, discrete multitone (DMT)
- **async**—Asynchronous
- **cable**—Cable
- **ethernet**—Ethernet
- **fddi**—Fiber Distributed Data Interface
- **g3-fax**—G.3 Fax
- **hdlc-clear-channel**—HDLC Clear Channel
- **iapp**—Inter-Access Point Protocol (IAPP)
- **isdsl**—ISDN DSL
- **isdsl-sync**—ISDN Synchronous
- **isdsl-async-v110**—ISDN Async V.110
- **isdsl-async-v120**—ISDN Async V.120

- **piafs**—Personal Handyphone System (PHS) Internet Access Forum Standard
- **sdsl**—Symmetric DSL
- **sync**—Synchronous
- **token-ring**—Token Ring
- **virtual**—Virtual
- **wireless**—Other wireless
- **wireless-1x-ev**—Wireless 1xEV
- **wireless-cdma2000**—Wireless code division multiple access (CDMA) 2000
- **wireless-ieee80211**—Wireless 802.11
- **wireless-umts**—Wireless universal mobile telecommunications system (UMTS)
- **x25**—X.25
- **x75**—X.75
- **xdsl**—DSL of unknown type

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

Related Documentation

- *Configuring RADIUS Server Options for Subscriber Access*
- *Configuring RADIUS Server Parameters for Subscriber Access*

neighbor-discovery-router-advertisement (Access)

Syntax neighbor-discovery-router-advertisement *ndra-pool-name*;

Hierarchy Level [edit access address-assignment]

Release Information Statement introduced in Junos OS Release 10.4.

Description Configure the name of the address-assignment pool used to assign the router advertisement prefix.

Options *ndra-pool-name*—Name of the address assignment pool.

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

Related Documentation

neighbor-port-info-display

Syntax	<pre>neighbor-port-info-display { port-description; port-id; }</pre>
Hierarchy Level	[edit protocols lldp]
Release Information	Statement introduced in Junos OS Release 14.1X53-D40 and Release 15.1R5 and Release 16.1R3 for EX Series switches.
Description	<p>Configure the type of Link Layer Discovery Protocol (LLDP) neighbor port information that the switch displays in the Port info field in the output of the show lldp neighbors CLI command.</p> <p>Devices in a network use LLDP to learn about and identify neighbor devices. LLDP-capable devices transmit information in type, length, and value (TLV) messages to neighbor devices.</p> <p>The Port info field of the show lldp neighbors command displays the port information received from LLDP neighbors. This information is sent from the LLDP neighbor to the switch in a type, length, and value (TLV) message. You can use the neighbor-port-info-display CLI statement to configure the switch to display the information contained in either the Port Description TLV or the Port Identification TLV.</p> <p>By default, the information contained in the Port Description TLV is used for the port information and is displayed in the Port info field. The Port Description TLV contains the textual description of the logical unit or the port. The description for the logical unit is used, if available; otherwise, the description for the physical interface (port) is used. For example, LAG member interfaces do not contain a logical unit; therefore, only the description configured on the physical interface is used.</p> <p>The Port Identification TLV contains the identifier for the neighbor port. The SNMP index of the interface is used as the port identifier.</p>
Default	On EX Series switches, the Port info field in the output of the show lldp neighbors CLI command displays the Port Description TLV.
Options	<p>port-description—Configure this option to display the Port Description TLV in the Port info field of the show lldp neighbors CLI command.</p> <p>port-id—Configure this option to display the Port Identification TLV in the Port info field of the show lldp neighbors CLI command.</p>

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

Related Documentation

- [show lldp neighbors on page 2123](#)
- [Configuring LLDP \(CLI Procedure\) on page 556](#)
- [Understanding LLDP on page 555](#)
- [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)

netbios-snooping

Syntax netbios-snooping;

Hierarchy Level [edit protocols [lldp](#)]

Release Information Statement introduced in Junos OS Release 11.1 for EX Series switches.

Description Enable NetBIOS snooping on the switch.

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

Related Documentation

- [Configuring NetBIOS Snooping \(CLI Procedure\) on page 526](#)

next-hop (Dynamic Access Routes)

Syntax	<code>next-hop <i>next-hop</i>;</code>
Hierarchy Level	<p>[edit dynamic-profiles <i>profile-name</i> routing-instances \$junos-routing-instance routing-options access route <i>prefix</i>],</p> <p>[edit dynamic-profiles <i>profile-name</i> routing-instances \$junos-routing-instance routing-options rib <i>routing-table-name</i> access route <i>prefix</i>],</p> <p>[edit dynamic-profiles <i>profile-name</i> routing-options access route <i>prefix</i>]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.5.</p> <p>Support at the [edit dynamic-profiles <i>profile-name</i> routing-instances \$junos-routing-instance routing-options access route <i>prefix</i>] and [edit dynamic-profiles <i>profile-name</i> routing-instances \$junos-routing-instance routing-options rib <i>routing-table-name</i> access route <i>prefix</i>] hierarchy levels introduced in Junos OS Release 10.1.</p>
Description	<p>Dynamically configure the next-hop address for an access route. Access routes are typically unnumbered interfaces.</p> <p>The next-hop gateway can be specified explicitly in the framed route, as either the subscriber's fixed address (common for business subscribers) or 0.0.0.0. Alternatively, the absence of the gateway address implies address 0.0.0.0. The address 0.0.0.0, whether implicit or explicitly configured, resolves to the subscriber's assigned address (host route).</p> <p>If the RADIUS Framed-Route attribute (22) or Framed-IPv6-Route attribute [99] does not specify the next-hop gateway—as is common—the variable representing the next-hop automatically resolves to the subscriber's IP address.</p>
Options	<p><i>next-hop</i>—Either the specific next-hop address you want to assign to the access route or one of the following next-hop address predefined variables.</p> <ul style="list-style-type: none"> For IPv4 access routes, use the variable, \$junos-framed-route-nexthop. The route prefix variable is dynamically replaced with the value in Framed-Route RADIUS attribute [22]. For IPv6 access routes, use the variable, \$junos-framed-route-ipv6-nexthop. The variable is dynamically replaced with the value in Framed-IPv6-Route RADIUS attribute [99].
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"> <i>Configuring Dynamic Access Routes for Subscriber Management</i>


next-server

Syntax	<code>next-server <i>next-server</i>;</code>
Hierarchy Level	[edit system services dhcp], [edit system services dhcp pool <i>pool-id</i>], [edit system services dhcp static-binding <i>mac-address</i>]
Release Information	Statement introduced in Junos OS Release 8.4.
Description	(J Series Services Routers only) Specify the IP address for the next DHCP server used for communication after a DHCP boot client establishes initial contact.
Options	<i>next-server</i> —The IP address of the DHCP server that is used as the “siaddr” in a DHCP protocol packet.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	

no-adaptation

Syntax	no-adaptation;
Hierarchy Level	[edit system services dhcp-local-server liveness-detection method bfd], [edit system services dhcp-local-server dhcpv6 liveness-detection method bfd], [edit forwarding-options dhcp-relay liveness-detection method bfd], [edit forwarding-options dhcp-relay dhcpv6 liveness-detection method bfd], [edit system services dhcp-local-server group <i>group-name</i> liveness-detection method bfd], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> liveness-detection method bfd], [edit forwarding-options dhcp-relay group <i>group-name</i> liveness-detection method bfd], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> liveness-detection method bfd]
Release Information	Statement introduced in Junos OS Release 12.1. Statement introduced in Junos OS Release 12.3R2 for EX Series switches.
Description	Configure Bidirectional Forwarding Detection (BFD) sessions to not adapt to changing network conditions.
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 Group Liveness Detection with BFD for DHCP Local Server Clients</i>• Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714

no-allow-snooped-clients

Syntax	no-allow-snooped-clients;
Hierarchy Level	<pre>[edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> interface <i>interface-name</i> overrides], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> overrides], [edit forwarding-options dhcp-relay dhcpv6 overrides], [edit forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides], [edit forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit forwarding-options dhcp-relay overrides], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay ...], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...]</pre>
Release Information	<p>Statement introduced in Junos OS Release 10.2.</p> <p>Support at the [edit ... dhcpv6] hierarchy levels introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 12.3 for EX Series switches.</p>
Description	<p>Explicitly disable DHCP snooping support on DHCP relay agent.</p> <p>Use the statement at the [edit ... dhcpv6] hierarchy levels to explicitly disable snooping support for DHCPv6 relay agent.</p>
<div>  <p>NOTE: In Junos OS Release 10.0 and earlier, DHCP snooping is <i>enabled</i> by default. In Release 10.1 and later, DHCP snooping is <i>disabled</i> by default.</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"> • Extended DHCP Relay Agent Overview on page 632 • Overriding the Default DHCP Relay Configuration Settings on page 638 • DHCP Snooping Support on page 650 • Configuring DHCP Snooped Packets Forwarding Support for DHCP Relay Agent on page 655

no-bind-on-request (DHCP Relay Agent)

Syntax	no-bind-on-request;
Hierarchy Level	<p>[edit forwarding-options dhcp-relay dhcpv6 overrides],</p> <p>[edit forwarding-options dhcp-relay overrides],</p> <p>[edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> overrides],</p> <p>[edit forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides]</p>
Release Information	<p>Statement introduced in Junos OS Release 10.4.</p> <p>Support at the [edit ... dhcpv6] hierarchy levels introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.3 for EX Series switches.</p>
Description	<p>Explicitly disable automatic binding of received DHCP request messages that have no entry in the database (<i>stray</i> requests). Use the statement at the [edit ... dhcpv6] hierarchy levels to configure DHCPv6 support.</p> <p>M120 and M320 routers do not support DHCPv6.</p>



NOTE: Beginning with Junos OS Release 10.4, automatic binding of stray requests is enabled by default. In Junos OS Release 10.3 and earlier releases, automatic binding of stray requests is disabled by 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"> • Extended DHCP Relay Agent Overview on page 632 • Overriding the Default DHCP Relay Configuration Settings on page 638 • Disabling Automatic Binding of Stray DHCP Requests on page 679

no-listen

Syntax	no-listen;
Hierarchy Level	[edit forwarding-options helpers bootp interface (<i>interface-name</i> <i>interface-group</i>)], [edit forwarding-options helpers domain interface <i>interface-name</i>], [edit forwarding-options helpers port <i>port-number</i> interface <i>interface-name</i>], [edit forwarding-options helpers tftp interface <i>interface-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 11.3 for QFX Series switches.
Description	Disable recognition of DNS requests or stop packets from being forwarded on a logical interface, a group of logical interfaces, a router, or a switch.
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 DNS and TFTP Packet Forwarding</i> • <i>Configuring Port-based LAN Broadcast Packet Forwarding</i> • <i>Configuring Routers, Switches, and Interfaces as DHCP and BOOTP Relay Agents</i>

no-mac-table-binding (802.1X)

Syntax	no-mac-table-binding;
Hierarchy Level	[edit protocols dot1x authenticator]
Release Information	Statement introduced in Junos OS Release 11.1 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	For 802.1X authentication, disable the removal of the session from the authentication session table when the MAC address ages out of the Ethernet switching table.
Default	Not enabled
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">• Controlling Authentication Session Timeouts (CLI Procedure) on page 517

no-reauthentication

Syntax	no-reauthentication;
Hierarchy Level	[edit protocols dot1x authenticator interface (802.1X) (all [<i>interface-names</i>])]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	For 802.1X authentication, disables reauthentication.
Default	Not disabled
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 802.1X Interface Settings (CLI Procedure) on page 357• Configuring 802.1X Authentication (J-Web Procedure) on page 358• Understanding Authentication on Switches on page 348

no-vlan-interface-name

Syntax no-vlan-interface-name;

Hierarchy Level

```
[edit forwarding-options dhcp-relay dhcpv6 (relay-agent-interface-id |
relay-agent-remote-id)],
[edit forwarding-options dhcp-relay dhcpv6 group group-name (relay-agent-interface-id |
relay-agent-remote-id)],
[edit forwarding-options dhcp-relay relay-option-82 (circuit-id | remote-id)],
[edit forwarding-options dhcp-relay group group-name relay-option-82 (circuit-id |
remote-id)],
[edit logical-systems logical-system-name ... forwarding-options dhcp-relay dhcpv6
(relay-agent-interface-id | relay-agent-remote-id)],
[edit logical-systems logical-system-name ... forwarding-options dhcp-relay ... relay-option-82
(circuit-id | remote-id)],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay dhcpv6
(relay-agent-interface-id | relay-agent-remote-id)],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay ...
relay-option-82 (circuit-id | remote-id)],
[edit vlans vlan-name forwarding-options dhcp-security dhcpv6-options option-18],
[edit vlans vlan-name forwarding-options dhcp-security dhcpv6-options option-37]
```

Release Information Statement introduced in Junos OS Release 14.1.



NOTE: The EX Series switches that support the **no-vlan-interface-name** statement are the EX4300, EX4600, and EX9200 switches.

Description When you do not want bridge domain or VLAN tag information, do not include the VLAN ID nor the VLAN interface name (the default) in the circuit or remote ID value in the DHCP option 82 information.



NOTE: The **no-vlan-interface-name** statement is mutually exclusive with the **use-interface-description** and **use-vlan-id** statements.

When you configure the **no-vlan-interface-name** statement only, the format displays only the Layer 3 interface:

```
irb.subunit
```



NOTE: The *subunit* is required and used to differentiate the interface for remote systems.

When you configure the **no-vlan-interface-name** and **use-interface-description** statements, the format displays the IRB interface description:

```
irb_descr
```

If you configure the **no-vlan-interface-name** and **use-interface-description** statements, and no description for the IRB interface is found, the format displays the IRB interface name:

```
irb.subunit
```

When you configure the **no-vlan-interface-name** and **include-irb-and-l2** statements, the format displays the Layer 2 logical interface name and the IRB interface name:

```
(fe | ge)-fpc/pic/port.subunit+irb.subunit
```

When you configure the **no-vlan-interface-name**, **include-irb-and-l2** and **use-interface-name** statements, the format displays the Layer 2 interface description and the IRB interface name:

```
l2_descr+irb.subunit
```


If you configure the **no-vlan-interface-name**, **include-irb-and-l2** and **use-interface-name** statements, and no description for the Layer 2 interface is found, the format displays the Layer 2 logical interface name and the IRB interface name:

```
(fe | ge)-fpc/pic/port.subunit+irb.subunit
```

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>Including a Textual Description in DHCP Options</i>• Using DHCP Relay Agent Option 82 Information on page 657• <i>Configuring DHCPv6 Relay Agent Options</i>
------------------------------	---

no-passwords

Syntax	no-passwords;
Hierarchy Level	[edit system services ssh]
Description	Disable ssh password based authentication.
	<div>  <p>NOTE: Enabling this option under [edit system services ssh] applies to SSH login service and NETCONF running over ssh services.</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"> • Configuring SSH Service for Remote Access to the Router or Switch on page 253

no-public-keys

Syntax	no-public-keys;
Hierarchy Level	[edit system services ssh]
Release Information	Statement introduced in Junos OS Release 15.1.
Description	Disable public key authentication system wide. Another statement (system login user <i>username</i> authentication) is used to disable public key authentication by individual user.
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"> • authentication on page 1181 • ssh on page 1781

no-reauthentication

Syntax	no-reauthentication;
Hierarchy Level	[edit protocols dot1x authenticator interface (802.1X) (all [<i>interface-names</i>])]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	For 802.1X authentication, disables reauthentication.
Default	Not disabled
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 802.1X Interface Settings (CLI Procedure) on page 357• Configuring 802.1X Authentication (J-Web Procedure) on page 358• Understanding Authentication on Switches on page 348


no-tagging

Syntax	no-tagging;
Hierarchy Level	[edit protocols lldp]
Release Information	Statement introduced in Junos OS Release 14.1X53-D10 for EX Series switches.
Description	Configure the switch to send LLDPDUs without including VLAN tags on interfaces for which VLAN tagging is enabled (tagged interfaces).
Default	Interfaces for which VLAN tagging is enabled include a VLAN tag (tag 0) in LLDPDUs if the no-tagging option is not configured.
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 LLDP and LLDP-MED on EX Series Switches on page 562

no-tcp-forwarding

Syntax	no-tcp-forwarding
Hierarchy Level	[edit system services ssh]
Release Information	Statement introduced in Release 11.4 of Junos OS.
Description	Use this configuration option to prevent a user from creating an SSH tunnel over a CLI session to a Junos router via SSH. This type of tunnel could be used to forward TCP traffic, bypassing any firewall filters or ACLs, allowing access to resources beyond the router.
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 SSH Service for Remote Access to the Router or Switch on page 253 • ssh on page 1781 • <i>Junos OS Security Configuration Guide</i>

non-strict-priority-scheduling

Syntax	non-strict-priority-scheduling;
Hierarchy Level	[edit class-of-service non-strict-priority-scheduling]
Release Information	Statement introduced in Junos OS Release 15.1X49-D80.
	<div>  <p>NOTE: This statement is supported only on SRX300, SRX320, SRX340, SRX345, SRX550M, SRX1500, and vSRX2.0 devices.</p> </div>
Description	Configure non-strict priority scheduling to avoid starvation of lower-priority queues on SRX300, SRX320, SRX340, SRX345, SRX1500, SRX550M, and vSRX 2.0 devices.
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 CoS Non-Strict Priority Scheduling</i>

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">• <i>Configuring the Commit Delay Timer</i>• commit-delay on page 1252

ntp

Syntax

```
ntp {
  authentication-key key-number type md5 value <password>;
  boot-server <address>;
  broadcast <address> <key key-number> <routing-instance routing-instance-name> <version value> <ttl value>;
  broadcast-client;
  multicast-client <address>;
  peer address <key key-number> <version value> <prefer>;
  server address <key key-number> <version value> <prefer>;
  source-address source-address <routing-instance routing-instance-name>;
  trusted-key [key-numbers];
}
```

Hierarchy Level [edit system]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure Network Time Protocol (NTP) on the SRX Series device.

The remaining statements are explained separately.



NOTE: There must be no space in the password for configuring the Network Time Protocol (NTP) authentication-key.

Required Privilege Level

- system—To view this statement in the configuration.
- system-control—To add this statement to the configuration.

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">• <i>Configuring the MIB Profile</i>

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"> • <i>Configuring MIB Views</i>

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">• <i>Configuring the MIB Profile</i>

options (Access Profile)

```
Syntax  options {
    accounting-session-id-format (decimal | description);
    calling-station-id-delimiter delimiter-character;
    calling-station-id-format {
        agent-circuit-id;
        agent-remote-id;
        interface-description;
        nas-identifier;
    }
    chap-challenge-in-request-authenticator;
    client-accounting-algorithm (direct | round-robin);
    client-authentication-algorithm (direct | round-robin);
    coa-dynamic-variable-validation;
    ethernet-port-type-virtual;
    access-loop-id-local;
    interface-description-format {
        exclude-adapter;
        exclude-channel;
        exclude-sub-interface;
    }
    ip-address-change-notify message;
    juniper-dsl-attributes;
    nas-identifier identifier-value;
    nas-port-extended-format {
        adapter-width width;
        ae-width width;
        port-width width;
        slot-width width;
        stacked-vlan-width width;
        vlan-width width;
        atm {
            adapter-width width;
            port-width width;
            pw-width width;
            slot-width width;
            vci-width width;
            vpi-width width;
        }
    }
    nas-port-id-delimiter delimiter-character;
    nas-port-id-format {
        agent-circuit-id;
        agent-remote-id;
        interface-description;
        interface-text-description;
        nas-identifier;
        order {
            agent-circuit-id;
            agent-remote-id;
            interface-description;
            interface-text-description;
        }
    }
}
```

```

        nas-identifier;
        postpend-vlan-tags;
    }
    postpend-vlan-tags;
}
nas-port-type {
    ethernet {
        port-type;
    }
}
override {
    calling-station-id remote-circuit-id;
    nas-ip-address tunnel-client-gateway-address;
    nas-port tunnel-client-nas-port;
    nas-port-type tunnel-client-nas-port-type;
}
remote-circuit-id-delimiter;
remote-circuit-id-fallback;
remote-circuit-id-format {
    agent-circuit-id;
    agent-remote-id;
}
revert-interval interval;
service-activation {
    dynamic-profile (optional-at-login | required-at-login);
    extensible-service (optional-at-login | required-at-login);
}
vlan-nas-port-stacked-format;
}

```

Hierarchy Level [edit access profile *profile-name* **radius**]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Configure the options used by RADIUS authentication and accounting servers.

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 admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Configuring RADIUS Server Options for Subscriber Access*
- *RADIUS Server Options for Subscriber Access*

options (Access Profile)

```
Syntax  options {
    accounting-session-id-format (decimal | description);
    calling-station-id-delimiter delimiter-character;
    calling-station-id-format {
        agent-circuit-id;
        agent-remote-id;
        interface-description;
        nas-identifier;
    }
    chap-challenge-in-request-authenticator;
    client-accounting-algorithm (direct | round-robin);
    client-authentication-algorithm (direct | round-robin);
    coa-dynamic-variable-validation;
    ethernet-port-type-virtual;
    access-loop-id-local;
    interface-description-format {
        exclude-adapter;
        exclude-channel;
        exclude-sub-interface;
    }
    ip-address-change-notify message;
    juniper-dsl-attributes;
    nas-identifier identifier-value;
    nas-port-extended-format {
        adapter-width width;
        ae-width width;
        port-width width;
        slot-width width;
        stacked-vlan-width width;
        vlan-width width;
        atm {
            adapter-width width;
            port-width width;
            pw-width width;
            slot-width width;
            vci-width width;
            vpi-width width;
        }
    }
    nas-port-id-delimiter delimiter-character;
    nas-port-id-format {
        agent-circuit-id;
        agent-remote-id;
        interface-description;
        interface-text-description;
        nas-identifier;
        order {
            agent-circuit-id;
            agent-remote-id;
            interface-description;
            interface-text-description;
        }
    }
}
```

```

        nas-identifier;
        postpend-vlan-tags;
    }
    postpend-vlan-tags;
}
nas-port-type {
    ethernet {
        port-type;
    }
}
override {
    calling-station-id remote-circuit-id;
    nas-ip-address tunnel-client-gateway-address;
    nas-port tunnel-client-nas-port;
    nas-port-type tunnel-client-nas-port-type;
}
remote-circuit-id-delimiter;
remote-circuit-id-fallback;
remote-circuit-id-format {
    agent-circuit-id;
    agent-remote-id;
}
revert-interval interval;
service-activation {
    dynamic-profile (optional-at-login | required-at-login);
    extensible-service (optional-at-login | required-at-login);
}
vlan-nas-port-stacked-format;
}

```

Hierarchy Level [edit access profile *profile-name* **radius**]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Configure the options used by RADIUS authentication and accounting servers.

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 admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Configuring RADIUS Server Options for Subscriber Access*
- *RADIUS Server Options for Subscriber Access*

option (DHCP server)

Syntax	<pre>option { [(id-number option-type option-value) (id-number array option-type option-value)]; }</pre>
Hierarchy Level	<pre>[edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]</pre>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure one or more user-defined options that are not included in the Junos default implementation of the DHCP server. For example, if a client requests a DHCP option that is not included in the DHCP server, you can create a user-defined option that enables the server to respond to the client's request.
Options	<ul style="list-style-type: none"> • id-number—Any whole number. The ID number is used to index the option and must be unique across a DHCP server. • option-type—Any of the following types: byte, byte-stream, flag, integer, ip-address, short, string, unsigned-integer, unsigned-short. • array—An option can include an array of values. • option-value—Value associated with an option. The option value must be compatible with the option type (for example, an On or Off value for a flag type).
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"> • Creating User-Defined DHCP Options Not Included in the Default Junos Implementation of the DHCP Server on page 582

option-60 (DHCP Local Server)

Syntax	option-60;
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> authentication username-include],</p> <p>[edit system services dhcp-local-server authentication username-include],</p> <p>[edit system services dhcp-local-server group <i>group-name</i> authentication username-include]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Specify that the payload of Option 60 (Vendor Class Identifier) from the client PDU be concatenated with the username during the subscriber authentication or DHCP client authentication process.
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 External AAA Authentication Services with DHCP on page 682

option-60 (DHCP Relay Agent)

Syntax

```

option-60 {
  default-action {
    drop drop;
    forward-only forward-only;
    local-server-group local-server-group;
  }
  equals {
    ascii name {
      drop drop;
      forward-only forward-only;
      local-server-group local-server-group;
    }
    hexadecimal name {
      drop drop;
      forward-only forward-only;
      local-server-group local-server-group;
    }
  }
  not-present {
    drop drop;
    forward-only forward-only;
    local-server-group local-server-group;
  }
  equals {
    ascii name {
      drop drop;
      forward-only forward-only;
      local-server-group local-server-group;
    }
    hexadecimal name {
      drop drop;
      forward-only forward-only;
      local-server-group local-server-group;
    }
  }
}

```

Hierarchy Level

```

[edit bridge-domains name forwarding-options dhcp-relay group name relay-option],
[edit bridge-domains name forwarding-options dhcp-relay relay-option],
[edit forwarding-options dhcp-relay group name relay-option],
[edit forwarding-options dhcp-relay relay-option],
[edit logical-systems name bridge-domains name forwarding-options dhcp-relay group name relay-option],
[edit logical-systems name bridge-domains name forwarding-options dhcp-relay relay-option],
[edit logical-systems name forwarding-options dhcp-relay group name relay-option],
[edit logical-systems name forwarding-options dhcp-relay relay-option],
[edit logical-systems name routing-instances name bridge-domains name forwarding-options dhcp-relay group name relay-option],

```

```
[edit logical-systems name routing-instances name bridge-domains name forwarding-options
  dhcp-relay relay-option],
[edit logical-systems name routing-instances name forwarding-options dhcp-relay group
  name relay-option],
[edit logical-systems name routing-instances name forwarding-options dhcp-relay
  relay-option],
[edit logical-systems name routing-instances name vlans name forwarding-options dhcp-relay
  group name relay-option],
[edit logical-systems name routing-instances name vlans name forwarding-options dhcp-relay
  relay-option],
[edit logical-systems name vlans name forwarding-options dhcp-relay group name
  relay-option],
[edit logical-systems name vlans name forwarding-options dhcp-relay relay-option],
[edit routing-instances name bridge-domains name forwarding-options dhcp-relay group
  name relay-option],
[edit routing-instances name bridge-domains name forwarding-options dhcp-relay
  relay-option],
[edit routing-instances name forwarding-options dhcp-relay group name relay-option],
[edit routing-instances name forwarding-options dhcp-relay relay-option],
[edit routing-instances name vlans name forwarding-options dhcp-relay group name
  relay-option],
[edit routing-instances name vlans name forwarding-options dhcp-relay relay-option],
[edit vlans name forwarding-options dhcp-relay group name relay-option],
[edit vlans name forwarding-options dhcp-relay relay-option]
```

Release Information	Statement introduced in Junos OS Release 9.1. Statement introduced in Junos OS Release 12.3R2 for EX Series switches. Statement updated in Junos OS Release 17.4R1 for MX Series.
Description	Specify that the payload of the Option 60 (Vendor Class Identifier) from the client PDU is concatenated with the username during the subscriber authentication or client authentication process.
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">• Using External AAA Authentication Services with DHCP on page 682• DHCPv4 and DHCPv6 Forward-Only Action for Relay Traffic with Unknown DHCP Server Address


option-82 (DHCP Local Server Authentication)

Syntax	<code>option-82 <circuit-id> <remote-id>;</code>
Hierarchy Level	<pre>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> authentication username-include], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server authentication username-include], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group <i>group-name</i> authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> authentication username-include], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> authentication username-include], [edit system services dhcp-local-server authentication username-include], [edit system services dhcp-local-server group <i>group-name</i> authentication username-include]</pre>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Specify the type of Option 82 information from the client PDU that is concatenated with the username during the subscriber authentication or DHCP client authentication process. You can specify either, both, or neither of the Agent Circuit ID and Agent Remote ID suboptions. If you specify both, the Agent Circuit ID is supplied first, followed by a delimiter, and then the Agent Remote ID. If you specify that neither suboption is supplied, the raw payload of Option 82 from the PDU is concatenated to the username.</p>
Options	<p>circuit-id—(Optional) Agent Circuit ID suboption (suboption 1).</p> <p>remote-id—(Optional) Agent Remote ID suboption (suboption 2).</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 External AAA Authentication Services with DHCP on page 682


option-82 (DHCP Local Server Pool Matching)

Syntax	option-82;
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server pool-match-order],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server pool-match-order],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server pool-match-order],</p> <p>[edit system services dhcp-local-server pool-match-order]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.0.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Configure the extended DHCP local server to use the option 82 value in the DHCP client DHCP PDU together with the ip-address-first method to determine which address-assignment pool to use. You must configure the ip-address-first statement before configuring the option-82 statement. The DHCP local server first determines which address-assignment pool to use based on the ip-address-first method. Then, the local server matches the option 82 value in the client PDU with the option 82 configuration in the address-assignment pool. This statement is supported for IPv4 address-assignment pools only.</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">• Configuring How the Extended DHCP Local Server Determines Which Address-Assignment Pool to Use on page 723• Extended DHCP Local Server Overview on page 611• Address-Assignment Pools Overview


option-82 (DHCP Relay Agent)

Syntax	<code>option-82 <circuit-id> <remote-id>;</code>
Hierarchy Level	<p>[edit forwarding-options dhcp-relay authentication username-include],</p> <p>[edit forwarding-options dhcp-relay group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Specify the option 82 that is concatenated with the username during the subscriber authentication or client authentication process. You can specify either, both, or neither the Agent Circuit ID and the Agent Remote ID suboptions. If you specify both, the Agent Circuit ID is supplied first, followed by a delimiter, and then the Agent Remote ID. If neither suboption is supplied, the raw payload of option 82 is concatenated to the username.</p>
	<p> NOTE: The option 82 value used in creating the username is based on the option 82 value that is encoded in the outgoing (relayed) PDU.</p>
Options	<p>circuit-id—(Optional) The string for the Agent Circuit ID suboption (suboption 1).</p> <p>remote-id—(Optional) The string for the Agent Remote ID suboption (suboption 2).</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"> • Using External AAA Authentication Services with DHCP on page 682

option-number (DHCP Relay Agent Option)

Syntax	<code>option-number <i>option-number</i>;</code>
Hierarchy Level	<p>[edit forwarding-options <code>dhcp-relay relay-option</code>], [edit forwarding-options <code>dhcp-relay dhcpv6 relay-option</code>], [edit forwarding-options dhcp-relay <code>group group-name relay-option</code>], [edit forwarding-options dhcp-relay dhcpv6 <code>group group-name relay-option</code>], [edit logical-systems <i>logical-system-name</i> forwarding-options <code>dhcp-relay ...</code>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options <code>dhcp-relay ...</code>], [edit routing-instances <i>routing-instance-name</i> forwarding-options <code>dhcp-relay ...</code>]</p>
Release Information	<p>Statement introduced in Junos OS Release 12.3.</p> <p>Statement introduced in Junos OS Release 12.3 for EX Series switches.</p>
Description	<p>Specify the DHCP option DHCP relay agent uses for selective processing of client traffic. You can configure support globally or for a named group of interfaces. You can also configure support for the extended DHCP relay agent on a per logical system and per routing instance basis.</p> <p>Use the <code>[edit forwarding-options dhcp-relay dhcpv6]</code> hierarchy level to configure the DHCPv6 relay agent support.</p>
Options	<p><i>option-number</i>—The DHCP or DHCPv6 option in the incoming traffic.</p>
<div>  NOTE: EX Series switches do not support the User Class Options. </div>	
<ul style="list-style-type: none"> • 15 (DHCPv6 only)—Use DHCPv6 option 15 (User Class Option) in packets • 16 (DHCPv6 only)—(MX Series routers and EX Series switches only) Use DHCPv6 option 16 (Vendor Class Option) in packets • 60 (DHCPv4 only)—(MX Series routers and EX Series switches only) Use DHCP option 60 (Vendor Class Identifier) in DHCP packets • 77 (DHCPv4 only)—Use DHCP option 77 (User Class Identifier) in 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"> • <i>Using DHCP Option Information to Selectively Process DHCP Client Traffic</i>

order

Syntax	<code>order (radius [<i>accounting-order-data-list</i>]);</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</i> accounting]</code>
Release Information	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 the order of authentication, authorization, and accounting (AAA) servers to use while sending accounting messages and updates.
Default	No order specified
Options	<p>radius—RADIUS accounting for specified subscribers.</p> <p>[<i>accounting-order-data-list</i>]— Set of data listing the authentication order to be used, enclosed by brackets. This can be any combination of the authentication methods, up to and including a full list of the entire authentication order.</p>
<div>  NOTE: The [edit access] hierarchy is not available on QFabric systems. </div>	
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"> • Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378 • Configuring 802.1X RADIUS Accounting (CLI Procedure) on page 386

outbound-ssh

Syntax	<pre> [edit system services] outbound-ssh { client <i>client-id</i> { address { port <i>port-number</i>; retry <i>number</i>; timeout <i>seconds</i>; } device-id <i>device-id</i>; keep-alive { retry <i>number</i>; timeout <i>seconds</i>; } reconnect-strategy (in-order sticky); secret <i>password</i>; services netconf; } traceoptions { file filename <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>
Hierarchy Level	[edit system services]
Release Information	<p>Statement introduced in Junos OS Release 8.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Configure a router or switch running the Junos OS behind a firewall to communicate with client management applications on the other side of the firewall.
Default	To configure transmission of the router's or switch's device ID to the application, include the device-id statement at the [edit system services] hierarchy level.
Options	<p>client-id—Identifies the outbound-ssh configuration stanza on the router or switch. Each outbound-ssh stanza represents a single outbound SSH connection. This attribute is not sent to the client.</p> <p>device-id—Identifies the router or switch to the client during the initiation sequence.</p> <p>keep-alive—(Optional) When configured, specifies that the router or switch send keepalive messages to the management server. To configure the keepalive message, you must set both the timeout and retry attributes.</p>

reconnect-strategy—(Optional) Specify the method the router or switch uses to reestablish a disconnected outbound SSH connection. Two methods are available:

- **in-order**—Specify that the router or switch first attempt to establish an outbound SSH session based on the management server address list. The router or switch attempts to establish a session with the first server on the list. If this connection is not available, the router or switch attempts to establish a session with the next server, and so on down the list until a connection is established.
- **sticky**—Specify that the router or switch first attempt to reconnect to the management server that it was last connected to. If the connection is unavailable, it attempts to establish a connection with the next client on the list and so forth until a connection is made.

retry—Number of keepalive messages the router or switch sends without receiving a response from the client before the current SSH connection is disconnected. The default is three messages.

secret—(Optional) Router's or switch's public SSH host key. If added to the **outbound-ssh** statement, during the initialization of the outbound SSH service, the router or switch passes its public key to the management server. This is the recommended method of maintaining a current copy of the router's or switch's public key.

timeout—Length of time that the Junos server waits for data before sending a keep alive signal. The default is 15 seconds.

When reconnecting to a client, the router or switch attempts to reconnect to the client based on the **retry** and **timeout** values for each client listed.

address—Hostname or the IPv4 address or IPv6 address of the NSM application server. You can list multiple clients by adding each client's IP address or hostname along with the following connection parameters:

- **port**—Outbound SSH port for the client. The default is port 22.
- **retry**—Number of times the router or switch attempts to establish an outbound SSH connection before giving up. The default is three tries.
- **timeout**—Length of time that the router or switch attempts to establish an outbound SSH connection before giving up. The default is fifteen seconds.



NOTE: Starting with Release 15.1, Junos OS supports outbound-SSH connections with devices having IPv6 addresses.

filename—(Optional) By default, the filename of the log file used to record the trace options is the name of the traced process (for example, **mib2d** or **snmpd**). Use this option to override the default value.

files—(Optional) Maximum number of trace files generated. By default, the maximum number of trace files is 10. Use this option to override the default value.

When a trace file reaches its maximum size, the system archives the file and starts a new file. The system archives trace files by appending a number to the filename in sequential order from 1 to the maximum value (specified by the default value or the options value set here). Once the maximum value is reached, the numbering sequence is restarted at 1, overwriting the older file.

size—(Optional) Maximum size of the trace file in kilobytes (KB). Once the maximum file size is reached, the system archives the file. The default value is 1000 KB. Use this option to override the default value.

match—(Optional) When used, the system only adds lines to the trace file that match the regular expression specified. For example, if the match value is set to **=error**, the system only records lines to the trace file that include the string **error**.

services—Services available for the session. Currently, NETCONF is the only service available.

world-readable | no-world-readable—(Optional) Whether the files are accessible by the originator of the trace operation only or by any user. By default, log files are only accessible by the user that started the trace operation (**no-world-readable**).

all | configuration | connectivity—(Optional) Type of tracing operation to perform.

all—Log all events.

configuration—Log all events pertaining to the configuration of the router or switch.

connectivity—Log all events pertaining to the establishment of a connection between the client server and the router or switch.

no-remote-trace—(Optional) Disable remote tracing.

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 Outbound SSH Service on page 258• <i>System Management Configuration Statements</i>
------------------------------	--

outbound-ssh

Syntax

```

outbound-ssh {
  client client-id {
    address address {
      port port-number;
      retry number;
      timeout seconds;
    }
    device-id device-id;
    keep-alive {
      retry number;
      timeout seconds;
    }
    reconnect-strategy (in-order | sticky);
    secret password;
    services netconf;
  }
  traceoptions {
    file filename <files number> <match regex> <size size> <world-readable |
      no-world-readable>;
    flag flag;
    no-remote-trace;
  }
}

```

Hierarchy Level [edit system services]

Release Information Statement introduced in Junos OS Release 10.4.
Support for IPv6 address added in Junos OS Release 12.1X47-D15.

Description Initiate outbound SSH connections.

Options **client *client-id***—Defines a device-initiated connection. This value serves to uniquely identify the outbound-ssh configuration stanza. Each outbound-ssh stanza represents a single outbound SSH connection. Thus, the administrator is free to assign the client-id any meaningful unique value.

address *address*—Specifies the IPv4 or IPv6 address or hostname of the client.

port *port-number*—Specifies the port at which a server listens for outbound SSH connection requests.

retry *number*—Specifies the maximum number of connection attempts a device can make to the specified IP address. The default is three attempts.

timeout *seconds*—Specifies how long the application waits between attempts to reconnect to the specified IP address, in seconds. The default is 15 seconds.

device *device-id*—Identifies the device to the management client. Each time the device establishes an outbound SSH connection, it first sends an initiation sequence (*device-id*) to the management client.

keep-alive—Enables the device to send SSH protocol keepalive messages to the client application. The **timeout** statement specifies how long the device waits to receive data before sending a request for acknowledgment from the application. The default is 15 seconds. The **retry** statement specifies how many keepalive messages the router sends without receiving a response from the client. When that number is exceeded, the device disconnects from the application, ending the outbound SSH connection. The default is three retries.

reconnect-strategy (in-order|sticky)—Specifies how the device reconnects to the server after a connection is dropped.

in-order—Configures the device to reconnect to the first configured server. If this server is unavailable, the device tries to connect to the next configured server. This process repeats until a connection is completed.

sticky—Configures the device to reconnect to the server from which it disconnected.

secret *password*—Sends the device's public SSH host key when the device connects to the client.

services *netconf*—Configures the application to accept NETCONF as an available service.

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 (Outbound SSH) on page 1849• Configuring Outbound SSH Service on page 258
------------------------------	---

overrides (DHCP Local Server)

```

Syntax  asymmetric-lease-time seconds;
        asymmetric-prefix-lease-time seconds;
        client-discover-match <option60-and-option82 | incoming-interface>;
        client-negotiation-match incoming-interface;
        delay-advertise {
            based-on (option-15 | option-16 | option-18 | option-37) {
                equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                not-equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                starts-with {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
            }
            delay-time seconds;
        }
        delay-offer {
            based-on (option-60 | option-77 | option-82) {
                equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                not-equals {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
                starts-with {
                    ascii ascii-string;
                    hexadecimal hexadecimal-string;
                }
            }
            delay-time seconds;
        }
        delegated-pool;
        delete-binding-on-renegotiation;
        dual-stack dual-stack-group-name;
        include-option-82 {
            forcerenew;
            nak;
        }
        interface-client-limit number;
        multi-address-embedded-option-response;
        process-inform {
            pool pool-name;
        }
        protocol-attributes attribute-set-name;

```

```
rapid-commit;  
}
```

Hierarchy Level [edit system services **dhcp-local-server**],
[edit system services dhcp-local-server **dhcpv6**],
[edit system services dhcp-local-server dhcpv6 **group** *group-name*],
[edit system services dhcp-local-server dhcpv6 group *group-name* **interface** *interface-name*],
[edit system services dhcp-local-server **group** *group-name*],
[edit system services dhcp-local-server group *group-name* **interface** *interface-name*],
[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system
services **dhcp-local-server** ...],
[edit logical-systems *logical-system-name* system services **dhcp-local-server** ...],
[edit routing-instances *routing-instance-name* system services **dhcp-local-server** ...]

Release Information Statement introduced in Junos OS Release 9.2.
Statement introduced in Junos OS Release 12.1 for EX Series switches.
Support for the **allow-no-end** option introduced in Junos OS Release 14.1X53-D15 for EX Series switches.
Statement introduced in Junos OS Release 12.3X48-D10 for SRX Series devices.

Description Override the default configuration settings for the extended DHCP local server. Specifying the **overrides** statement with no subordinate statements removes all DHCP local server overrides at that hierarchy level.

- To override global DHCP local server configuration options, include the **overrides** statement and its subordinate statements at the **[edit system services dhcp-local-server]** hierarchy level.
- To override configuration options for a named group of interfaces, include the statements at the **[edit system services dhcp-local-server group group-name]** hierarchy level.
- To override configuration options for a specific interface within a named group of interfaces, include the statements at the **[edit system services dhcp-local-server group group-name interface interface-name]** hierarchy level.
- Use the **[edit system services dhcp-local-server dhcpv6]** hierarchy level to override DHCPv6 configuration options.



NOTE: By default, `jdhcp` does not process DHCPINFORM message. Only after you enable the overrides command using the `set system services dhcp-local-server overrides process-inform` statement, `jdhcp` starts processing the DHCPINFORM message.

The remaining statements are explained separately. Search for a statement in [CLI Explorer](#) or click a linked statement in the Syntax section for details.

The [interface-client-limit](#) statement is not supported in the **[edit system services dhcp-local-server dhcpv6]** hierarchy level.

The [asymmetric-prefix-lease-time](#), [delegated-pool](#), [multi-address-embedded-option-response](#), and [rapid-commit](#) statements are supported in the **[edit system services dhcp-local-server dhcpv6 ...]** hierarchy level only.

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

Related Documentation

- [Extended DHCP Local Server Overview on page 611](#)
- [Overriding the Default DHCP Local Server Configuration Settings Overview on page 617](#)
- [Configuring a DHCP Server on Switches \(CLI Procedure\) on page 671](#)

overrides (DHCP Relay Agent)

Syntax

```
overrides {
  allow-no-end-option;
  allow-snooped-clients;
  always-write-giaddr;
  always-write-option-82;
  asymmetric-lease-time seconds;
  asymmetric-prefix-lease-time seconds;
  client-discover-match <option60-and-option82 | incoming-interface>;
  client-negotiation-match incoming-interface;
  delay-authentication;
  delete-binding-on-renegotiation;
  disable-relay;
  dual-stack dual-stack-group-name;
  interface-client-limit number;
  layer2-unicast-replies;
  no-allow-snooped-clients;
  no-bind-on-request;
  proxy-mode;
  relay-source
  replace-ip-source-with;
  send-release-on-delete;
  trust-option-82;
}
```

Hierarchy Level

```
[edit forwarding-options dhcp-relay],
[edit forwarding-options dhcp-relay dhcpv6],
[edit forwarding-options dhcp-relay dhcpv6 group group-name],
[edit forwarding-options dhcp-relay dhcpv6 group group-name interface interface-name],
[edit forwarding-options dhcp-relay group group-name],
[edit forwarding-options dhcp-relay group group-name interface interface-name],
[edit logical-systems logical-system-name forwarding-options dhcp-relay ...],
[edit logical-systems logical-system-name routing-instances routing-instance-name
  forwarding-options dhcp-relay ...],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay ...]
```

Release Information

Statement introduced in Junos OS Release 8.3.
 Support at the **[edit ... dhcpv6]** hierarchy levels introduced in Junos OS Release 11.4.
 Statement introduced in Junos OS Release 12.1 for EX Series switches.

Description

Override the default configuration settings for the extended DHCP relay agent. Specifying the **overrides** statement with no subordinate statements removes all DHCP relay agent overrides at that hierarchy level. Use the statement at the **[edit ... dhcpv6]** hierarchy levels to configure DHCPv6 support.

M120 and M320 routers do not support DHCPv6.

The following statements are supported at both the **[edit ... dhcp-relay]** and **[edit ... dhcpv6]** hierarchy levels.

- `allow-snooped-clients`
- `asymmetric-lease-time`
- `delete-binding-on-renegotiation`
- `dual-stack`
- `interface-client-limit`
- `no-allow-snooped-clients`
- `no-bind-on-request`
- `relay-source`
- `send-release-on-delete`

The following statements are supported at the `[edit ... dhcpv6]` hierarchy levels only.

- `asymmetric-prefix-lease-time`

All other statements are supported at the `[edit ... dhcp-relay]` hierarchy levels only.

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	interface—To view this statement in the configuration.
	interface-control—To add this statement to the configuration.
Related Documentation	• Extended DHCP Relay Agent Overview on page 632
	• Overriding the Default DHCP Relay Configuration Settings on page 638

overrides (New Relay Options)

Syntax

```
overrides {  
  allow-no-end-option;  
  always-write-option-82;  
  asymmetric-lease-time;  
  bootp-support;  
  delete-binding-on-renegotiation;  
  disable-relay;  
  dual-stack;  
  no-bind-on-request;  
  relay-source;  
  replace-ip-source-with;  
  send-release-on-delete;  
  trust-option-82;  
  user-defined-option-82;  
}
```

Hierarchy Level [edit forwarding-options dhcp-relay]

Release Information Statement introduced in Junos OS Release 15.1X49-D100.

Description Override the default configuration settings for the extended DHCP relay agent. Specifying the **overrides** statement with no subordinate statements removes all DHCP relay agent overrides at that hierarchy level.

Options **allow-no-end-option**—Accept packets without end-of-option.

asymmetric-lease-time—Provides a way to send the DHCP client a lease that is shorter than the actual lease granted by the DHCP local server.

Range: 600 through 86,400 seconds.

bootp-support—Allows send bootp request from a remote client to a DHCP server for an IP address.

delete-binding-on-renegotiation—Allows DHCP relay agent to delete binding information for a specific client when a DHCP DISCOVER packet is received from the client.

disable-relay—Disable DHCP relay processing.

dual-stack—Specify the dual stack group to use.

no-bind-on-request—Explicitly disable automatic binding of received DHCP request messages that have no entry in the database (stray requests).

relay-source—Specify the interface for relay source.

send-release-on-delete—Always send RELEASE to the server when a binding is deleted.

trust-option-82—Allow processing of DHCP client packets that have a gateway IP address giaddr of 0 and contain option 82 information.

user-defined-option-82—Specify user defined description for option-82.

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	• replace-ip-source-with (Before Forwarding Packet) on page 1692
	• always-write-option-82 on page 1142

overrides (System Services DHCP)

Syntax	<pre>overrides { interface-client-limit <i>number</i>; }</pre>
Hierarchy Level	<pre>[edit system services dhcp-local-server dhcpv6] [edit system services dhcp-local-server dhcpv6 group <i>group-name</i>] [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> interface <i>interface-name</i>]</pre>
Release Information	Statement introduced in Junos OS Release 10.4.
Description	<p>Override the default configuration settings for the extended DHCP local server. Specifying the overrides statement with no subordinate statements removes all DHCP local server overrides at that hierarchy level.</p> <ul style="list-style-type: none"> To override global DHCP local server configuration options, include the overrides statement and its subordinate statements at the [edit system services dhcp-local-server] hierarchy level. To override configuration options for a named group of interfaces, include the statements at the [edit system services dhcp-local-server dhcpv6 group <i>group-name</i>] hierarchy level. To override configuration options for a specific interface within a named group of interfaces, include the statements at the [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> interface <i>interface-name</i>] hierarchy level. Use the DHCPv6 hierarchy levels to override DHCPv6 configuration options.
Options	<p>interface-client-limit <i>number</i>—Sets the maximum number of DHCP clients per interface allowed for a specific group or for all groups. A group specification takes precedence over a global specification for the members of that group.</p> <p>Range: 1 through 500,000</p> <p>Default: No limit</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"> DHCP Server, Client, and Relay Agent Overview on page 742

password (Login)

Syntax	<pre>password { change-type (set-transitions character-set); format (sha1 sha256 sha512); maximum-length <i>length</i>; minimum-changes <i>number</i>; minimum-length <i>length</i>; }</pre>
Hierarchy Level	[edit system login]
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 special requirements such as character length and encryption format for plain-text passwords. Newly created passwords must meet these requirements.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	

password (Access Control Service)

Syntax	<code>password <i>password</i>;</code>
Hierarchy Level	<code>[edit services unified-access-control infranet-controller <i>hostname</i>]</code>
Release Information	Statement introduced in Junos OS Release 12.2 for EX Series switches.
Description	Configure the password to connect the switch to the Junos Pulse Access Control Service network access control (NAC) device. This password must match the password specified on the Access Control Service through its administrative interface.
Options	<i>password</i> —A string of up to 200 alphanumeric characters bounded by quotation marks. Spaces are allowed, but special characters, such as <code>?</code> , are not allowed.
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 an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control (CLI Procedure) on page 519• Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service (CLI Procedure) on page 522

password (DHCP Local Server)

Syntax	<code>password <i>password-string</i>;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server authentication],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 authentication],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group group-name authentication],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group group-name authentication],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication],</p> <p>[edit system services dhcp-local-server authentication],</p> <p>[edit system services dhcp-local-server dhcpv6],</p> <p>[edit system services dhcp-local-server dhcpv6 group group-name authentication],</p> <p>[edit system services dhcp-local-server group group-name authentication]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Configure the password that is sent to the external AAA authentication server for subscriber authentication or DHCP client authentication.
Options	<i>password-string</i> —Authentication password.

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">• Using External AAA Authentication Services with DHCP on page 682

password (DHCP Relay Agent)

Syntax	<code>password <i>password-string</i>;</code>
Hierarchy Level	<p>[edit forwarding-options dhcp-relay authentication], [edit forwarding-options dhcp-relay dhcpv6 authentication], [edit forwarding-options dhcp-relay dual-stack-group <i>dual-stack-group-name</i> authentication], [edit forwarding-options dhcp-relay group <i>group-name</i> authentication], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay authentication], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 authentication], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay authentication], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 authentication], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay authentication], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 authentication], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.1. Statement introduced in Junos OS Release 12.3R2 for EX Series switches. Support at the [edit ... dhcpv6] hierarchy levels introduced in Junos OS Release 11.4. Support at the [edit ... dual-stack-group dual-stack-group-name authentication] hierarchy level introduced in Junos OS Release 15.1.</p>
Description	Configure the password that is sent to the external AAA authentication server for subscriber authentication or client authentication. Use the statement at the [edit ... dhcpv6] hierarchy levels to configure DHCPv6 support.
Options	<i>password-string</i> —Authentication password.
Required Privilege Level	<p>interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.</p>

- Related Documentation**
- [Using External AAA Authentication Services with DHCP on page 682](#)
 - *Configuring Passwords for Usernames*

password (DHCP Local Server)

Syntax	<code>password password-string;</code>
Hierarchy Level	<pre> [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server authentication], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 authentication], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group group-name authentication], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group group-name authentication], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication], [edit system services dhcp-local-server authentication], [edit system services dhcp-local-server dhcpv6], [edit system services dhcp-local-server dhcpv6 group group-name authentication], [edit system services dhcp-local-server group group-name authentication] </pre>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Configure the password that is sent to the external AAA authentication server for subscriber authentication or DHCP client authentication.
Options	<i>password-string</i> —Authentication password.

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

Related Documentation

- [Using External AAA Authentication Services with DHCP on page 682](#)

password (Login)

Syntax

```
password {
  change-type (set-transitions | character-set);
  format (sha1 | sha256 | sha512);
  minimum-character-changes number
  maximum-length length;
  maximum-lifetime days
  minimum-changes number;
  minimum-length length;
  minimum-lifetime days
  minimum-lower-cases number;
  minimum-nums number;
  minimum-punctuations number;
  minimum-reuse number;
  minimum-upper-cases number;
}
```

Hierarchy Level [edit system [login](#)]

Release Information Statement introduced in Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure special requirements such as character length and encryption format for plain-text passwords. Newly created passwords must meet these requirements.

Using several password minimum requirement options will cause the **minimum-length** to be reset if the total sum of the required minimums exceeds the **minimum-length** setting.

The individual statements are explained separately.

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

Related Documentation

- [Example: Changing the Requirements for Junos OS Plain-Text Passwords on page 181](#)

path-length

Syntax	<code>path-length <i>certificate-path-length</i>;</code>
Hierarchy Level	[edit security certificates]
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	(Encryption interface on M Series and T Series routers and EX Series switches only) Configure the digital certificate path length.
Options	<p><i>certificate-path-length</i>—Digital certificate path length.</p> <p>Range: 2 through 15 certificates</p> <p>Default: 15 certificates</p>
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"> <i>Configuring the Path Length for the Certificate Hierarchy</i>

partition (Gx-Plus)

Syntax	<pre>partition <i>partition-name</i> { <i>diameter-instance</i> <i>instance-name</i>; <i>destination-host</i> <i>hostname</i>; <i>destination-realm</i> <i>realm</i>; }</pre>
Hierarchy Level	[edit access gx-plus]
Release Information	Statement introduced in Junos OS Release 11.2. Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Description	Configure a Gx-Plus partition.
Options	<p><i>partition-name</i>—Name of the Gx-Plus partition.</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	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">• <i>Configuring Gx-Plus</i>• <i>Configuring the Gx-Plus Partition</i>

peer (NTP)

Syntax	<code>peer address <key key-number> <version value> <prefer>;</code>
Hierarchy Level	<code>[edit system ntp]</code>
Release Information	Statement introduced before Junos OS Release 7.4.
Description	For NTP, configure the SRX Series device to operate in symmetric active mode with the remote system at the specified address. In this mode, the SRX Series device and the remote system can synchronize with each other. This configuration is useful in a network in which either the SRX Series device or the remote system might be a better source of time.
Options	<p>address—Address of the remote system. You must specify an address, not a hostname.</p> <p>key key-number—(Optional) All packets sent to the address include authentication fields that are encrypted using the specified key number.</p> <p>Range: Any unsigned 32-bit integer</p> <p>prefer—(Optional) Mark the remote system as the preferred host, which means that if all other factors are equal, this remote system is chosen for synchronization among a set of correctly operating systems.</p> <p>version value—(Optional) Specify the NTP version number to be used in outgoing NTP packets.</p> <p>Range: 1 through 4</p> <p>Default: 4</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"> • ntp on page 1573

permissions

Syntax	<code>permissions [<i>permissions</i>];</code>
Hierarchy Level	[edit system login class]
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 login access privileges to be provided on the router or switch.
Options	<i>permissions</i> —Privilege type. For a list of permission flag types, see Table 7 on page 108 .
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">• Example: Configuring User Permissions with Access Privilege Levels on page 113• user on page 1883

pool (DHCP Local Server Overrides)

Syntax `pool pool-name;`

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server overrides process-inform],
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server dhcpv6 overrides process-inform],
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server dhcpv6 group group-name overrides process-inform],
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server dhcpv6 group group-name interface interface-name overrides
process-inform],
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server group group-name overrides process-inform],
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server group group-name interface interface-name overrides
process-inform],
[edit logical-systems logical-system-name system services dhcp-local-server overrides
process-inform],
[edit logical-systems logical-system-name system services dhcp-local-server dhcpv6
overrides process-inform],
[edit logical-systems logical-system-name system services dhcp-local-server dhcpv6 group
group-name overrides process-inform],
[edit logical-systems logical-system-name system services dhcp-local-server dhcpv6 group
group-name interface interface-name overrides process-inform],
[edit logical-systems logical-system-name system services dhcp-local-server group
group-name overrides process-inform],
[edit logical-systems logical-system-name system services dhcp-local-server group
group-name interface interface-name overrides process-inform],
[edit routing-instances routing-instance-name system services dhcp-local-server overrides
process-inform],
[edit routing-instances routing-instance-name system services dhcp-local-server dhcpv6
overrides process-inform],
[edit routing-instances routing-instance-name system services dhcp-local-server dhcpv6
group group-name overrides process-inform],
[edit routing-instances routing-instance-name system services dhcp-local-server dhcpv6
group group-name interface interface-name overrides process-inform],
[edit routing-instances routing-instance-name system services dhcp-local-server group
group-name overrides process-inform],
[edit routing-instances routing-instance-name system services dhcp-local-server group
group-name interface interface-name overrides process-inform],
[edit system services dhcp-local-server overrides process-inform],
[edit system services dhcp-local-server dhcpv6 overrides process-inform],
[edit system services dhcp-local-server dhcpv6 group group-name overrides process-inform],
[edit system services dhcp-local-server dhcpv6 group group-name interface interface-name
overrides process-inform],
[edit system services dhcp-local-server group group-name overrides process-inform],
[edit system services dhcp-local-server group group-name interface interface-name overrides
process-inform]
```

Release Information	Statement introduced in Junos OS Release 11.4. Statement introduced in Junos OS Release 12.3R2 for EX Series switches.
Description	Configure DHCP or DHCPv6 local server to reply to DHCP information request messages (DHCPINFORM for DHCPv4 and INFORMATION-REQUEST for DHCPv6) with information taken from the specified pool without interacting with AAA.
Options	<i>pool-name</i> —Name of the address pool, which must be configured within family inet for DHCP local server and within family inet6 for DHCPv6 local server.
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">• Enabling Processing of Client Information Requests on page 689• Overriding the Default DHCP Local Server Configuration Settings Overview on page 617

pool (System)

Syntax	<pre>pool address/prefix-length { address-range { low address; high address; } exclude-address { address; } }</pre>
Hierarchy Level	[edit system services dhcp],
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	For J Series Services Routers and EX Series switches only. Configure a pool of IP addresses for DHCP clients on a subnet. When a client joins the network, the DHCP server dynamically allocates an IP address from this pool.
Options	<p>address-range—Lowest and highest IP addresses in the pool that are available for dynamic address assignment. If no range is specified, the pool will use all available addresses within the subnet specified. (Broadcast addresses, interface addresses, and excluded addresses are not available.)</p> <p>exclude-address—Addresses within the range that are not used for dynamic address assignment. You can exclude one or more addresses within the range.</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"> • address-assignment (Address-Assignment Pools) on page 1155


pool-match-order

Syntax	<pre>pool-match-order { external-authority; ip-address-first; option-82; }</pre>
Hierarchy Level	<pre>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services <i>dhcp-local-server</i>], [edit logical-systems <i>logical-system-name</i> system services <i>dhcp-local-server</i>], [edit routing-instances <i>routing-instance-name</i> system services <i>dhcp-local-server</i>], [edit system services <i>dhcp-local-server</i>]</pre>
Release Information	Statement introduced in Junos OS Release 9.0. Statement introduced in Junos OS Release 12.1.
Description	<p>Configure the order in which the DHCP local server uses information in the DHCP client PDU to determine how to obtain an address for the client.</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>
Default	DHCP local server uses the ip-address-first method to determine which address pool to use.
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 How the Extended DHCP Local Server Determines Which Address-Assignment Pool to Use on page 723• Extended DHCP Local Server Overview on page 611

port

Syntax	<code>port <i>port-number</i>;</code>
Hierarchy Level	<code>[edit access radius-server <i>server-address</i>],</code> <code>[edit access profile <i>profile-name</i> radius-server <i>server-address</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	Configure the port number on which to contact the RADIUS server.
Options	<i>port-number</i> —Port number on which to contact the RADIUS server. Default: 1812 (as specified in RFC 2865)
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 Router or Switch Interaction with RADIUS Servers</i>• <i>Configuring Authentication and Accounting Parameters for Subscriber Access</i>


port (Access Control Service)

Syntax	<code>port <i>port-number</i>;</code>
Hierarchy Level	[edit services unified-access-control infranet-controller]
Release Information	Statement introduced in Junos OS Release 12.2 for EX Series switches.
Description	Configure the switch's connection to the security port on the Junos Pulse Access Control Service network access control (NAC) device.
<div> NOTE: Do not change this port setting.</div>	
Options	<i>port-number</i> —11123
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 an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control (CLI Procedure) on page 519• Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service (CLI Procedure) on page 522


port (HTTP/HTTPS)

Syntax	<code>port <i>port-number</i>;</code>
Hierarchy Level	[edit system services web-management]
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 port on which the HTTP or HTTPS service is connected.
Options	<i>port-number</i> —The TCP port number on which the specified service listens.
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 Management Access for the EX Series Switch (J-Web Procedure)</i>• <i>J-Web Interface User Guide</i>• http on page 1424• https on page 1425• web-management on page 1908

port (NETCONF)

Syntax	<code>port <i>port-number</i>;</code>
Hierarchy Level	<code>[edit system services netconf]</code>
Release Information	Statement introduced in Junos OS Release 10.0.
Description	Configure the TCP port used for NETCONF-over-SSH connections.
	<div>  NOTE: <ul style="list-style-type: none"> The configured port accepts only NETCONF-over-SSH connections. Regular SSH session requests for this port are rejected. The default SSH port (22) continues to accept NETCONF sessions even with a configured NETCONF server port. To disable the SSH port from accepting NETCONF sessions, you can specify this in the login event script. We do not recommend configuring the default ports for FTP (21) and Telnet (23) services for configuring NETCONF-over-SSH connections. </div>
Options	<p>port<i>port-number</i>—Port number on which to enable incoming NETCONF connections over SSH.</p> <p>Default: 830 (as specified in RFC 4742, <i>Using the NETCONF Configuration Protocol over Secure Shell (SSH)</i>)</p> <p>Range: 1 through 65535</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"> NETCONF XML Management Protocol Guide Configuring NETCONF-Over-SSH Connections on a Specified TCP Port on page 263

port (RADIUS Server)

Syntax	<code>port <i>port-number</i>;</code>
Hierarchy Level	<code>[edit system radius-server <i>address</i>],</code> <code>[edit system accounting destination radius server <i>address</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 port number on which to contact the RADIUS server.
Options	<i>number</i> —Port number on which to contact the RADIUS server. Default: 1812 (as specified in RFC 2865)
<div>  <p>NOTE: The <code>[edit system accounting]</code> hierarchy is not available on QFabric systems.</p> </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"> • Configuring RADIUS Server Authentication on page 203

port (SRC Server)

Syntax	<code>port <i>port-number</i>;</code>
Hierarchy Level	<code>[edit system services service-deployment servers <i>server-address</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	Configure the port number on which to contact the SRC server.
Options	<i>port-number</i> —(Optional) The TCP port number for the SRC server. Default: 3333
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 the Junos OS to Work with SRC Software on page 265

port (TACACS+ Server)

Syntax	<code>port <i>port-number</i>;</code>
Hierarchy Level	<code>[edit system accounting destination tacplus server <i>server-address</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	Configure the port number on which to contact the TACACS+ server.
Options	<i>number</i> —Port number on which to contact the TACACS+ server. Default: 49
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 TACACS+ System Accounting on page 242

power-negotiation

Syntax	<pre>power-negotiation { disable; }</pre>
Hierarchy Level	[edit protocols lldp interface (all <i>interface-name</i>)]
Release Information	Statement introduced in Junos OS Release 12.2 for EX Series switches.
Description	<p>Configure Link Layer Discovery Protocol (LLDP) power negotiation, which negotiates with Power over Ethernet (PoE) powered devices to allocate power.</p> <p>LLDP power negotiation requires the PoE management option to be set to class.</p> <p>The remaining statement is explained separately. See CLI Explorer.</p>
Default	LLDP power negotiation is enabled by default when the PoE management option is set to class .
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 LLDP (CLI Procedure) on page 556• Configuring PoE on EX Series Switches (CLI Procedure)

preference (Subscriber Management)

Syntax	<code>preference route-distance</code>
Hierarchy Level	<p>[edit dynamic-profiles <i>profile-name</i> routing-instances \$junos-routing-instance routing-options access route <i>prefix</i>],</p> <p>[edit dynamic-profiles <i>profile-name</i> routing-instances \$junos-routing-instance routing-options rib <i>routing-table-name</i> access route <i>prefix</i>],</p> <p>[edit dynamic-profiles <i>profile-name</i> routing-options access route <i>prefix</i>]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.5.</p> <p>Support at [edit dynamic-profiles <i>profile-name</i> routing-instances \$junos-routing-instance routing-options access route <i>prefix</i>] and [edit dynamic-profiles <i>profile-name</i> routing-instances \$junos-routing-instance routing-options rib <i>routing-table-name</i> access route <i>prefix</i>] hierarchy levels introduced in Junos OS Release 10.1.</p>
Description	Dynamically configure the distance for an access route.
Options	<p>route-distance—Either the specific distance you want to assign to the access route or either of the following distance variables:</p> <ul style="list-style-type: none"> • \$junos-framed-route-distance—Distance of an IPv4 access route; the variable is dynamically replaced with the preference value (Subattribute 5) from the RADIUS Framed-Route attribute [22]. • \$junos-framed-route-ipv6-distance—Distance of an IPv6 access route; the variable is dynamically replaced with the preference value (Subattribute 5) from the RADIUS Framed-IPv6-Route attribute [99].
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"> • <i>Configuring Dynamic Access Routes for Subscriber Management</i>

prefix

Syntax	<pre>prefix { host-name; logical-system-name; routing-instance-name; }</pre>
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcp-client client-identifier]
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Specify a prefix as a client identifier.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	

prefix (DHCP Relay Agent)

Syntax	<code>prefix <i>prefix</i>;</code>
Hierarchy Level	<pre>[edit forwarding-options dhcp-relay dhcpv6 (relay-agent-interface-id relay-agent-remote-id)], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> (relay-agent-interface-id relay-agent-remote-id)], [edit forwarding-options dhcp-relay relay-option-82 (circuit-id remote-id)], [edit forwarding-options dhcp-relay group <i>group-name</i> relay-option-82 (circuit-id remote-id)], [edit logical-systems <i>logical-system-name</i> ... forwarding-options dhcp-relay dhcpv6 (relay-agent-interface-id relay-agent-remote-id)], [edit logical-systems <i>logical-system-name</i> ... forwarding-options dhcp-relay ... relay-option-82 (circuit-id remote-id)], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 (relay-agent-interface-id relay-agent-remote-id)], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ... relay-option-82 (circuit-id remote-id)]</pre>
Release Information	<p>Statement introduced in Junos OS Release 8.3.</p> <p>Support at the [edit ... dhcpv6] hierarchy levels introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.3 for EX Series switches.</p> <p>Support at the [edit ... relay-agent-remote-id] and [edit ... remote-id] hierarchy levels introduced in Junos OS Release 14.1.</p>
Description	Add a prefix to the DHCP base option 82 Agent Circuit ID (suboption 1) or Agent Remote ID (suboption 2) information, or to the DHCPv6 option 18 (Relay Agent Interface-ID) or option 37 (Relay Agent Remote-ID) information in DHCP packets that DHCP relay agent sends to a DHCP server. The prefix can consist of any combination of the hostname, logical system name, and routing instance name.
Options	<p><i>prefix</i>—Any of the following:</p> <ul style="list-style-type: none"> host-name—Prepend the hostname of the router configured with the host-name statement at the [edit system] hierarchy level to the DHCP option information. logical-system-name—Prepend the name of the logical system to the option information. routing-instance-name—Prepend the name of the routing instance to the option information.
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"> Including a Prefix in DHCP Options Using DHCP Relay Agent Option 82 Information on page 657

- *Configuring DHCPv6 Relay Agent Options*

preferred-prefix-length

Syntax	<code>preferred-prefix-length <i>preferred-prefix-length</i>;</code>
Hierarchy Level	<p>[edit interfaces <i>interface-name</i> unit logical-unit-number family family dhcpv6-client prefix-delegating]</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client prefix-delegating]</p> <p>[edit tenants <i>tenant-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client prefix-delegating]</p>
Release Information	<p>Statement introduced in Junos OS Release 12.3X48-D30 and in Junos OS Release 15.1X49-D100.</p> <p>The logical-systems and tenants options are introduced in Junos OS Release 18.4R1.</p>
Description	Allows you to configure DHCPv6 client preferred prefix length. If preferred-prefix-length is configured, the DHCPv6 client checks the prefix length in the ADVERTISE packet and if the check fails, a sysolg is created.
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"> • sub-prefix-length on page 1797

process-inform

Syntax

```
process-inform {
    pool pool-name;
}
```


Hierarchy Level

[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server [overrides](#)],
 [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 [overrides](#)],
 [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 group *group-name* [overrides](#)],
 [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 group *group-name* interface *interface-name* [overrides](#)],
 [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server group *group-name* [overrides](#)],
 [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server group *group-name* interface *interface-name* [overrides](#)],
 [edit logical-systems *logical-system-name* system services dhcp-local-server [overrides](#)],
 [edit logical-systems *logical-system-name* system services dhcp-local-server dhcpv6 [overrides](#)],
 [edit logical-systems *logical-system-name* system services dhcp-local-server dhcpv6 group *group-name* [overrides](#)],
 [edit logical-systems *logical-system-name* system services dhcp-local-server dhcpv6 group *group-name* interface *interface-name* [overrides](#)],
 [edit logical-systems *logical-system-name* system services dhcp-local-server group *group-name* [overrides](#)],
 [edit logical-systems *logical-system-name* system services dhcp-local-server group *group-name* interface *interface-name* [overrides](#)],
 [edit routing-instances *routing-instance-name* system services dhcp-local-server [overrides](#)],
 [edit routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 [overrides](#)],
 [edit routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 group *group-name* [overrides](#)],
 [edit routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 group *group-name* interface *interface-name* [overrides](#)],
 [edit routing-instances *routing-instance-name* system services dhcp-local-server group *group-name* [overrides](#)],
 [edit routing-instances *routing-instance-name* system services dhcp-local-server group *group-name* interface *interface-name* [overrides](#)],
 [edit system services dhcp-local-server [overrides](#)],
 [edit system services dhcp-local-server dhcpv6 [overrides](#)],
 [edit system services dhcp-local-server dhcpv6 group *group-name* [overrides](#)],
 [edit system services dhcp-local-server dhcpv6 group *group-name* interface *interface-name* [overrides](#)],
 [edit system services dhcp-local-server group *group-name* [overrides](#)],
 [edit system services dhcp-local-server group *group-name* interface *interface-name* [overrides](#)]

Release Information Statement introduced in Junos OS Release 11.4.
 Statement introduced in Junos OS Release 12.1 for EX Series switches.

Description	<p>Enable the processing of DHCP information request messages (DHCPINFORM for DHCPv4 and INFORMATION-REQUEST for DHCPv6) sent from the client to request DHCP options. For DHCP local servers, the messages are also passed to the configured server list.</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>
Default	Information request messages are not processed.
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">• Enabling Processing of Client Information Requests on page 689• Overriding the Default DHCP Local Server Configuration Settings Overview on page 617

profile

Syntax	<pre> profile <i>profile-name</i> { accounting (Access Profile) { accounting-stop-on-access-deny; accounting-stop-on-failure; order (radius [<i>accounting-order-data-list</i>]; } authentication-order [<i>authentication-method</i>]; radius { accounting-server [<i>server-addresses</i>]; authentication-server [<i>server-addresses</i>]; } } </pre>
Hierarchy Level	[edit access]
Release Information	<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 an access profile. The access profile contains the entire authentication, authorization, and accounting (AAA) configuration that aids in handling AAA requests, including the authentication method and order, AAA server addresses, and AAA accounting.
Default	Not enabled.
Options	<p><i>profile-name</i>—Profile name of up to 32 characters.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
<div>  <p>NOTE: The [edit access] hierarchy is not available on QFabric systems.</p> </div>	
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"> • Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378 • Configuring 802.1X RADIUS Accounting (CLI Procedure) on page 386

profilerd

Syntax	<pre> profilerd { 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 profiler process.
Options	<ul style="list-style-type: none"> • command <i>binary-file-path</i>—Path to binary for process. • disable—Disable the profiler 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.

protocols

```
Syntax protocols {
    bgp {
        disable;
        accept-remote-nexthop;
        advertise-external <conditional>;
        advertise-inactive;
        (advertise-peer-as | no-advertise-peer-as);
        authentication-algorithm (aes-128-cmac-96 | hmac-sha-1-96 | md5);
        authentication-key key;
        authentication-key-chain key-chain;
        bfd-liveness-detection {
            authentication {
                algorithm (keyed-md5 | keyed-sha-1 | meticulous-keyed-md5 |
                    meticulous-keyed-sha-1 | simple-password);
                key-chain key-chain-name;
                loose-check;
            }
            detection-time {
                threshold milliseconds;
            }
            hold-down-interval milliseconds;
            minimum-interval milliseconds;
            minimum-receive-interval milliseconds;
            multiplier number;
            no-adaptation;
            session-mode (automatic | multihop | single-hop);
            transmit-interval {
                minimum-interval milliseconds;
                threshold milliseconds;
            }
            version (1 | automatic);
        }
        cluster cluster-identifier;
        damping;
        description text-description;
        export [ policy-names ];
        family family-name {
            ... the family subhierarchies appear after the main [edit protocols bgp] hierarchy ...
        }
        graceful-restart {
            disable;
            restart-time seconds;
            stale-routes-time seconds;
        }
        group group-name {
            ... the group subhierarchy appears after the main [edit protocols bgp] hierarchy ...
        }
        hold-time seconds;
        import [ policy-names ];
        include-mp-next-hop;
        keep (all | none);
    }
}
```

```

local-address address;
local-as autonomous-system <loops number> <alias> <private>;
local-preference local-preference;
log-updown;
metric-out (metric | igp (delay-med-update | offset) | minimum-igp offset);
mtu-discovery;
multihop {
    no-nexthop-change;
    ttl ttl-value;
}
no-aggregator-id;
no-client-reflect;
out-delay seconds;
outbound-route-filter {
    bgp-orf-cisco-mode;
    prefix-based {
        accept {
            inet;
            inet6;
        }
    }
}
passive;
path-selection {
    always-compare-med;
    as-path-ignore;
    cisco-non-deterministic;
    external-router-id;
    med-plus-igp {
        igp-multiplier number;
        med-multiplier number;
    }
}
peer-as autonomous-system;
preference preference;
remove-private;
tcp-mss segment-size;
traceoptions {
    file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
    flag flag <flag-modifier> <disable>;
}
}
dcbx {
    disable;
    interface (interface-name | all) {
        disable;
        application-map application-map-name;
        applications {
            no-auto-negotiation;
        }
        enhanced-transmission-selection {
            no-auto-negotiation;
            no-recommendation-tlv;
            recommendation-tlv {

```

```

        no-auto-negotiation;
    }
}
dcbx-version (auto-negotiate | ieee-dcbx | dcbx-version-1.01);
priority-flow-control {
    no-auto-negotiation;
}
}
}
iccp {
    authentication-key string;
    local-ip-addr local-ip-addr;
    peer ip-address {
        authentication-key string;
        backup-liveness-detection {
            backup-peer-ip ip-address;
        }
        liveness-detection {
            detection-time {
                threshold milliseconds;
            }
            minimum-interval milliseconds;
            minimum-receive-interval milliseconds;
            multiplier number;
            no-adaptation;
            transmit-interval {
                minimum-interval milliseconds;
                threshold milliseconds;
            }
            version (Liveness Detection) (1 | automatic);
        }
        local-ip-addr ipv4-address;
        session-establishment-hold-time seconds;
    }
    session-establishment-hold-time seconds;
    traceoptions {
        file <filename> <files number> <match regular-expression> <microsecond-stamp>
            <size size> <world-readable | no-world-readable>;
        flag flag;
        no-remote-trace;
    }
}
igmp-snooping {
    traceoptions {
        file filename <files number> <size size> <world-readable | no-world-readable> <match
            regex>;
        flag flag (detail | disable | receive | send);
    }
}
vlan vlan-name {
    disable;
}
interface interface-name {
    group-limit limit;
    multicast-router-interface;
    static {

```



```

        group ip-address;
    }
}
robust-count number;
}
}
isis {
    disable;
    export [ policy-names ];
    ignore-attached-bit;
    interface interface-name {
        bfd-liveness-detection {
            authentication {
                algorithm (keyed-md5 | keyed-sha-1 | meticulous-keyed-md5 |
                    meticulous-keyed-sha-1 | simple-password);
                key-chain key-chain-name;
                loose-check;
            }
            detection-time {
                threshold milliseconds;
            }
            minimum-interval milliseconds;
            minimum-receive-interval milliseconds;
            multiplier number;
            no-adaptation;
            transmit-interval {
                minimum-interval milliseconds;
                threshold milliseconds;
            }
            version (1 | automatic);
        }
        checksum;
        csnp-interval (seconds | disable);
        disable;
        hello-padding (adaptive | loose | strict);
        level (1 | 2) {
            disable;
            hello-authentication-key key;
            hello-authentication-type authentication;
            hello-interval seconds;
            hold-time seconds;
            ipv4-multicast-metric number;
            metric metric;
            passive;
            priority number;
        }
        lsp-interval milliseconds;
        mesh-group (value | blocked);
        no-ipv4-multicast;
        no-unicast-topology;
        passive;
        point-to-point;
    }
    level (1 | 2) {
        disable;
    }
}

```

```

authentication-key key;
authentication-type authentication;
external-preference preference;
no-csnp-authentication;
no-hello-authentication;
no-psnp-authentication;
preference preference;
prefix-export-limit number;
wide-metrics-only;
}
loose-authentication-check;
lsp-lifetime seconds;
max-areas number;
no-adjacency-holddown;
no-authentication-check;
no-ipv4-routing;
overload {
    advertise-high-metrics;
    timeout seconds;
}
reference-bandwidth reference-bandwidth;
rib-group {
    inet group-name;
}
topologies {
    ipv4-multicast;
}
traceoptions {
    file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
    flag flag <flag-modifier> <disable>;
}
traffic-engineering {
    disable;
    family inet {
        shortcuts {
            multicast-rpf-routes:
        }
    }
}
}
lldp {
    disable;
    advertisement-interval seconds;
    hold-multiplier number;
    interface (LLDP) (all | interface-name) {
        disable;
    }
    traceoptions {
        file filename <files number> <size size> <world-readable | no-world-readable> <match
            regex>;
        flag flag (detail | disable | receive | send);
    }
}
mstp {

```

```

disable;
bpdu-timeout-action;
bridge-priority priority;
configuration-name name;
forward-delay seconds;
hello-time seconds;
interface (all | interface-name) {
    disable;
    bpdu-timeout-action {
        block;
        alarm;
    }
    cost cost;
    edge;
    mode mode;
    no-root-port;
    priority priority;
}
max-age seconds;
max-hops hops;
msti msti-id {
    vlan (vlan-id | vlan-name);
    interface interface-name {
        disable;
        cost cost;
        edge;
        mode mode;
        priority priority;
    }
}
revision-level revision-level;
traceoptions {
    file filename <files number > <size size > <no-stamp | world-readable |
    no-world-readable>;
    flag flag;
}
}
ospf {
    disable;
    area area-id {
        area-range ip-prefix </prefix-length> <exact> <override-metric metric> <restrict>;
        context-identifier identifier
        interface interface-name {
            disable;
            authentication {
                md5 key-id key key-string <start-time YYYY-MM-DD.hh:mm>;
                simple-password key-string;
            }
            bandwidth-based-metrics {
                bandwidth value metric number;
            }
            bfd-liveness-detection {
                authentication {
                    algorithm (keyed-md5 | keyed-sha-1 | meticulous-keyed-md5 |
                    meticulous-keyed-sha-1 | simple-password);
                }
            }
        }
    }
}

```

```

        key-chain key-chain-name;
        loose-check;
    }
    detection-time {
        threshold milliseconds;
    }
    full-neighbors-only;
    minimum-interval milliseconds;
    minimum-receive-interval milliseconds;
    multiplier number;
    no-adaptation;
    transmit-interval {
        minimum-interval milliseconds;
        threshold milliseconds;
    }
    version (1 | automatic);
}
dead-interval seconds;
dynamic-neighbors;
flood-reduction;
hello-interval seconds;
interface-type (nbma | p2mp | p2p);
metric metric;
neighbor address <eligible>;
no-eligible-backup;
no-interface-state-traps;
no-neighbor-down-notification;
passive {
    traffic-engineering {
        remote-node-id address;
    }
}
poll-interval seconds;
priority number;
retransmit-interval seconds;
secondary;
te-metric metric;
topology (name | default | ipv4-multicast) {
    disable;
    bandwidth-based-metrics {
        bandwidth value;
        metric number;
    }
    metric metric;
}
transit-delay seconds;
}
network-summary-export [ policy-names ];
network-summary-import [ policy-names ];
nssa {
    area-range ip-prefix</prefix-length> <exact> <override-metric metric> <restrict>;
    default-lsa {
        default-metric metric;
        metric-type type;
        type-7;
    }
}

```

```

    }
    (summaries | no-summaries);
  }
  stub <default-metric metric> <summaries | no-summaries>;
  virtual-link neighbor-id router-id transit-area area-id {
    disable;
    authentication {
      md5 key-id key key-string <start-time YYYY-MM-DD.hh:mm>;
      simple-password key-string;
    }
    dead-interval seconds;
    demand-circuit;
    flood-reduction;
    hello-interval seconds;
    ipsec-sa sa-name;
    no-neighbor-down-notification;
    retransmit-interval seconds;
    topology (name | default | ipv4-multicast) {
      disable;
      metric metric;
    }
    transit-delay seconds;
  }
}
database-protection {
  ignore-count number;
  ignore-time seconds;
  maximum-lsa number;
  reset-time seconds;
  warning-only;
  warning-threshold percent;
}
export [ policy-names ];
external-preference preference;
graceful-restart {
  disable;
  helper-disable <both | restart-signaling | standard>;
  no-strict-lsa-checking;
  notify-duration seconds;
  restart-duration seconds;
}
import [ policy-names ];
no-nssa-abr;
no-rfc-1583;
overload <timeout seconds>;
preference preference;
prefix-export-limit number;
reference-bandwidth reference-bandwidth;
rib-group group-name;
topology (default | ipv4-multicast | name) {
  overload;
  prefix-export-limit number;
  topology-id number;
}
traceoptions {

```

```
file filename <files number> <size maximum-file-size> <world-readable |  
no-world-readable>;  
flag flag <flag-modifier> <disable>;  
}  
traffic-engineering {  
  advertise-unnumbered-interfaces;  
  credibility-protocol-preference;  
  ignore-lsp-metrics;  
  multicast-rpf-routes;  
  no-topology;  
  shortcuts <lsp-metric-into-summary>;  
}  
}  
pim {  
  disable;  
  assert-timeout seconds;  
  dense-groups {  
    addresses;  
  }  
  dr-election-on-p2p;  
  export;  
  family (inet | inet6) {  
    disable;  
  }  
  graceful-restart {  
    disable;  
    restart-duration seconds;  
  }  
  import [ policy-names ];  
  interface interface-name {  
    accept-remote-source;  
    disable;  
    family (inet | inet6) {  
      disable;  
    }  
    hello-interval seconds;  
    mode (dense | sparse | sparse-dense);  
    neighbor-policy [ policy-names ];  
    override-interval milliseconds;  
    priority number;  
    propagation-delay milliseconds;  
    reset-tracking-bit;  
    version version;  
  }  
  join-load-balance;  
  join-prune-timeout;  
  nonstop-routing;  
  override-interval milliseconds;  
  propagation-delay milliseconds;  
  reset-tracking-bit;  
  rib-group group-name;  
  rp {  
    auto-rp {  
      (announce | discovery | mapping);  
      (mapping-agent-election | no-mapping-agent-election);
```

```

}
bootstrap {
  family (inet | inet6) {
    export [ policy-names ];
    import [ policy-names ];
    priority number;
  }
}
bootstrap-import [ policy-names ];
bootstrap-export [ policy-names ];
bootstrap-priority number;
dr-register-policy [ policy-names ];
embedded-rp {
  group-ranges {
    destination-ip-prefix </prefix-length>;
  }
  maximum-rps limit;
}
local {
  family (inet | inet6) {
    address address;
    anycast-pim {
      disable;
      rp-set {
        address address <forward-msdp-sa>;
      }
      local-address address;
    }
    group-ranges {
      destination-ip-prefix </prefix-length>;
    }
    hold-time seconds;
    priority number;
  }
}
rp-register-policy [ policy-names ];
spt-threshold {
  infinity [ policy-names ];
}
static {
  address address {
    group-ranges {
      version version;
      destination-ip-prefix </prefix-length>;
    }
  }
}
}
rpf-selection {
  group group-address {
    source source-address {
      next-hop next-hop-address;
    }
  }
  wildcard-source {
    next-hop next-hop-address;
  }
}

```

```

    }
  }
  prefix-list prefix-list-addresses {
    source source-address {
      next-hop next-hop-address;
    }
    wildcard-source {
      next-hop next-hop-address;
    }
  }
  traceoptions {
    file filename <files number> <size size> <world-readable | no-world-readable>;
    flag flag <flag-modifier> <disable>;
  }
  tunnel-devices [ mt-fpc/pic/port ];
}
rip {
  authentication-key password;
  authentication-type type;
  (check-zero | no-check-zero);
  group group-name {
    bfd-liveness-detection {
      authentication {
        algorithm (keyed-md5 | keyed-sha-1 | meticulous-keyed-md5 |
          meticulous-keyed-sha-1 | simple-password);
        key-chain key-chain-name;
        loose-check;
      }
      detection-time {
        threshold milliseconds;
      }
      minimum-interval milliseconds;
      minimum-receive-interval milliseconds;
      multiplier number;
      no-adaptation;
      transmit-interval {
        minimum-interval milliseconds;
        threshold milliseconds;
      }
    }
    version (1 | automatic);
  }
  export [ policy-names ];
  import [ policy-names ];
  metric-out metric;
  neighbor neighbor-name {
    any-sender;
    authentication-key password;
    authentication-type type;
    bfd-liveness-detection {
      ... same statements as at the [edit protocols rip group group-name
        bfd-liveness-detection] hierarchy level ...
    }
    (check-zero | no-check-zero);
    import [ policy-names ];
    message-size number;
  }
}

```



```

        metric-in metric;
        receive (both | none | version-1 | version-2);
        route-timeout seconds;
        send (broadcast | multicast | none | version-1);
        update-interval seconds;
    }
    preference preference;
    route-timeout seconds;
    update-interval seconds;
}
holddown seconds;
import [ policy-names ];
message-size number;
metric-in metric;
receive (both | none | version-1 | version-2);
rib-group group-name;
route-timeout seconds;
send (broadcast | multicast | none | version-1);
traceoptions {
    file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
    flag flag <flag-modifier> <disable>;
}
update-interval seconds;
}
rstp {
    disable;
    bpdu-block-on-edge;
    bridge-priority priority;
    forward-delay seconds;
    hello-time seconds;
    interface (all | interface-name) {
        disable;
        bpdu-timeout-action {
            alarm;
            block;
        }
        cost cost;
        edge;
        mode mode;
        no-root-port;
        priority priority;
    }
    max-age seconds;
}
traceoptions {
    file filename <files number> <size size> <no-stamp> <world-readable |
        no-world-readable>;
    flag flag;
}
}
stp {
    disable;
    bridge-priority priority;
    forward-delay seconds;

```

```

hello-time seconds;
interface (all | interface-name) {
    disable;
    bpdu-timeout-action {
        alarm;
        block;
    }
    cost cost;
    edge;
    mode mode;
    no-root-port;
    priority priority;
}
max-age seconds;
}
traceoptions {
    file filename <files number > <size size > <no-stamp | world-readable |
        no-world-readable>;
    flag flag;
}
uplink-failure-detection {
    group group-name {
        link-to-monitor interface-name;
        link-to-disable interface-name;
    }
}
}
vstp {
    bpdu-block-on-edge;
    disable;
    force-version stp;
    vlan vlan-id {
        bridge-priority priority;
        forward-delay seconds;
        hello-time seconds;
        interface (all | interface-name) {
            bpdu-timeout-action (Spanning Trees) {
                block;
                log;
            }
            cost cost;
            disable;
            edge (Spanning Trees);
            mode mode;
            no-root;
            priority priority;
        }
        max-age seconds;
        traceoptions {
            file filename <files number > <size size > <no-stamp | world-readable |
                no-world-readable>;
            flag flag;
        }
    }
}
}
}

```

Hierarchy Level	[edit]
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 protocols. 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	<ul style="list-style-type: none"> • Junos OS Routing Protocols Configuration Guide

protocol-version

Syntax	protocol-version [v2];
Hierarchy Level	[edit system services ssh]
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 OCX Series switches.
Description	Specify the Secure Shell (SSH) protocol version.
Default	v2—SSH protocol version 2 is the default, introduced in Junos OS Release 11.4.
Options	SSH protocol version v2.
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 the SSH Protocol Version on page 255

provisioning-order (Diameter Applications)

Syntax	provisioning-order (gx-plus jsrc pcrf);
Hierarchy Level	[edit access profile <i>profile-name</i>]
Release Information	<p>Statement introduced in Junos OS Release 9.6.</p> <p>Support for Gx-Plus introduced in Junos OS Release 11.2.</p> <p>Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.</p> <p>pcrf option added in Junos OS Release 16.2.</p>
Description	Configure AAA to use the specified application for subscriber service provisioning.
Options	<p>gx-plus—Specify Gx-Plus as the application used to communicate with a PCRF server for subscriber service provisioning. Sets the Subscription-Id-Type Diameter AVP sub-attribute (450) to 4 (END_USER_PRIVATE) and sets the Subscription-Id-Data Diameter AVP sub-attribute (444) to reserved. Both of these sub-attributes are conveyed in the Diameter AVP Subscription-ID (443) by a CCR-I message.</p> <p>jsrc—Specify JSRC as the application used to communicate with the SAE for subscriber service provisioning. JSRC is used in an SRC environment to request services from the SAE for an authenticated subscriber. JSRC attempts to activate these services. If successful, JSRC returns an ACK message. If unsuccessful, the subscriber is denied access.</p> <p>pcrf—Specify Policy Control and Charging Rules Function (PCRF) as the application used to request provisioning from the PCRF server over the Gx protocol. If you change this configuration, any existing subscriber sessions are unaffected.</p>
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">• <i>JSRC Configuration Overview</i>• <i>Provisioning Subscribers with JSRC</i>• <i>Configuring Gx-Plus</i>• <i>Provisioning Subscribers with Gx-Plus</i>• <i>Understanding Gx Interactions Between the Router and the PCRF</i>• <i>Understanding Rule Interactions Between the PCRF, PCEF, and OCS</i>

proxy

Syntax

```
proxy {  
  password password;  
  port port-number;  
  server url;  
  username user-name;  
}
```

Hierarchy Level [edit system]

Release Information Statement introduced in Junos OS Release 8.5.

Description Specify the proxy information for the router.

- Options**
- **password *password***—Password configured in the proxy server.
 - **port *port number***—Proxy server port number.
Range: 0 through 65,535
 - **server *url***—URL or IP address of the proxy server host.
 - **username *username***—Username configured in the proxy server.

Required Privilege Level

system—To view this statement in the configuration.
system-control—To add this statement to the configuration.

proxy-mode

Syntax	proxy-mode;
Hierarchy Level	<p>[edit forwarding-options dhcp-relay overrides], [edit forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay overrides], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.5.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Enable DHCP relay proxy mode on the extended DHCP relay. Proxy mode supports all extended DHCP relay functionality.</p> <p>You cannot configure both the DHCP relay proxy and the extended DHCP local server on the same interface.</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"> • DHCP Relay Proxy Overview on page 636 • Extended DHCP Relay Agent Overview on page 632 • Enabling DHCP Relay Proxy Mode on page 638

ptopo-configuration-maximum-hold-time

Syntax	<code>ptopo-configuration-maximum-hold-time <i>seconds</i>;</code>
Hierarchy Level	[edit protocols lldp]
Release Information	Statement introduced in Junos OS Release 9.6 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 how long to maintain the physical topology database entries. The physical topology identifies the devices on the network and their physical interconnections.
Options	<i>seconds</i> —Time to maintain physical topology database entries. Default: 300 Range: 1 through 2147483647
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"> • show lldp on page 2109 • Understanding LLDP and LLDP-MED on EX Series Switches on page 562 • Understanding LLDP on page 555

ptopo-configuration-trap-interval

Syntax	ptopo-configuration-trap-interval <i>seconds</i> ;
Hierarchy Level	[edit protocols lldp]
Release Information	Statement introduced in Junos OS Release 9.6 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	Specify how often SNMP trap notifications are sent regarding changes in physical topology global statistics.
Default	SNMP trap notifications of changes in physical topology global statistics are disabled.
Options	<i>seconds</i> —Interval between SNMP trap notifications about physical topology global statistics. Range: 0 through 3600
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.


quiet-period

Syntax	<code>quiet-period <i>seconds</i>;</code>
Hierarchy Level	[edit protocols dot1x authenticator interface (802.1X) (all [<i>interface-names</i>])]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	For 802.1X authentication, configure the number of seconds the interface remains in the wait state following a failed authentication attempt by a supplicant before reattempting authentication.
Default	60 seconds
Options	<i>seconds</i> —Number of seconds the interface remains in the wait state. Range: 0 through 65,535 seconds Default: 60 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"> • show network-access aaa statistics authentication on page 2138 • Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378

quiet-period (Captive Portal)

Syntax	<code>quiet-period <i>seconds</i>;</code>
Hierarchy Level	[edit services captive-portal interface (all <i>interface-names</i>)]
Release Information	Statement introduced in Junos OS Release 10.1 for EX Series switches.
Description	Configure time, in seconds, after a user exceeds the maximum number of retries before they can attempt to authenticate.
Options	<i>seconds</i> —Number of seconds. Range: 1–65535 Default: 60
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: Setting Up Captive Portal Authentication on an EX Series Switch on page 527• Configuring Captive Portal Authentication (CLI Procedure) on page 532

radius

Syntax	<pre>radius { accounting-server [server-addresses]; authentication-server [server-addresses]; }</pre>
Hierarchy Level	[edit access profile <i>profile-name</i>]
Release Information	<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>Configure the RADIUS servers for authentication and for accounting. To configure multiple RADIUS servers, include multiple radius statements. The servers are tried in order and in a round-robin fashion until a valid response is received from one of the servers or until all the configured retry limits are reached.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
<div>  NOTE: The [edit access] hierarchy is not available on QFabric systems. </div>	
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"> • Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378 • Configuring 802.1X RADIUS Accounting (CLI Procedure) on page 386 • Filtering 802.1X Supplicants by Using RADIUS Server Attributes on page 388

radius (System)

Syntax	<pre>radius { server { server-address { accounting-port port-number; secret password; source-address address; retry number; timeout seconds; } } }</pre>
Hierarchy Level	[edit system accounting destination]
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	Configure the RADIUS accounting server.
Options	<p>server-address—Address of the RADIUS accounting server.</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">• Configuring RADIUS System Accounting on page 223

radius (Access Profile)

```

Syntax  radius {
        accounting-server [ ip-address ];
        attributes {
            exclude
            attribute-name packet-type;
            standard-attribute number {
                packet-type [ access-request | accounting-off | accounting-on | accounting-start |
                    accounting-stop ];
            }
            vendor-id id-number {
                vendor-attribute vsa-number {
                    packet-type [ access-request | accounting-off | accounting-on | accounting-start
                        | accounting-stop ];
                }
            }
        }
        ignore {
            dynamic-iflset-name;
            framed-ip-netmask;
            idle-timeout;
            input-filter;
            logical-system-routing-instance;
            output-filter;
            session-timeout;
            standard-attribute number;
            vendor-id id-number {
                vendor-attribute vsa-number;
            }
        }
    }
    authentication-server [ ip-address ];
    options {
        accounting-session-id-format (decimal | description);
        calling-station-id-delimiter delimiter-character;
        calling-station-id-format {
            agent-circuit-id;
            agent-remote-id;
            interface-description;
            nas-identifier;
        }
        chap-challenge-in-request-authenticator;
        client-accounting-algorithm (direct | round-robin);
        client-authentication-algorithm (direct | round-robin);
        coa-dynamic-variable-validation;
        ethernet-port-type-virtual;
        interface-description-format {
            exclude-adapter;
            exclude-channel;
            exclude-sub-interface;
        }
        ip-address-change-notify message;
    }

```

```
juniper-dsl-attributes;  
nas-identifier identifier-value;  
nas-port-extended-format {  
    adapter-width width;  
    ae-width width;  
    port-width width;  
    slot-width width;  
    stacked-vlan-width width;  
    vlan-width width;  
    atm {  
        adapter-width width;  
        port-width width;  
        slot-width width;  
        vci-width width;  
        vpi-width width;  
    }  
}  
nas-port-id-delimiter delimiter-character;  
nas-port-id-format {  
    agent-circuit-id;  
    agent-remote-id;  
    interface-description;  
    interface-text-description;  
    nas-identifier;  
    order {  
        agent-circuit-id;  
        agent-remote-id;  
        interface-description;  
        interface-text-description;  
        nas-identifier;  
        postpend-vlan-tags;  
    }  
    postpend-vlan-tags;  
}  
nas-port-type {  
    ethernet {  
        port-type;  
    }  
}  
override {  
    calling-station-id remote-circuit-id;  
    nas-ip-address tunnel-client-gateway-address;  
    nas-port tunnel-client-nas-port;  
    nas-port-type tunnel-client-nas-port-type;  
}  
remote-circuit-id-delimiter;  
remote-circuit-id-fallback;  
remote-circuit-id-format {  
    agent-circuit-id;  
    agent-remote-id;  
}  
revert-interval interval;  
service-activation {  
    dynamic-profile (optional-at-login | required-at-login);  
    extensible-service (optional-at-login | required-at-login);  
}
```

```

    }
    vlan-nas-port-stacked-format;
  }
  preauthentication-server ip-address;
}

```

Hierarchy Level [edit access profile *profile-name*]

Release Information Statement introduced in Junos OS Release 9.1.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description Configure the RADIUS parameters that the router uses for AAA authentication and accounting for subscribers.

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 admin—To view this statement in the configuration.
admin-control—To add this statement to the configuration.

Related Documentation

- *Configuring RADIUS Server Parameters for Subscriber Access*
- *RADIUS Server Options for Subscriber Access*

radius (System)

Syntax	<pre>radius { server { server-address { accounting-port port-number; secret password; source-address address; retry number; timeout seconds; } } }</pre>
Hierarchy Level	[edit system accounting destination]
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	Configure the RADIUS accounting server.
Options	<p>server-address—Address of the RADIUS accounting server.</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">• Configuring RADIUS System Accounting on page 223


radius-disconnect (DHCP Local Server)

Syntax	<code>radius-disconnect;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server reconfigure trigger],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 reconfigure trigger],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure trigger],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure trigger],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server reconfigure trigger],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 reconfigure trigger],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure trigger],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure trigger],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server reconfigure trigger],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 reconfigure trigger],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure trigger],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure trigger],</p> <p>[edit system services dhcp-local-server reconfigure trigger],</p> <p>[edit system services dhcp-local-server dhcpv6 reconfigure trigger],</p> <p>[edit system services dhcp-local-server group <i>group-name</i> reconfigure trigger],</p> <p>[edit system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure trigger]</p>
Release Information	<p>Statement introduced in Junos OS Release 10.0.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Support at the [edit ... dhcpv6 ...] hierarchy levels introduced in Junos OS Release 10.4.</p>
Description	Configure all DHCP clients or only the DHCP clients serviced by the specified group of interfaces to be reconfigured when a RADIUS-initiated disconnect is received by the DHCP client or group of clients. A group configuration takes precedence over a DHCP local server configuration.
Default	The client is deleted when a RADIUS-initiated disconnect is received.
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 Dynamic Client Reconfiguration of Extended Local Server Clients Overview on page 693](#)
- [Configuring Reconfiguration of the Client on Receipt of RADIUS-Initiated Disconnect on page 697](#)

radius-options (edit system)

Syntax	<pre>radius-options { attributes { nas-ip-address <i>ip-address</i>; } enhanced-accounting; password-protocol <i>mschap-v2</i>; }</pre>
Hierarchy Level	[edit system]
Release Information	<p>Statement introduced in Junos OS Release 8.3.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>MS-CHAPv2 password protocol configuration option introduced in Junos OS Release 9.2.</p> <p>MS-CHAPv2 password protocol configuration option introduced in Junos OS Release 9.2 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>
	<p> NOTE: The radius-options statement is not available on QFabric systems.</p>
	<p>enhanced-accounting statement introduced in Junos OS Release 14.1.</p>
Description	Configure RADIUS options for the NAS-IP address for outgoing RADIUS packets and password protocol used in RADIUS packets.
Options	<p>enhanced-accounting—View the attribute values of a logged in user.</p> <p>nas-ip-address <i>ip-address</i>—IP address of the network access server (NAS) that requests user authentication.</p> <p>password-protocol <i>mschap-v2</i>—Protocol MS-CHAPv2, used for password authentication and password changing.</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"> • Configuring MS-CHAPv2 for Password-Change Support • Configuring RADIUS System Accounting on page 223 • enhanced-accounting on page 1370

radius-options (Protocols 802.1X)

Syntax	<pre>radius-options { use-vlan-id; use-vlan-name; }</pre>
Hierarchy Level	[edit protocols dot1x authenticator]
Release Information	Statement introduced in Junos OS Release 12.1 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	Configure 802.1X authenticator so that the VLAN ID or VLAN name is included in the packet sent to the RADIUS server to request authentication.
Options	<p>use-vlan-id—Include the VLAN ID in the packet sent to the RADIUS server to request authentication.</p> <p>use-vlan-name—Include the VLAN name in the packet sent to the RADIUS server to request authentication. The VLAN name is sent even if the 802.1X interface is configured with the VLAN ID.</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 802.1X Interface Settings (CLI Procedure) on page 357• Specifying RADIUS Server Connections on Switches (CLI Procedure) on page 500• authenticator on page 1198


radius-options

Syntax	<pre>radius-options { attributes { nas-ip-address <i>nas-ip-address</i>; } password-protocol mschap-v2; }</pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 8.5. Support for network access server (NAS) IPv6 address added in Junos OS Release 12.1X47-D15 for SRX1500, SRX5400, SRX5600, and SRX5800 devices.
Description	Configure RADIUS options for the NAS-IP address for outgoing RADIUS packets and password protocol used in RADIUS packets.
Options	<ul style="list-style-type: none"> • attributes—Configure RADIUS attributes. <ul style="list-style-type: none"> • nas-ip-address <i>nas-ip-address</i>—Valid IPv4 or IPv6 address of the NAS requesting user authentication. • password-protocol mschap-v2—Protocol MS-CHAPv2, used for password authentication and password changing.
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"> • radius-server on page 1672

radius-options (Access)

Syntax	<pre>radius-options { revert-interval <i>seconds</i>; }</pre>
Hierarchy Level	<pre>[edit access]; [edit access profile <i>profile-name</i>]</pre>
Release Information	Statement introduced in Release 8.5 of Junos OS.
Description	Configure RADIUS options.
Options	The remaining statement is explained separately.
Required Privilege Level	access—To view this statement in the configuration. access-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• <i>Junos OS Security Configuration Guide</i>


radius-options (edit system)

Syntax	<pre>radius-options { attributes { nas-ip-address <i>ip-address</i>; } enhanced-accounting; password-protocol <i>mschap-v2</i>; }</pre>
Hierarchy Level	[edit system]
Release Information	<p>Statement introduced in Junos OS Release 8.3.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>MS-CHAPv2 password protocol configuration option introduced in Junos OS Release 9.2.</p> <p>MS-CHAPv2 password protocol configuration option introduced in Junos OS Release 9.2 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>
	<p> NOTE: The radius-options statement is not available on QFabric systems.</p>
	<p>enhanced-accounting statement introduced in Junos OS Release 14.1.</p>
Description	Configure RADIUS options for the NAS-IP address for outgoing RADIUS packets and password protocol used in RADIUS packets.
Options	<p>enhanced-accounting—View the attribute values of a logged in user.</p> <p>nas-ip-address <i>ip-address</i>—IP address of the network access server (NAS) that requests user authentication.</p> <p>password-protocol <i>mschap-v2</i>—Protocol MS-CHAPv2, used for password authentication and password changing.</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"> • Configuring MS-CHAPv2 for Password-Change Support • Configuring RADIUS System Accounting on page 223 • enhanced-accounting on page 1370

radius-options (Protocols 802.1X)

Syntax	<pre>radius-options { use-vlan-id; use-vlan-name; }</pre>
Hierarchy Level	[edit protocols dot1x authenticator]
Release Information	Statement introduced in Junos OS Release 12.1 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	Configure 802.1X authenticator so that the VLAN ID or VLAN name is included in the packet sent to the RADIUS server to request authentication.
Options	<p>use-vlan-id—Include the VLAN ID in the packet sent to the RADIUS server to request authentication.</p> <p>use-vlan-name—Include the VLAN name in the packet sent to the RADIUS server to request authentication. The VLAN name is sent even if the 802.1X interface is configured with the VLAN ID.</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 802.1X Interface Settings (CLI Procedure) on page 357• Specifying RADIUS Server Connections on Switches (CLI Procedure) on page 500• authenticator on page 1198

radius-server

Syntax	<pre>radius-server server-address { accounting-port port-number; port number; retry number; secret password; source-address source-address; timeout seconds; }</pre>
Hierarchy Level	[edit system]
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	<p>Configure a RADIUS server for Point-to-Point Protocol (PPP).</p> <p>To configure multiple RADIUS servers, include multiple radius-server statements. The servers are tried in order and in a round-robin fashion until a valid response is received from one of the servers or until all the configured retry limits are reached.</p>
Options	<p>server-address—Address of the RADIUS authentication server.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
<div>  <p>NOTE: The accounting-port and source-address options are not available on QFabric systems.</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"> • Configuring RADIUS Authentication (QFX Series or OCX Series) on page 213 • accounting-port on page 1144 • port on page 1623 • retry on page 1704 • <i>secret</i> • <i>source-address</i> • <i>timeout</i>

radius-server

Syntax	<pre>radius-server server-address { accounting-port port-number; accounting-retry number; accounting-timeout seconds; dynamic-request-port port-number; max-outstanding-requests value; port port-number; preauthentication-port port-number; preauthentication-secret password; retry attempts; routing-instance routing-instance-name; secret password; source-address source-address; timeout seconds; }</pre>
Hierarchy Level	<p>[edit access],</p> <p>[edit access profile <i>profile-name</i>]</p>
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>dynamic-request-port option added in Junos OS Release 14.2 for MX Series routers.</p> <p>preauthentication-port and preauthentication-secret options added in Junos OS Release 15.1 for MX Series routers.</p> <p>Support for IPv6 server-address introduced in Junos OS Release 16.1.</p>
Description	<p>Configure RADIUS for subscriber access management, L2TP, or PPP.</p> <p>To configure multiple RADIUS servers, include multiple radius-server statements. The servers are tried in order and in a round-robin fashion until a valid response is received from one of the servers or until all the configured retry limits are reached.</p>
Options	<p>server-address—IPv4 or IPv6 address of the RADIUS server.</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>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 RADIUS Authentication for L2TP</i> • <i>Configuring the PPP Authentication Protocol</i> • <i>Configuring Router or Switch Interaction with RADIUS Servers</i>

- *Configuring Authentication and Accounting Parameters for Subscriber Access*
- *show network-access aaa statistics*
- *clear network-access aaa statistics*

radius-server

Syntax	<pre>radius-server server-address { accounting-port port-number; max-outstanding-requests value; port port-number; retry value; secret password; source-address source-address; timeout seconds; }</pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 8.5. Support for IPv6 source address added in Junos OS Release 12.1X47-D15 for SRX1500, SRX5400, SRX5600, and SRX5800 devices.
Description	<p>Configure RADIUS server address for subscriber access management, Layer 2 Tunnelling Protocol (L2TP), or (Point-to-Point Protocol (PPP).</p> <p>To configure multiple RADIUS servers, include multiple radius-server statements. The servers are tried in order and in a round-robin fashion until a valid response is received from one of the servers or until all the configured retry limits are reached.</p>
Options	<ul style="list-style-type: none">• server-address—Address of the RADIUS server.• accounting-port port-number—RADIUS server accounting port number. Range: 1 through 65,335 files Default: 1813• port port-number—RADIUS server authentication port number. Range: 1 through 65,335 files Default: 1812• retry value—Number of times that the router is allowed to attempt to contact a RADIUS server. Range: 1 through 10 Default: 3• secret password—Password to use; it can include spaces if the character string is enclosed in quotation marks.• max-outstanding-requests value—Maximum number of outstanding requests in flight to server. Range: 1 through 65,335 files

- **source-address *source-address***—Valid IPv4 or IPv6 address configured on one of the router or switch interfaces.
- **timeout *seconds***—Amount of time to wait.

Range: 1 through 90 seconds

Default: 3 seconds

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

radius-server (System)

Syntax

```
radius-server {
  server-address {
    accounting-port port-number;
    port number;
    retry number;
    routing-instance routing-instance-name;
    secret password;
    source-address source-address;
    timeout seconds;
  }
}
```

Hierarchy Level [edit system]

Release Information Statement introduced before Junos OS Release 7.4.

Description Configure a RADIUS server for Point-to-Point Protocol (PPP).

To configure multiple RADIUS servers, include multiple **radius-server** statements. The servers are tried in order and in a round-robin fashion until a valid response is received from one of the servers or until all the configured retry limits are reached.

Options **server-address**—Address of the RADIUS authentication server.

The remaining statements are explained separately. See [CLI Explorer](#).

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

Related Documentation

- [Configuring RADIUS Server Authentication on page 203](#)

rapid-commit

Syntax	<code>rapid-commit;</code>
Hierarchy Level	<code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcpv6-client]</code> <code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client]</code> <code>[edit tenants <i>tenant-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client]</code>
Release Information	Statement introduced in Junos OS Release 12.1X45-D10. The logical-systems and tenants options are introduced in Junos OS Release 18.4R1.
Description	Used to signal the use of the two-message exchange for address assignment.
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">• DHCPv6 Client Overview on page 819• Understanding DHCPv6 Client and Server Identification on page 817


rapid-commit (DHCPv6 Local Server)

Syntax	<code>rapid-commit;</code>
Hierarchy Level	<p>[edit system services dhcp-local-server dhcpv6 overrides], [edit system services dhcp-local-server dhcpv6 group group-name overrides], [edit system services dhcp-local-server dhcpv6 group group-name interface interface-name overrides], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 ...], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 ...], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 ...]</p>
Release Information	<p>Statement introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Configure DHCPv6 local server to recognize the Rapid Commit option (DHCPv6 option 14) in DHCPv6 solicit messages sent from the DHCPv6 client. When rapid commit is enabled for both DHCPv6 local server and the DHCPv6 client, a two-message handshake is used instead of the standard four-message handshake. You can enable rapid commit support on DHCPv6 local server globally, for a named group, or for a specific interface.</p>
Default	Rapid commit support is not enabled.
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"> • Enabling DHCPv6 Rapid Commit Support on page 629 • Overriding the Default DHCP Local Server Configuration Settings Overview on page 617

rate-limit

Syntax	<code>rate-limit <i>limit</i>;</code>
Hierarchy Level	<code>[edit system services finger],</code> <code>[edit system services ftp],</code> <code>[edit system services netconf ssh],</code> <code>[edit system services ssh],</code> <code>[edit system services telnet],</code> <code>[edit system services tftp-server],</code> <code>[edit system services xnm-clear-text],</code> <code>[edit system services xnm-ssl]</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 14.1X53-D20 for OCX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	Configure the maximum number of connections attempts per minute, per protocol (either IPv6 or IPv4) on an access service. For example, a rate limit of 10 allows 10 IPv6 telnet session connection attempts per minute and 10 IPv4 telnet session connection attempts per minute.
Default	150 connections
Options	<p><code>rate-limit <i>limit</i></code>—(Optional) Maximum number of connection attempts allowed per minute, per IP protocol (either IPv4 or IPv6).</p> <p>Range: 1 through 250</p> <p>Default: 150</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"> Configuring clear-text or SSL Service for Junos XML Protocol Client Applications on page 263

reauthentication

Syntax	<code>reauthentication <i>interval</i>;</code>
Hierarchy Level	[edit protocols <code>dot1x authenticator interface</code> (all [<i>interface-names</i>])]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	The reauthentication statement is used to locally configure the number of seconds before the 802.1X authentication session times out and the client must reattempt authentication.
	<div>  <p>NOTE: If the authentication server sends an authentication session timeout to the client, this takes priority over the value configured locally using the reauthentication statement. The session timeout value is sent from the server to the client as an attribute of the RADIUS Access-Accept message.</p> </div>
Options	<p><i>interval</i>—Sets the periodic reauthentication time interval in seconds.</p> <p>Range: 1 through 4,294,967,296 seconds</p> <p>Default: 3600 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 802.1X Interface Settings (CLI Procedure) on page 357

reconfigure (DHCP Local Server)

Syntax

```
reconfigure {
  attempts attempt-count;
  clear-on-abort;
  strict;
  support-option-pd-exclude;
  timeout timeout-value;
  token token-value;
  trigger {
    radius-disconnect;
  }
}
```

Hierarchy Level

```
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server],
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server dhcpv6],
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server group group-name],
[edit logical-systems logical-system-name routing-instances routing-instance-name system
services dhcp-local-server dhcpv6 group group-name],
[edit logical-systems logical-system-name system services dhcp-local-server],
[edit logical-systems logical-system-name system services dhcp-local-server dhcpv6],
[edit logical-systems logical-system-name system services dhcp-local-server group
group-name],
[edit logical-systems logical-system-name system services dhcp-local-server dhcpv6 group
group-name],
[edit routing-instances routing-instance-name system services dhcp-local-server],
[edit routing-instances routing-instance-name system services dhcp-local-server dhcpv6],
[edit routing-instances routing-instance-name system services dhcp-local-server group
group-name],
[edit routing-instances routing-instance-name system services dhcp-local-server dhcpv6
group group-name],
[edit system services dhcp-local-server],
[edit system services dhcp-local-server dhcpv6],
[edit system services dhcp-local-server group group-name],
[edit system services dhcp-local-server dhcpv6 group group-name]
```

Release Information

Statement introduced in Junos OS Release 10.0.

Support at the **[edit ... dhcpv6 ...]** hierarchy levels introduced in Junos OS Release 10.4.

Statement introduced in Junos OS Release 12.1 for EX Series switches.

support-option-pd-exclude statement introduced in Junos OS Release 17.3 for the MX Series.

Description

Enable dynamic reconfiguration triggered by the DHCP local server of all DHCP clients or only the DHCP clients serviced by the specified group of interfaces. A group configuration takes precedence over a DHCP local server configuration. The **strict** statement is available only for DHCPv6.

The remaining statements are explained separately. Search for a statement in [CLI Explorer](#) or click a linked statement in the Syntax section for details.

Options	support-option-pd-exclude —Request to exclude prefix option in the reconfigure 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">• Configuring Dynamic Client Reconfiguration of Extended Local Server Clients Overview on page 693• <i>DHCPv6 Prefix Exclusion</i>• <i>dhcp-attributes</i>• reconfigure on page 1678

reconfigure (System Services DHCP)

Syntax	<pre> reconfigure { attempts <i>number</i>; clear-on-abort; strict; timeout <i>number</i>; token <i>token-name</i>; trigger { radius-disconnect; } } </pre>
Hierarchy Level	<pre> [edit system services dhcp-local-server dhcpv6] [edit system services dhcp-local-server group <i>group-name</i>] [edit system services dhcp-local-server dhcpv6 group <i>group-name</i>] </pre>
Release Information	Statement introduced in Junos OS Release 10.4.
Description	Enable dynamic reconfiguration triggered by the DHCP local server of all DHCP clients or only the DHCP clients serviced by the specified group of interfaces. A group configuration takes precedence over a DHCP local server configuration.
Options	<p>attempts <i>number</i>—Configure maximum number of attempts to reconfigure all DHCP clients or only the DHCP clients serviced by the specified group of interfaces before reconfiguration is considered to have failed. A group configuration takes precedence over a DHCP local server configuration.</p> <p>Range: 1 through 10 attempts</p> <p>Default: 8 attempts</p> <p>clear-on-abort —Delete all DHCP clients or only the DHCP clients serviced by the specified group of interfaces when reconfiguration fails; that is, when the maximum number of retry attempts have been made without success. A group configuration takes precedence over a DHCP local server configuration.</p> <p>strict —Configure the system to only allow packets that contain the reconfigure accept option.</p> <p>timeout <i>seconds</i>—Configure the initial value in seconds between attempts to reconfigure all DHCP clients or only the DHCP clients serviced by the specified group of interfaces. Each successive attempts doubles the interval between attempts. For example, if the first value is 2, the first retry is attempted 2 seconds after the first attempt fails. The second retry is attempted 4 seconds after the first retry fails. The third retry is attempted 8 seconds after the second retry fails, and so on. A group configuration takes precedence over a DHCP local server configuration.</p> <p>Range: 1 through 10 seconds</p> <p>Default: 2 seconds</p>

token *token-name*—Configure a plain-text token for all DHCP clients or only the clients specified by the specified group of interfaces. The default is null (empty string).

trigger — Specify DHCP reconfigure trigger.

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">• DHCP Server, Client, and Relay Agent Overview on page 742• DHCP Server Configuration Overview on page 767
------------------------------	--

req-option

Syntax	<code>req-option (dns-server domain fqdn nis-domain nis-server ntp-server sip-domain sip-server time-zone vendor-spec);</code>
Hierarchy Level	<code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcpv6-client]</code> <code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client]</code> <code>[edit tenants <i>tenant-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client]</code>
Release Information	Statement introduced in Junos OS Release 12.1X45-D10. The logical-systems and tenants options are introduced in Junos OS Release 18.4R1.
Description	The configuration options requested by the DHCPv6 client.
Options	dns-server —Specify a DNS server. domain —Specify a domain name. fqdn —Specify a fully qualified domain name. nis-domain —Specify a Network Information Service (NIS) domain. nis-server —Specify a Network Information Service (NIS) server. ntp-server —Specify a Network Time Protocol (NTP) server. sip-domain —Specify a Session Initiation Protocol (SIP) domain. sip-server —Specify a Session Initiation Protocol (SIP) server. time-zone —Specify a time zone. vendor-spec —Specify vendor specification.
Required Privilege Level	interface —To view this statement in the configuration. interface-control —To add this statement to the configuration.

regex-additive-logic

Syntax	regex-additive-logic;
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 16.1.
Description	<p>Enable additive logic (that is, deny all by default / allow some as specified) to be used in regular expressions.</p> <p>This statement changes the behavior of existing regular expressions so that all configuration hierarchies are denied by default and must be explicitly allowed using the allow-configuration-regexps statement.</p> <p>For example, to grant users in a named user class access to a specific configuration hierarchy, but deny access to all other configuration hierarchies, enable the regex-additive-logic statement and configure an allow-configuration-regexps statement that includes the specific configuration hierarchy to which you want to allow access. When a user logs in, only the specified configuration hierarchy is visible.</p>
Default	By default, this statement is disabled; configuration hierarchies not explicitly denied with a deny-configuration-regexps statement are visible to the user.
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"> • Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138 • Example: Using Additive Logic With Regular Expressions to Specify Access Privileges on page 153 • Regular Expressions for Allowing and Denying Junos OS Operational Mode Commands, Configuration Statements, and Hierarchies on page 117 • allow-configuration-regexps on page 1168 • deny-configuration-regexps on page 1273 • user on page 1883

redirect-url

Syntax	<code>redirect-url url;</code>
Hierarchy Level	[edit protocols <code>dot1x authenticator interface interface-name</code>]
Release Information	Statement introduced in Junos OS Release 15.1R3 for EX Series switches.
Description	<p>Configure a URL that redirects unauthenticated hosts to a central Web authentication (CWA) server. The CWA server provides a web portal where the user can enter a username and password. If these credentials are validated by the CWA server, the user is authenticated and is allowed access to the network.</p> <p>The redirect URL for central Web authentication can be configured centrally on the AAA server or locally on the switch. Use the redirect-url statement to configure the redirect URL locally on the interface connecting the host to the switch.</p> <p>The redirect URL and a dynamic firewall filter must both be present for the central Web authentication process to be triggered. For more information about configuring the redirect URL and the dynamic firewall filter for central Web authentication, see “Configuring Central Web Authentication” on page 550.</p>
Default	Disabled. The redirect URL is not enabled for central Web authentication by default.
Options	<p>url—The URL that redirects the host to the server that will handle central web authentication. The redirect URL must use the HTTP or HTTPS protocol and include an IP address or website name. The following are examples of valid redirect URL formats:</p> <ul style="list-style-type: none"> • <code>http://www.example.com</code> • <code>https://www.example.com</code> • <code>http://10.10.10.10</code> • <code>https://10.10.10.10</code> • <code>http://www.example.com/login.html</code> • <code>https://www.example.com/login.html</code> • <code>http://10.10.10.10/login.html</code> • <code>https://10.10.10.10/login.html</code>



NOTE: When the dynamic firewall filter is configured using the special Filter-ID attribute `JNPR_RSVD_FILTER_CWA`, the CWA redirect URL must include the IP address of the AAA server, for example, `https://10.10.10.10`.

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

Related Documentation

- [Configuring Central Web Authentication on page 550](#)

relay-agent-interface-id (DHCP Local Server)

Syntax relay-agent-interface-id;

Hierarchy Level [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 authentication [username-include](#)],
 [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 group *group-name* authentication [username-include](#)],
 [edit logical-systems *logical-system-name* system services dhcp-local-server dhcpv6 authentication [username-include](#)],
 [edit logical-systems *logical-system-name* system services dhcp-local-server dhcpv6 group *group-name* authentication [username-include](#)],
 [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 authentication [username-include](#)],
 [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 group *group-name* authentication [username-include](#)],
 [edit routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 authentication [username-include](#)],
 [edit routing-instances *routing-instance-name* system services dhcp-local-server dhcpv6 group *group-name* authentication [username-include](#)],
 [edit system services dhcp-local-server dhcpv6 authentication [username-include](#)],
 [edit system services dhcp-local-server dhcpv6 group *group-name* authentication [username-include](#)]

Release Information Statement introduced in Junos OS Release 9.6.
 Statement introduced in Junos OS Release 12.3R2 for EX Series switches.

Description Specify that the DHCPv6 Relay Agent Interface-ID option (option 18) in the client PDU name is concatenated with the username during the subscriber authentication or DHCP client authentication process.

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

Related Documentation

- [Creating Unique Usernames for DHCP Clients on page 684](#)

relay-agent-interface-id (DHCPv6 Relay Agent)

Syntax	<pre> relay-agent-interface-id { include-irb-and-l2; keep-incoming-interface-id ; no-vlan-interface-name; prefix <i>prefix</i>; use-interface-description (logical device); use-option-82 <strict>; use-vlan-id; } </pre>
Hierarchy Level	<pre> [edit forwarding-options dhcp-relay dhcpv6], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i>], [edit forwarding-options dhcp-relay dual-stack-group <i>dual-stack-group-name</i>], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 ...], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dual-stack-group <i>dual-stack-group-name</i>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 ...], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dual-stack-group <i>dual-stack-group-name</i>], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 ...], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dual-stack-group], </pre>
Release Information	<p>Statement introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.3 for EX Series switches.</p> <p>Support at the <code>[edit ... dual-stack-group <i>dual-stack-group-name</i>]</code> hierarchy level introduced in Junos OS Release 15.1.</p>
Description	<p>Insert the DHCPv6 Relay Agent Interface-ID option (option 18) in DHCPv6 packets destined for the DHCPv6 server.</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"> • dhcp-relay on page 1294 • Extended DHCP Relay Agent Overview on page 632 • DHCPv6 Relay Agent Overview on page 648 • Inserting DHCPv6 Interface-ID Option (Option 18) In DHCPv6 Packets on page 649

relay-agent-remote-id (DHCP Local Server)

Syntax	<code>relay-agent-remote-id;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit system services dhcp-local-server dhcpv6 group <i>group-name</i> authentication username-include]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.6.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>For MX Series routers only, enterprise-id and remote-id options introduced in Junos OS Release 12.3R3.</p> <p>For MX Series routers only, the enterprise-id and remote-id options are obsoleted starting in Junos OS Releases 12.3R7, 13.2R4, 13.3R2, and 14.1R1.</p>
Description	Specify that the DHCPv6 Relay Agent Remote-ID option (option 37) in the client PDU name is concatenated with the username during the subscriber authentication or DHCP client authentication process. In order to generate an ASCII version of the username, the router concatenates only the remote-id portion of option 37 to the username, and ignores the enterprise number.
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"> • Creating Unique Usernames for DHCP Clients on page 684

relay-agent-remote-id (DHCPv6 Relay Agent Username)

Syntax	relay-agent-remote-id;
Hierarchy Level	<p>[edit forwarding-options dhcp-relay dhcpv6 authentication username-include],</p> <p>[edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit forwarding-options dhcp-relay dual-stack-group <i>dual-stack-group-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include]</p>
Release Information	<p>Statement introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>For MX Series routers only, enterprise-id and remote-id options introduced in Junos OS Release 12.3R3.</p> <p>For MX Series routers only, the enterprise-id and remote-id options are obsoleted starting in Junos OS Releases 12.3R7, 13.2R4, 13.3R2, and 14.1R1.</p> <p>Support at the [edit ... dual-stack-group <i>dual-stack-group-name</i>] hierarchy level introduced in Junos OS Release 15.1.</p>
Description	Specify that the DHCPv6 Relay Agent Remote-ID option (option 37) in the client PDU name is concatenated with the username during the subscriber authentication or client authentication process. In order to generate an ASCII version of the username, the router concatenates only the remote-id portion of option 37 to the username, and ignores the enterprise number.
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"> • DHCPv6 Relay Agent Overview on page 648 • Creating Unique Usernames for DHCP Clients on page 684

relay-option (DHCP Relay Agent)

Syntax

```

relay-option {
  option-number option-number;
  default-action {
    drop;
    forward-only;
    local-server-group local-server-group;
    relay-server-group relay-server-group;
  }
  equals (ascii ascii-string | hexadecimal hexadecimal-string) {
    drop;
    forward-only;
    local-server-group local-server-group;
    relay-server-group relay-server-group;
  }
  starts-with (ascii ascii-string | hexadecimal hexadecimal-string) {
    drop;
    forward-only;
    local-server-group local-server-group;
    relay-server-group relay-server-group;
  }
}

```

Hierarchy Level

```

[edit forwarding-options dhcp-relay],
[edit forwarding-options dhcp-relay dhcpv6],
[edit forwarding-options dhcp-relay group group-name],
[edit forwarding-options dhcp-relay dhcpv6 group group-name],
[edit logical-systems logical-system-name forwarding-options dhcp-relay ...],
[edit logical-systems logical-system-name routing-instances routing-instance-name
  forwarding-options dhcp-relay ...],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay ...]

```

Release Information Statement introduced in Junos OS Release 12.3.
Statement introduced in Junos OS Release 12.3 for EX Series switches.

Description Configure the extended DHCP relay agent selective processing that is based on DHCP options in DHCP client packets and specify the action to perform on client traffic. You can configure support globally or for a named group of interfaces, and for either DHCP or DHCPv6 relay agent.

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 interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.

Related Documentation

- *Using DHCP Option Information to Selectively Process DHCP Client Traffic*

relay-option-82

Syntax

```

relay-option-82 {
  circuit-id {
    include-irb-and-l2;
    keep-incoming-circuit-id ;
    no-vlan-interface-name;
    prefix prefix;
    use-interface-description (logical | device);
    use-vlan-id;
  }
  remote-id {
    include-irb-and-l2;
    keep-incoming-remote-id ;
    no-vlan-interface-name;
    prefix prefix;
    use-interface-description (logical | device);
    use-vlan-id;
  }
  server-id-override
  vendor-specific{
    host-name;
    location;
  }
}

```

Hierarchy Level

```

[edit forwarding-options dhcp-relay],
[edit forwarding-options dhcp-relay group group-name],
[edit logical-systems logical-system-name forwarding-options dhcp-relay],
[edit logical-systems logical-system-name forwarding-options dhcp-relay group group-name],
[edit logical-systems logical-system-name routing-instances routing-instance-name
 forwarding-options dhcp-relay],
[edit logical-systems logical-system-name routing-instances routing-instance-name
 forwarding-options dhcp-relay group group-name],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay group
 group-name]

```

Release Information Statement introduced in Junos OS Release 8.3.
Statement introduced in Junos OS Release 12.3 for EX Series switches.

Description Enable or disable the insertion of the DHCP relay agent information option (option 82) in DHCP packets destined for a DHCP server.

To enable insertion of option 82 information in DHCP packets, you must specify at least one of the **circuit-id** or **remote-id** statements.

You can use the **relay-option-82** statement and its subordinate statements at the **[edit forwarding-options dhcp-relay]** hierarchy level to control insertion of option 82 information

globally, or at the `[edit forwarding-options dhcp-relay group group-name]` hierarchy level to control insertion of option 82 information for a named group of interfaces.

To restore the default behavior (option 82 information is not inserted into DHCP packets), use the `delete relay-option-82` statement.

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	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"> • Using DHCP Relay Agent Option 82 Information on page 657 • dhcp-relay on page 1294

relay-server-group (DHCP Relay Agent Option)

Syntax	<code>relay-server-group relay-server-group;</code>
Hierarchy Level	<code>[edit forwarding-options dhcp-relay relay-option (default-action equals starts-with),</code> <code>[edit forwarding-options dhcp-relay dhcpv6 relay-option (default-action equals </code> <code>starts-with),</code> <code>[edit forwarding-options dhcp-relay group group-name relay-option (default-action equals</code> <code> starts-with),</code> <code>[edit forwarding-options dhcp-relay dhcpv6 group group-name relay-option (default-action</code> <code> equals starts-with),</code> <code>[edit logical-systems logical-system-name forwarding-options dhcp-relay ...],</code> <code>[edit logical-systems logical-system-name routing-instances routing-instance-name</code> <code>forwarding-options dhcp-relay ...],</code> <code>[edit routing-instances routing-instance-name forwarding-options dhcp-relay ...]</code>
Release Information	<p>Statement introduced in Junos OS Release 12.3.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Relay DHCP client packets to the specified group of DHCP servers when you use the DHCP relay selective processing feature. You can configure the relay operation globally or for a group of interfaces, and for either DHCP or DHCPv6 relay agent.
Options	<i>relay-server-group</i> —Name of DHCP server group.
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"> • Using DHCP Option Information to Selectively Process DHCP Client Traffic

replace-ip-source-with (Before Forwarding Packet)

Syntax	replace-ip-source-with giaddr;
Hierarchy Level	[edit forwarding-options dhcp-relay overrides]
Release Information	Statement introduced in Junos OS Release 15.1X49-D100.
Description	Replace the IP source address in DHCP relay request and release packets with the gateway IP address (giaddr) before forwarding the packet to the DHCP server.
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">• overrides (New Relay Options) on page 1600

replace-ip-source-with

Syntax	<code>replace-ip-source-with giaddr;</code>
Hierarchy Level	<p>[edit forwarding-options dhcp-relay overrides], [edit forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay overrides], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.6.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Replace the IP source address in DHCP relay request and release packets with the gateway IP address (giaddr).
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"> • Extended DHCP Relay Agent Overview on page 632 • Replacing the DHCP Relay Request and Release Packet Source Address on page 642

remote-debug-permission

Syntax	remote-debug-permission (qfabric-admin qfabric-operator qfabric-user);
Hierarchy Level	[edit system login user <i>username</i> authentication] [edit system root-authentication]
Release Information	Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches. Statement introduced in Junos OS Release 11.3 for the QFX Series.
Description	(QFabric systems only) Configure authentication classes that permit or deny user access to individual components of the QFabric system.
Default	qfabric-user
Options	qfabric-admin —Permits a user to log in to individual QFabric system components, view operations, and change component configurations. qfabric-operator —Permits a user to log in to individual QFabric system components and view component operations. qfabric-user —Prevents a user from logging in to individual QFabric system components.
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">• <i>Example: Configuring QFabric System Login Classes</i>• request component login on page 1956• Understanding QFabric System Login Classes on page 51

restart (Reset)

Syntax restart
 <application-identification | application-security | audit-process | commitd-service
 | chassis-control | class-of-service | database-replication | datapath-trace-service | ddns
 | dhcp | dhcp-service | dynamic-flow-capture | disk-monitoring | event-processing |
 ethernet-connectivity-fault-management | ethernet-link-fault-management
 | extensible-subscriber-services | fipsd | firewall | firewall-authentication-service
 | general-authentication-service | gracefully | gprs-process | idp-policy | immediately
 | interface-control | ipmi | ipsec-key-management | jflow-service | jnu-management
 | jnx-wmicd-service | jsrp-service | kernel-replication | l2-learning | l2cpd-service | lacp
 | license-service | logical-system-service | mib-process | mountd-service | named-service
 | network-security | network-security-trace | nfisd-service | ntpd-service | pgm
 | pic-services-logging | profilerd | pki-service | remote-operations | rest-api | routing | sampling
 | sampling-route-record | scc-chassisd | secure-neighbor-discovery | security-intelligence
 | security-log | services | service-deployment | simple-mail-client-service | soft | snmp
 | static-routed | statistics-service | subscriber-management | subscriber-management-helper
 | system-log-vital | tunnel-oamd | uac-service | user-ad-authentication | vrrp
 | web-management >

Release Information Command introduced before Junos OS Release 9.2

Description Restart a Junos OS process.



CAUTION: Never restart a software process unless instructed to do so by a customer support engineer. A restart might cause the router to drop calls and interrupt transmission, resulting in possible loss of data.

- Options**
- application-identification—(Optional) Restart the process that identifies an application using intrusion detection and prevention (IDP) to allow or deny traffic based on applications running on standard or nonstandard ports.
 - application-security—(Optional) Restart the application security process.
 - audit-process—(Optional) Restart the RADIUS accounting process that gathers statistical data that can be used for general network monitoring, for analyzing and tracking usage patterns, and for billing a user based upon the amount of time used or the type of services accessed.
 - chassis-control—(Optional) Restart the chassis management process.
 - class-of-service—(Optional) Restart the class-of-service (CoS) process, which controls the router's or switch's CoS configuration.
 - commitd-service—(Optional) Restart the committed services.
 - database-replication—(Optional) Restart the database replication process.
 - datapath-trace-service—(Optional) Restart the Restart the packet path tracing process.

- `ddns`—(Optional) Restart the dynamic domain name system, which dynamically updates IP addresses for registered domain names.
- `dhcp`—(Optional) Restart the software process for a Dynamic Host Configuration Protocol (DHCP) server. A DHCP server allocates network IP addresses and delivers configuration settings to client hosts without user intervention.
- `dhcp-service`—(Optional) Restart the Dynamic Host Configuration Protocol process.
- `disk-monitoring`—(Optional) Restart disk monitoring, which checks the health of the hard disk drive on the Routing Engine.
- `dynamic-flow-capture`—(Optional) Restart the dynamic flow capture (DFC) process, which controls DFC configurations on PIC3 monitoring services cards.
- `ethernet-connectivity-fault-management`—(Optional) Restart the process that provides IEEE 802.1ag Operation, Administration, and Maintenance (OAM) connectivity fault management (CFM) database information for CFM maintenance association end points (MEPs) in a CFM session.
- `ethernet-link-fault-management`—(Optional) Restart the process that provides the OAM link fault management (LFM) information for Ethernet interfaces.
- `event-processing`—(Optional) Restart the event process (`eventd`).
- `extensible-subscriber-services`—(Optional) Restart the extensible subscriber services process.
- `fipsd`—(Optional) Restart the `fipsd` services.
- `firewall`—(Optional) Restart the firewall management process, which manages the firewall configuration and accepts or rejects packets that are transiting an interface on a router or switch.
- `firewall-authentication-service`—(Optional) Restart the firewall authentication service process.
- `general-authentication-service`—(Optional) Restart the general authentication process.
- `gprs-process`—(Optional) Restart the General Packet Radio Service (GPRS) process.
- `gracefully`—(Optional) Restart the software process.
- `idp-policy`—(Optional) Restart the intrusion detection and prevention (IDP) protocol process.
- `immediately`—(Optional) Immediately restart the software process.
- `interface-control`—(Optional) Restart the interface process, which controls the router's or switch's physical interface devices and logical interfaces.
- `ipmi`—(Optional) Restart the intelligent platform management interface process.
- `ipsec-key-management`—(Optional) Restart the IPsec key management process.
- `jflow-service`—(Optional) Restart `jflow` service process.
- `jnu-management`—(Optional) Restart `jnu` management process.
- `jnx-wmicd-service`—(Optional) Restart `jnx wmicd` service process.

- `jsrp-service`—(Optional) Restart the Juniper Services Redundancy Protocol (jsrdp) process, which controls chassis clustering.
- `kernel-replication`—(Optional) Restart the kernel replication process, which replicates the state of the backup Routing Engine when graceful Routing Engine switchover (GRES) is configured.
- `lACP`—(Optional) Restart the Link Aggregation Control Protocol (LACP) process. LACP provides a standardized means for exchanging information between partner systems on a link. The LACP process allows link aggregation control instances to reach agreement on the identity of the LAG to which a link belongs, moves the link to that LAG, and enables the transmission and reception processes for the link to function in an orderly manner.
- `l2cpd-service`—(SRX5400, SRX5600, and SRX5800 devices only) (Optional) Restart the Layer 2 Control Protocol (L2CP) process, which enables features such as L2 protocol tunneling and nonstop bridging.
- `l2-learning`—(Optional) Restart the Layer 2 (L2) address flooding and learning process.
- `license-service`—(Optional) Restart the feature license management process.
- `logical-system-service`—(Optional) Restart the logical system service process.
- `mib-process`—(Optional) Restart the MIB version II process, which provides the router's MIB II agent.
- `mountd-service`—(Optional) Restart the service for Network File System (NFS) mount requests.
- `named-service`—(Optional) Restart the DNS Server process, which is used by a router or a switch to resolve hostnames into addresses.
- `network-security`—(Optional) Restart the network security process.
- `network-security-trace`—(Optional) Restart the network security trace process.
- `nfsd-service`—(Optional) Restart the remote NFS server process, which provides remote file access for applications that need NFS-based transport.
- `ntpd-service`—(Optional) Restart the Network Time Protocol (NTP) process.
- `pgm`—(Optional) Restart the process that implements the Pragmatic General Multicast (PGM) protocol for assisting in the reliable delivery of multicast packets.
- `pic-services-logging`—(Optional) Restart the logging process for some PICs. With this process, also known as `fsad` (the file system access daemon), PICs send special logging information to the Routing Engine for archiving on the hard disk.
- `pki-service`—(Optional) Restart the public key infrastructure (PKI) service process.
- `profillerd`—(Optional) Restart the profiler process.
- `remote-operations`—(Optional) Restart the remote operations process, which provides the ping and traceroute MIBs.
- `rest-api`—(Optional) Restart the rest api process.
- `routing`—(Optional) Restart the routing protocol process (`rpd`).

- **sampling**—(Optional) Restart the sampling process, which performs packet sampling based on particular input interfaces and various fields in the packet header.
- **sampling-route-record**—(Optional) Restart the sampling route record process.
- **scc-chassisd**—(Optional) Restart the scc chassisd process.
- **secure-neighbor-discovery**—(Optional) Restart the secure Neighbor Discovery Protocol (NDP) process, which provides support for protecting NDP messages.
- **security-intelligence**—(Optional) Restart security intelligence process.
- **security-log**—(Optional) Restart the security log process.
- **service-deployment**—(Optional) Restart the service deployment process, which enables Junos OS to work with the Session and Resource Control (SRC) software.
- **services**—(Optional) Restart a service.
- **simple-mail-client-service**—(Optional) Restart the simple mail client service process.
- **snmp**—(Optional) Restart the SNMP process, which enables the monitoring of network devices from a central location and provides the router's or switch's SNMP master agent.
- **static-routed**—(Optional) Restart the static routed process.
- **soft**—(Optional) Reread and reactivate the configuration without completely restarting the software processes. For example, BGP peers stay up and the routing table stays constant. Omitting this option results in a graceful restart of the software process.
- **statistics-service**—(Optional) Restart the process that manages the Packet Forwarding Engine statistics.
- **subscriber-management**—(Optional) Restart the subscriber management process.
- **subscriber-management-helper**—(Optional) Restart the subscriber management helper process.
- **system-log-vital**—(Optional) Restart system log vital process.
- **tunnel-oamd**—(Optional) Restart the tunnel OAM process for L2 tunneled networks.
- **uac-service**—(Optional) Restart the Unified Access Control (UAC) process.
- **user-ad-authentication**—(Optional) Restart User ad Authentication process
- **vrrp**—(Optional) Restart the Virtual Router Redundancy Protocol (VRRP) process, which enables hosts on a LAN to make use of redundant routing platforms on that LAN without requiring more than the static configuration of a single default route on the hosts.
- **web-management**—(Optional) Restart the Web management process.

Required Privilege Level reset

Related Documentation • [Restart Commands Overview](#)

List of Sample Output [restart interfaces on page 1699](#)

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

restart interfaces

```
user@host> restart interfaces
interfaces process terminated
interfaces process restarted
```

retransmission-attempt

Syntax `retransmission-attempt number;`

Hierarchy Level [edit interfaces *interface-name* unit *logical-unit-number* family inet dhcp]

Release Information Statement introduced in Junos OS Release 8.5 for J Series devices.
Statement introduced in Junos OS Release 9.0 for EX Series switches.
Statement introduced in Junos OS Release 9.2 for SRX Series devices.
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

Description Specify the number of times the device retransmits a Dynamic Host Control Protocol (DHCP) packet if a DHCP server fails to respond. After the specified number of attempts, no further attempts at reaching a server are made.

Options *number*—Number of retransmit attempts.
Range: 0 through 6
Default: 4

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

Related Documentation • [Configuring a DHCP Client \(CLI Procedure\) on page 677](#)
• [interfaces](#)
• [unit](#)
• [family](#)

retransmission-attempt (dhcp-client)

Syntax	<code>retransmission-attempts <i>number</i>;</code>
Hierarchy Level	<code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcp-client]</code>
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Specify the number of times the device attempts to retransmit a Dynamic Host Control Protocol (DHCP) packet fallback.
Options	number —Number of attempts to retransmit the packet. Range: 0 through 6
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 DHCP Client Operation on page 779• Minimum DHCP Client Configuration on page 780


retransmission-attempt (dhcpv6-client)

Syntax	<code>retransmission-attempt <i>number</i>;</code>
Hierarchy Level	<pre>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcpv6-client] [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client] [edit tenants <i>tenant-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client]</pre>
Release Information	<p>Statement introduced in Junos OS Release 12.1X45-D10.</p> <p>The logical-systems and tenants options are introduced in Junos OS Release 18.4R1.</p>
Description	Specify the number of times the device retransmits a DHCPv6 client packet if a DHCPv6 server fails to respond. After the specified number of attempts, no further attempts at reaching a server are made.
Options	number —Number of retransmit attempts
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	


retransmission-interval

Syntax	retransmission-interval <i>seconds</i> ;
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet dhcp]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Specify the time between successive retransmissions of the client DHCP request if a DHCP server fails to respond.
Options	seconds —Number of seconds between successive retransmissions. Range: 4 through 64 seconds Default: 4 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 a DHCP Client (CLI Procedure) on page 677



retransmission-interval (dhcp-client)

Syntax	<code>retransmission-interval <i>seconds</i>;</code>
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcp-client]
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Specify the initial retransmission interval. Successive retransmission intervals are doubled as per RFC2131.
	<p> NOTE: Though the SRX series devices implement the exponential backoff, as described in RFC 2131, the retransmit attempt does not stop when the retransmission interval reaches 64 seconds. The packet is transmitted till the retransmission attempt is reached. For example, if you configure the <code>retransmission-attempt</code> to 5 and the <code>retransmission-interval</code> to 20, the sequence of retransmission-interval is 20, 40, 80, 160, 320.</p>
Options	<p>seconds—Number of seconds before initial retransmission.</p> <p>Range: The range is 4 through 64. The default is 4 seconds.</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"> • Understanding DHCPv6 Client and Server Identification on page 817

retry

Syntax	<code>retry <i>number</i>;</code>
Hierarchy Level	<code>[edit system radius server <i>server-address</i>],</code> <code>[edit system accounting destination radius server <i>server-address</i>]</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	Number of times the router or switch is allowed to try to contact a RADIUS authentication or accounting server.
Options	<i>number</i> —Number of retries allowed for contacting a RADIUS server. Range: 1 through 10 Default: 3
<div> NOTE: The <code>[edit system accounting]</code> hierarchy is not available on QFabric systems.</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">• Configuring RADIUS Authentication (QFX Series or OCX Series) on page 213• <i>timeout</i>

retry

Syntax	<code>retry <i>attempts</i>;</code>
Hierarchy Level	<code>[edit access radius-server <i>server-address</i>];</code> <code>[edit access profile <i>profile-name</i> radius-server <i>server-address</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 number of times that the router or switch is allowed to attempt to contact a RADIUS authentication or accounting server. You can override the retry limit for accounting servers with the <i>accounting-retry</i> statement.
	<div>  <p>NOTE: To successfully set a retry limit for the accounting servers different from the authentication servers, you must configure both the <i>accounting-retry</i> and <i>accounting-timeout</i> statements. If you configure only one of these statements, then the value you configure is ignored in favor of the values configured with the <i>retry</i> and <i>timeout</i> statements.</p> </div>
	<div>  <p>NOTE: The maximum retry duration (the number of retries times the length of the timeout) cannot exceed 2700 seconds. An error message is displayed if you configure a longer duration.</p> </div>
Options	<p><i>attempts</i>—Number of times that the router is allowed to attempt to contact a RADIUS server.</p> <p>Range: 1 through 100</p> <p>Default: 3</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 Authentication and Accounting Parameters for Subscriber Access</i> • <i>Configuring Router or Switch Interaction with RADIUS Servers</i> • <i>Example: Configuring CHAP Authentication with RADIUS</i> • <i>Configuring RADIUS Authentication for L2TP</i> • timeout on page 1824

retry (RADIUS)

Syntax	<code>retry <i>number</i>;</code>
Hierarchy Level	[edit system radius-server <i>server-address</i>], [edit system accounting destination radius server <i>server-address</i>]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Number of times the router or switch is allowed to try to contact a RADIUS authentication or accounting server.
Options	<i>number</i> —Number of retries allowed for contacting a RADIUS server. Range: 1 through 10 Default: 3
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 RADIUS Server Authentication on page 203• Configuring RADIUS System Accounting on page 223• timeout on page 1821

retry-options

Syntax	<pre> retry-options { backoff-factor <i>seconds</i>; backoff-threshold <i>number</i>; maximum-time <i>seconds</i>; minimum-time <i>seconds</i>; tries-before-disconnect <i>number</i>; } </pre>
Hierarchy Level	[edit system login]
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>maximum-time option introduced in Junos OS Release 9.6.</p> <p>maximum-time option introduced in Junos OS Release 9.6 for EX Series switches.</p>
Description	Maximum number of times a user can attempt to enter a password while logging in through SSH or Telnet before being disconnected.
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"> • Limiting the Number of User Login Attempts for SSH and Telnet Sessions on page 87 • rate-limit on page 1676 • lockout-period on page 1503

retries

Syntax	<code>retries <i>number</i>;</code>
Hierarchy Level	[edit protocols dot1x authenticator interface (802.1X) (all [<i>interface-names</i>])]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	For 802.1X authentication, configure the number of times the switch attempts to authenticate the port after an initial failure. The port remains in a wait state during the quiet period after the authentication attempt.
Options	<i>number</i> —Number of retries. Default: 3 retries Range: 1 through 10
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 802.1X Interface Settings (CLI Procedure) on page 357• Configuring 802.1X Authentication (J-Web Procedure) on page 358• Example: Configuring Fallback Options on EX Series Switches for EAP-TTLS Authentication and Odyssey Access Clients on page 410

retries (Captive Portal)

Syntax	<code>retries <i>number-of-tries</i>;</code>
Hierarchy Level	<code>[edit services captive-portal interface (all <i>interface-names</i>)]]</code>
Release Information	Statement introduced in Junos OS Release 10.1 for EX Series switches.
Description	Configure the number of times the user can attempt to submit authentication information.
Options	<p><i>number-of-tries</i>—Number of authentication attempts by user.</p> <p>Range: 1–65535</p> <p>Default: 3</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"> • Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527 • Configuring Captive Portal Authentication (CLI Procedure) on page 532


revert-interval

Syntax	<code>revert-interval <i>interval</i>;</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</i> radius options];</code> <code>[edit access radius-options]</code>
Release Information	Statement introduced in Junos OS Release 9.1. Statement introduced in Junos OS Release 9.1 for EX Series switches.
Description	Configure the amount of time the router or switch waits after a server has become unreachable. The router or switch rechecks the connection to the server when the specified interval expires. If the server is then reachable, it is used in accordance with the order of the server list.
Options	interval —Amount of time to wait. Range: 0 through 604,800 seconds Default: 60 seconds
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">• <i>Configuring RADIUS Server Options for Subscriber Access</i>• <i>Configuring Authentication and Accounting Parameters for Subscriber Access</i>

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	<i>percentage</i> —Upper threshold for the alarm entry. Range: 1 through 100 Default: 80 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">• <i>Configuring Health Monitoring</i>• falling-threshold on page 1393

rng

Syntax	rng
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 18.3R1. HMAC DRBG option introduced in Junos OS Release 18.3R1 for non-FIPS mode.
Description	Configure a system cryptographically secure pseudorandom number generator (CSPRNG). <div> NOTE: Only root users can configure rng options. A reboot is required for the change to take effect.</div>
Default	By default, rng is not configured.
Options	fortuna —Configure the fortuna CSPRNG. hmac-drbg —Configure the HMAC DRBG CSPRNG.
Required Privilege Level	system—To view this statement in the configuration.

root-authentication

Syntax	<pre> root-authentication { encrypted-password <i>password</i>; load-key-file <i>URL</i>; plain-text-password; ssh-dsa <i>public-key</i> { <from <i>pattern-list</i>>; } ssh-rsa <i>public-key</i> { <from <i>pattern-list</i>>; } } </pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 8.5.
Description	Specify authentication information for the root login.
Options	<ul style="list-style-type: none"> • encrypted-password <i>password</i>—Specify the encrypted authentication password. You must configure a password whose number of characters range from 1 through 128 characters and enclose the password in quotation marks. • plain-text-password—The CLI prompts you for a password encrypts it, and stores the encrypted version in its user database. • load-key-file <i>URL</i>—File URL containing one or more SSH keys. • ssh-dsa <i>public-key</i>—SSH DSA public key string. <ul style="list-style-type: none"> • from <i>pattern-list</i>—Pattern list of allowed hosts. • ssh-rsa <i>public-key</i>—SSH RSA public key string. <ul style="list-style-type: none"> • from <i>pattern-list</i>—Pattern list of allowed hosts.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

root-authentication

Syntax	<pre> root-authentication { (encrypted-password "password" plain-text-password); load-key-file URL:filename; no-public-keys ssh-dsa "public-key"; ssh-ecdsa "public-key"; ssh-rsa "public-key"; } </pre>
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>
Description	<p>Configure the authentication methods for the root-level user, whose username is root.</p> <p>You can use the load-key-file URL:filename statement to load an SSH key file that was previously generated using ssh-keygen.</p> <p>Optionally, you can use the ssh-dsa, ssh-ecdsa, or ssh-rsa statements to directly configure SSH RSA, DSA, or ECDSA keys to authenticate root logins. You can configure more than one public key for SSH authentication of root logins as well as for user accounts. When a user logs in as root, the public keys are referenced to determine whether the private key matches any of them.</p> <p>To view the SSH keys entries, use the configuration mode show command. For example:</p> <pre> [edit system] user@host# set root-authentication load-key-file my-host::ssh/id_dsa.pub .file.19692 0 KB 0.3 kB/s ETA: 00:00:00 100% [edit system] user@host# show root-authentication { ssh-rsa "ABC123 user@domain.net"; # SECRET-DATA } </pre>
Options	<p>encrypted-password "password"—MD5 or other encrypted authentication. Specify the MD5 or other password. You can specify only one encrypted password.</p> <p>You cannot configure a blank password for encrypted-password using blank quotation marks (" "). You must configure a password whose number of characters range from 1 through 128 characters and enclose the password in quotation marks.</p> <p>load-key-file URL:filename—Load an SSH key file that was previously generated using ssh-keygen. The URL:filename is the path to the file's location and name. When using</p>

this option, the contents of the key file are copied into the configuration immediately after entering the **load-key-file URL:filename** statement. This command loads RSA (SSH version 2) and DSA (SSH version 2) public keys.

no-public-keys—Disables SSH public key based authentication.

plain-text-password—Plain-text password. The CLI prompts you for the password and then encrypts it. The CLI displays the encrypted version, and the software places the encrypted version in its user database. You can specify only one plain-text password.

ssh-eccdsa "public/private-key"—SSH ECDSA (variant of DSA that uses elliptic curve cryptography) public key. You can specify one or more public keys.

ssh-dsa "public-key"—SSH version 2 authentication. Specify the DSA (SSH version 2) public key. You can specify one or more public keys.

ssh-rsa "public-key"—SSH version 2 authentication. Specify the RSA (SSH version 2) public key. You can specify one or more public keys.


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

Related Documentation	<ul style="list-style-type: none"> • Junos OS User Accounts Overview on page 65 • Protecting Network Security by Configuring the Root Password • Recovering the Root Password on page 167 • authentication on page 1181
------------------------------	---

root-login

Syntax	root-login (allow deny deny-password);
Hierarchy Level	[edit system services ssh]
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 OCX Series switches.
Description	Control user access through SSH.
Default	root-login deny-password is the default for most systems. Starting in Junos release 17.4R1 for MX Series routers, the default for root-login is deny . In previous Junos releases, the default setting for the MX240, MX480, MX960, MX2010 and MX2020 was allow .
Options	allow —Allow users to log in to the router or switch as root through SSH. deny —Disable users from logging in to the router or switch as root through SSH. deny-password —Allow users to log in to the router or switch as root through SSH when the authentication method (for example, RSA authentication) does not require a password.
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 the Root Login Through SSH on page 254

route-suppression (DHCP Local Server and Relay Agent)

Syntax	<code>route-suppression (access access-internal destination);</code>
Hierarchy Level	<pre>[edit forwarding-options dhcp-relay], [edit forwarding-options dhcp-relay dhcpv6], [edit forwarding-options dhcp-relay group group-name], [edit forwarding-options dhcp-relay dhcpv6 group group-name], [edit logical-systems <i>logical-system-name</i> ...], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i>...], [edit routing-instances <i>routing-instance-name</i> ...], [edit system services dhcp-local-server], [edit system services dhcp-local-server dhcpv6], [edit system services dhcp-local-server group group-name], [edit system services dhcp-local-server dhcpv6 group group-name]</pre>
Release Information	Statement introduced in Junos OS Release 13.2.
Description	Configure the <code>jdhcpd</code> process to suppress the installation of access, access-internal, or destination routes during client binding.
	<div>  <p>NOTE: You cannot suppress access-internal routes when the subscriber is configured with both IA_NA and IA_PD addresses over IP demux interfaces—the IA_PD route relies on the IA_NA route for next hop connectivity.</p> </div>
Options	<p>access—(DHCPv6 only) Suppress installation of access routes. You can use the access and access-internal options in the same statement for DHCPv6.</p> <p>access-internal—In a DHCPv4 hierarchy, suppress installation of both access-internal and destination routes. In a DHCPv6 hierarchy, suppress access-internal routes only. Can be configured in the same statement with the access option.</p> <p>destination—(DHCPv4 only) Suppress installation of destination routes. This option and the access-internal option are mutually exclusive; however, the access-internal option also suppresses destination routes.</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"> Preventing DHCP from Installing Access, Access-Internal, and Destination Routes by Default on page 728

router

Syntax	<pre>router { address; }</pre>
Hierarchy Level	[edit system services dhcp], [edit system services dhcp], [edit system services dhcp-service], [edit system services dhcp-service pool], [edit system services dhcp-service static-binding]
Release Information	Statement introduced before Junos OS Release 7.4. Statement for EX Series switches introduced in Junos OS Release 9.0.
Description	For J Series Services Routers and EX Series switches only, specify IPv4 addresses for one or more devices available to a DHCP client. List devices (switches or routers) in order of preference.
Options	address —IPv4 address of the router or switch. To configure multiple devices, include multiple address options.
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 a DHCP Server on Switches (CLI Procedure) on page 671

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"> <i>Configuring the Routing Engine Profile</i>

routing-instance

Syntax	<code>routing-instance <i>routing-instance-name</i>;</code>
Hierarchy Level	<code>[edit access radius-server <i>server-address</i>],</code> <code>[edit access profile <i>profile-name</i> radius-server <i>server-address</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	Configure the routing instance used to send RADIUS packets to the RADIUS server.
Options	<i>routing-instance-name</i> —Routing instance name.
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 the PPP Authentication Protocol</i><i>Configuring Authentication and Accounting Parameters for Subscriber Access</i>

routing-instance

Syntax	<pre> routing-instance { instance-name { bridge-domain <i>bridge-domain-name</i>; } vlan (<i>vlan-id</i> <i>vlan-name</i>); } </pre>
Hierarchy Level	<pre> [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] </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-name (DHCP Local Server)

Syntax	routing-instance-name;
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit system services dhcp-local-server authentication username-include],</p> <p>[edit system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit system services dhcp-local-server group group-name authentication username-include]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Specify that the routing instance name be concatenated with the username during the subscriber authentication or DHCP client authentication process. No routing instance name is concatenated if the configuration is in the default routing instance.

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">• Using External AAA Authentication Services with DHCP on page 682

routing-instance-name (DHCP Relay Agent)

Syntax	routing-instance-name;
Hierarchy Level	<p>[edit forwarding-options dhcp-relay authentication username-include],</p> <p>[edit forwarding-options dhcp-relay dhcpv6 authentication username-include],</p> <p>[edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit forwarding-options dhcp-relay dual-stack-group <i>dual-stack-group-name</i> authentication username-include],</p> <p>[edit forwarding-options dhcp-relay group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include],</p> <p>[edit tenants <i>tenant-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include]</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Support at the [edit ... dhcpv6] hierarchy levels introduced in Junos OS Release 11.4.</p> <p>Support at the [edit ... dual-stack-group <i>dual-stack-group-name</i>] hierarchy level introduced in Junos OS Release 15.1.</p> <p>The tenants option is introduced in Junos OS Release 18.4R1.</p>
Description	<p>Specify that the routing instance name is concatenated with the username during the subscriber authentication or client authentication process. No routing instance name is concatenated if the configuration is in the default routing instance. Use the statement at the [edit ... dhcpv6] hierarchy levels to configure DHCPv6 support.</p>

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

Related Documentation

- [Using External AAA Authentication Services with DHCP on page 682](#)
- [Creating Unique Usernames for DHCP Clients on page 684](#)

scp

Syntax `scp (recursive | source-path | destination-path | source-address | routing-instance);`

Release Information Statement introduced in Junos OS Release 15.1X49-D110 for SRX300, SRX320, SRX340, and SRX345 devices.
Statement introduced in Junos OS Release 18.4R1 for MX240, MX480, MX960, MX2010, MX2020, and vMX routers.

Description Initiates a secure copy (**scp**) connection from the Junos CLI shell.

Options

- recursive—Copy files recursively.
- source-path— (Mandatory) Specify the source file location.
- destination-path—(Mandatory) Specify the destination file location.
- source-address—(Optional) Specify the local address to use in originating the secure copy connection.
- routing-instance—(Optional) Specify the name of the routing instance for the secure copy session. Default is **inet.0**.

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

Related Documentation

- [The ssh Command on page 278](#)

security

```
Syntax security {
  authentication-key-chains {
    key-chain key-chain-name {
      key key {
        secret secret-data;
        start-time yyyy-mm-dd.hh:mm:ss;
      }
    }
  }
  certificates {
    cache-size bytes;
    cache-timeout-negative seconds;
    certification-authority ca-profile-name {
      ca-name ca-identity;
      crl file-name;
      encoding (binary | pem);
      enrollment-url url-name;
      file certificate-filename;
      ldap-url url-name;
    }
    enrollment-retry attempts;
    local certificate-filename {
      certificate-key-string;
      load-key-file key-file-name;
    }
    maximum-certificates number;
    path-length certificate-path-length;
  }
  ssh-known-hosts {
    host {
      fetch-from-server host-name;
      load-key-file file-name;
    }
  }
  traceoptions {
    file filename <files number> <size size>;
    flag flag;
    level level;
    no-remote-trace
  }
}
```

Hierarchy Level [\[edit\]](#)

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 security services. Most of the configuration statements do not have default values. If you do not specify an identifier for a statement that does not have a default value, you cannot commit the configuration.

Required Privilege
Level

Related
Documentation

secret

Syntax `secret password;`

Hierarchy Level [edit system accounting destination radius [server](#) *server-address*],
[edit system accounting destination tacplus [server](#) *server-address*],
[edit system [radius-server](#) *server-address*],
[edit system [tacplus-server](#) *server-address*]

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 password to use with the RADIUS or TACACS+ server. The secret password used by the local router or switch must match that used by the server.



NOTE: To ensure better security, we recommend you to configure TACACS+ secret password with a minimum of 14 characters.

Options *password*—Password to use; can include spaces included in quotation marks.

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

Related Documentation

- [Configuring RADIUS Server Authentication on page 203](#)
- [Configuring TACACS+ Authentication on page 229](#)
- [Configuring TACACS+ System Accounting on page 242](#)
- [Configuring RADIUS System Accounting on page 223](#)

secret

Syntax	<code>secret <i>password</i>;</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</i> radius-server <i>server-address</i>],</code> <code>[edit access radius-disconnect <i>client-address</i>],</code> <code>[edit access radius-server <i>server-address</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	Configure the password to use with the RADIUS server. The secret password used by the local router or switch must match that used by the server.
Options	<i>password</i> —Password to use; it can include spaces if the character string is enclosed in quotation marks.
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>Configuring Authentication and Accounting Parameters for Subscriber Access</i>• <i>Configuring Router or Switch Interaction with RADIUS Servers</i>• <i>Example: Configuring CHAP Authentication with RADIUS</i>• <i>Configuring RADIUS Authentication for L2TP</i>• <i>Configuring the RADIUS Disconnect Server for L2TP</i>

secret

Syntax	<code>secret <i>secret-data</i>;</code>
Hierarchy Level	<code>[edit security authentication-key-chains key-chain <i>key-chain-name</i> key <i>key</i>]</code>
Release Information	<p>Statement introduced in Junos OS Release 7.6.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the BFD protocol introduced in Junos OS Release 9.6.</p> <p>Support for the BFD protocol introduced in Junos OS Release 9.6 for EX Series switches.</p> <p>Support for IS-IS introduced in Junos OS Release 11.2.</p> <p>Statement introduced in Junos OS Release 11.3 for QFX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
Description	Specify a password in encrypted text or plain text format. The secret password always appears in encrypted format.
Options	<i>secret-data</i> —Password to use; it can include spaces if the character string is enclosed in quotation marks.
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 Authentication Key Updates on page 284 • <i>Example: Configuring BFD Authentication for Securing Static Routes</i> • <i>Example: Configuring Hitless Authentication Key Rollover for IS-IS</i>

secure-authentication

Syntax	secure-authentication (http https);
Hierarchy Level	[edit services captive-portal]
Release Information	Statement introduced in Junos OS Release 10.1 for EX Series switches.
Description	Enable HTTP or HTTPS access on the captive portal interface.
Default	http
Options	<p>http—Enables HTTP access on the captive portal interface.</p> <p>https—Enables HTTPS access on the captive portal interface. HTTPS is recommended.</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">• Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527• Configuring Captive Portal Authentication (CLI Procedure) on page 532

send-acct-status-on-config-change (Access Profile)

Syntax	<code>send-acct-status-on-config-change;</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</i> accounting]</code>
Release Information	Statement introduced in Junos OS Release 13.1. Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.
Description	Configure the router's authd process to send accounting messages when the RADIUS server status changes for an access profile. When you include this statement, authd sends an Acct-On message when the first RADIUS server is added to an access profile, and to send an Acct-Off message when the last RADIUS server is removed from an access profile.
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">• <i>Configuring RADIUS Server Parameters for Subscriber Access</i>• <i>Configuring Per-Subscriber Session Accounting</i>

send-release-on-delete (DHCP Relay Agent)

Syntax	send-release-on-delete;
Hierarchy Level	<p>[edit forwarding-options dhcp-relay dhcpv6 overrides],</p> <p>[edit forwarding-options dhcp-relay overrides],</p> <p>[edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> overrides],</p> <p>[edit forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> overrides],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides]</p>
Release Information	<p>Statement introduced in Junos OS Release 10.2.</p> <p>Support at the [edit ... dhcpv6] hierarchy levels introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.3 for EX Series switches.</p>
Description	<p>Send a release message to the DHCP (or DHCPv6) server whenever DHCP relay or relay proxy deletes a client. Use the statement at the [edit ... dhcpv6] hierarchy levels to configure DHCPv6 support.</p> <p>M120 and M320 routers do not support DHCPv6.</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"> • Extended DHCP Relay Agent Overview on page 632 • Overriding the Default DHCP Relay Configuration Settings on page 638 • Sending Release Messages When Clients Are Deleted on page 690

server (NTP)

Syntax	<code>server <i>address</i> <key <i>key-number</i>> <version <i>value</i>> <prefer>;</code>
Hierarchy Level	<code>[edit system <i>ntp</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4.
Description	<p>For NTP, configure the SRX Series device to operate in client mode with the remote system at the specified address. In this mode, the SRX Series device can be synchronized with the remote system, but the remote system can never be synchronized with the SRX Series device.</p> <p>If the NTP client time drifts so that the difference in time from the NTP server exceeds 128 milliseconds, the client is automatically stepped back into synchronization. If the offset between the NTP client and server exceeds the 1000-second threshold, the client still synchronizes with the server, but it also generates a system log message noting that the threshold was exceeded.</p>
Options	<p><i>address</i>—Address of the remote system. You must specify an address, not a hostname.</p> <p><i>key key-number</i>—(Optional) Use the specified key number to encrypt authentication fields in all packets sent to the specified address.</p> <p>Range: Any unsigned 32-bit integer</p> <p><i>prefer</i>—(Optional) Mark the remote system as the preferred host, which means that if all other things are equal, this remote system is chosen for synchronization among a set of correctly operating systems.</p> <p><i>version value</i>—(Optional) Specify the version number to be used in outgoing NTP packets.</p> <p>Range: 1 through 4</p> <p>Default: 4</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"> • ntp on page 1573

server (DNS, Port, and TFTP Service)

Syntax	<code>server <i>address</i> <logical-system <i>logical-system-name</i>> <routing-instance <i>routing-instance-name</i>>;</code>
Hierarchy Level	<p>[edit forwarding-options helpers domain], [edit forwarding-options helpers domain interface <i>interface-name</i>], [edit forwarding-options helpers port <i>port-number</i>], [edit forwarding-options helpers port <i>port-number</i> interface <i>interface-name</i>], [edit forwarding-options helpers tftp], [edit forwarding-options helpers tftp interface <i>interface-name</i>]</p>
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 for port helpers in Junos OS Release 17.2R1 for EX4300 switches.</p> <p>Support for multiple server instances for a given port introduced in Junos OS Release 17.2 for MX Series routers.</p> <p>Support for multiple server instances for a given port introduced in Junos OS Release 17.3R1 for EX9200 switches.</p>
Description	<p>Specify the DNS or TFTP server for forwarding DNS or TFTP requests, or specify a destination server address for forwarding LAN broadcast packets as unicast traffic for a custom-configured UDP port.</p> <p>When configuring port helpers, in releases prior to Junos OS Release 17.2, only one server can be specified for a given port. For Junos OS Release 17.2 and later, multiple servers can be specified for a given port at the global or interface-specific level. When multiple servers are specified, the same packet, with the originator IP address and port requests, is forwarded to the different configured servers; the payload of the UDP packet is not modified.</p>
Options	<p><i>address</i>—IP address of the server.</p> <p>logical-system <i>logical-system-name</i>—(Optional) Logical system name of the server.</p> <p>routing-instance [<i>routing-instance-names</i>]—(Optional) Set the routing instance name or names that belong to the DNS server or TFTP 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"> Configuring DNS and TFTP Packet Forwarding Configuring Port-based LAN Broadcast Packet Forwarding

server (RADIUS Accounting)

Syntax	<pre> server { server-address { accounting-port port-number; retry number; routing-instance routing-instance; secret password; source-address address; timeout seconds; } } </pre>
Hierarchy Level	[edit system accounting destination radius]
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>Support for the source-address-inet6 statement introduced in Junos OS Release 14.1X53-D10 for EX Series switches.</p>
Description	<p>Configure RADIUS logging.</p> <p>The remaining statements are explained separately.</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"> • Configuring RADIUS System Accounting on page 223

server (TACACS+ Accounting)

Syntax	<pre>server { server-address { port port-number; routing-instance (Accounting and Authentication) routing-instance; secret password; single-connection; timeout seconds; } }</pre>
Hierarchy Level	[edit system accounting destination tacplus]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. routing-instance option introduced in Junos OS Release 17.4R1.
Description	Configure TACACS+ logging. The remaining statements are explained separately.
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 TACACS+ System Accounting on page 242


server-address

Syntax	<code>server-address <i>ip-address</i>;</code>
Hierarchy Level	<code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet dhcp]</code>
Release Information	<p>Statement introduced in Junos OS Release 8.5 for J Series devices.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 9.2 for SRX Series devices.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
Description	<p>Specify the address of the DHCP server that the client should accept DHCP offers from. If this option is included in the DHCP configuration, the client accepts offers only from this server and ignores all other offers.</p>
Default	The client accepts the first offer it receives from any DHCP server.
Options	<i>ip-address</i> —DHCP server 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"> • Configuring a DHCP Client (CLI Procedure) on page 677 • <i>interfaces</i> • <i>unit</i> • <i>family</i>

server-address (dhcp-client)

Syntax	<code>server address <i>ip-address</i>;</code>
Hierarchy Level	<code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcp-client]</code>
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Specify the preferred DHCP server address that is sent to DHCP clients.
Options	ip-address —DHCP server address.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	

server-fail

Syntax	<code>server-fail (deny permit use-cache <i>vlan-id</i> <i>vlan-name</i>);</code>
Hierarchy Level	[edit protocols dot1x authenticator interface (all [<i>interface-names</i>])]
Release Information	Statement introduced in Junos OS Release 9.3 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	<p>Configure authentication fallback options to specify how end devices connected to a switch are supported if the RADIUS authentication server becomes unavailable. Server fail fallback is triggered most often during reauthentication when the already configured and in-use RADIUS server becomes inaccessible. However, server fail fallback can also be triggered by a supplicant's initial attempt at authentication through the RADIUS server.</p> <p>When you configure the server fail fallback feature you must specify an action that the switch applies to end devices when the authentication servers are unavailable. The switch can accept or deny access to supplicants or maintain the access already granted to supplicants before the RADIUS timeout occurred. You can also configure the switch to move the supplicants to a specific VLAN. The VLAN must already be configured on the switch.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 20px;"> <p> NOTE: The <code>server-fail</code> statement is specifically for data traffic. For VoIP tagged traffic, use the <code>server-fail-voip</code> statement. The same interface can have a <code>server-fail</code> VLAN and a <code>server-fail-voip</code> VLAN configured.</p> </div>
Default	If the server-fail statement is not configured, in the event that the RADIUS authentication server becomes unavailable, the end device is not authenticated and is denied access to the network.
Options	<p>deny—Force fail the supplicant authentication. No traffic will flow through the interface.</p> <p>permit—Force succeed the supplicant authentication. Traffic will flow through the interface as if it were successfully authenticated by the RADIUS server.</p> <p>use-cache—Force succeed the supplicant authentication only if it was previously authenticated successfully. This action ensures that already authenticated supplicants are not affected.</p> <p>vlan-id—Move supplicant on the interface to the VLAN specified by this numeric identifier. This action is allowed only if it is the first supplicant connecting to the interface. If an authenticated supplicant is already connected, then the supplicant is not moved</p>


to the VLAN and is not authenticated. The VLAN must already be configured on the switch.

vlan-name—Move supplicant on the interface to the VLAN specified by this name. This action is allowed only if it is the first supplicant connecting to an interface. If an authenticated supplicant is already connected, then the supplicant is not moved to the VLAN and is not authenticated. The VLAN must already be configured on the switch.

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">• show dot1x on page 2082• Example: Configuring 802.1X Authentication Options When the RADIUS Server Is Unavailable to an EX Series Switch on page 430• Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378• Configuring RADIUS Server Fail Fallback (CLI Procedure) on page 437• Understanding Server Fail Fallback and Authentication on Switches on page 436
------------------------------	---

server-fail-voip

Syntax	<code>server-fail (deny permit use-cache vlan-name);</code>
Hierarchy Level	[edit protocols dot1x authenticator interface (all [<i>interface-names</i>])]
Release Information	Statement introduced in Junos OS Releases 14.1X53-D40 and 15.1R4 for EX Series switches.
Description	<p>Configure authentication fallback options to specify how VoIP clients sending voice traffic are supported if the RADIUS authentication server becomes unavailable. Server fail fallback is triggered most often during reauthentication when the already configured and in-use RADIUS server becomes inaccessible. However, server fail fallback can also be triggered by a supplicant's initial attempt at authentication through the RADIUS server.</p> <p>When you configure the server fail fallback feature you must specify an action that the switch applies to end devices when the authentication servers are unavailable. The switch can accept or deny access to supplicants or maintain the access already granted to supplicants before the RADIUS timeout occurred. You can also configure the switch to move the supplicants to a specific VLAN. The VLAN must already be configured on the switch.</p> <p>The server-fail-voip statement is specific to the VoIP-tagged traffic sent by clients. VoIP clients still require that the server-fail statement be configured for the un-tagged traffic that they generate. Therefore, when you configure the server-fail-voip statement you must also configure the server-fail statement.</p>
	<p> NOTE: An option other than server-fail deny must be configured for server-fail-voip to successfully commit.</p>
Default	If the server-fail-voip statement is not configured, in the event that the RADIUS authentication server becomes unavailable, a VoIP client that begins authentication by sending voice traffic is not authenticated, and the voice traffic is dropped.
Options	<p>deny—Force fail the supplicant authentication. No traffic will flow through the interface.</p> <p>permit—Force succeed the supplicant authentication. Traffic will flow through the interface as if it were successfully authenticated by the RADIUS server.</p> <p>use-cache—Force succeed the supplicant authentication only if it was previously authenticated successfully. This action ensures that already authenticated supplicants are not affected. This option can be used only for reauthentication.</p>

vlan-name—Move supplicant on the interface to the VLAN specified by this name. This action is allowed only if it is the first supplicant connecting to an interface. If an authenticated supplicant is already connected, then the supplicant is not moved to the VLAN and is not authenticated. The VLAN must already be configured on the switch.

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

Related Documentation

- [show dot1x on page 2082](#)
- [Example: Configuring 802.1X Authentication Options When the RADIUS Server Is Unavailable to an EX Series Switch on page 430](#)
- [Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378](#)
- [Configuring RADIUS Server Fail Fallback \(CLI Procedure\) on page 437](#)
- [Understanding Server Fail Fallback and Authentication on Switches on page 436](#)

server-group

Syntax	<pre> server-group { server-group-name { server-ip-address; } } </pre>
Hierarchy Level	<p>[edit forwarding-options dhcp-relay], [edit forwarding-options dhcp-relay dhcpv6], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6]</p>
Release Information	<p>Statement introduced in Junos OS Release 8.3.</p> <p>Support at the [edit ... dhcpv6] hierarchy levels introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.1 for EX Series switches.</p>
Description	<p>Specify the name of a group of DHCP server addresses for use by the extended DHCP relay agent. Apply the group with the active-server-group statement globally for all interfaces or for a named group of interfaces configured with the group statement. This mechanism enables you to apply different DHCP relay configurations for different groups of servers, with a common configuration for the servers within a server group.</p>
Options	<p><i>server-group-name</i>—Name of the group of DHCP or DHCPv6 server addresses.</p> <p><i>server-ip-address</i>—IP address of the DHCP server belonging to this named server group. Use IPv6 addresses when configuring DHCPv6 support. Starting in Junos OS Release 18.4R1, you can configure up to 32 server IP addresses per group for DHCPv4 servers. In earlier releases, you can configure only up to 5 server IP addresses for DHCPv4 servers. For DHCPv6 servers, you can configure only up to 32 addresses in all releases. The configuration fails commit check if you configure more than the maximum number of server addresses.</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"> • Extended DHCP Relay Agent Overview on page 632 • Configuring Active Server Groups to Apply a Common DHCP Relay Agent Configuration to Named Server Groups on page 701

server-identifier

Syntax	<code>server-identifier <i>address</i>;</code>
Hierarchy Level	<code>[edit system services dhcp],</code> <code>[edit system services dhcp pool],</code> <code>[edit system services dhcp static-binding]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	<p>Configure a server identifier. The identifier can be used to identify a DHCP server in a DHCP message. It can also be used as a destination address from clients to servers (for example, when the boot file is set, but not the boot server).</p> <p>Servers include the server identifier in DHCPOFFER messages so that clients can distinguish between multiple lease offers. Clients include the server identifier in DHCPREQUEST messages to select a lease and indicate which offer is accepted from multiple lease offers. Also, clients can use the server identifier to send unicast request messages to specific DHCP servers to renew a current lease.</p> <p>This address must be a manually assigned, static IP address. The server cannot send a request and receive an IP address from itself or another DHCP server.</p>
Default	If no server identifier is set, the DHCP server sets the server identifier based on the primary interface address used by the server to receive a client request. For example, if the client sends a DHCP request and the server receives it on fe-0/0/0 and the primary interface address is 1.1.1.1, then the server identifier is set to 1.1.1.1.
Options	<i>address</i> —IPv4 address of the server. This address must be accessible by all clients served within a specified range of addresses (based on an address pool or static binding).
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	

server-reject-vlan

Syntax	<pre>server-reject-vlan (vlan-id vlan-name) { eapol-block; block-interval block-interval; }</pre>
Hierarchy Level	[edit protocols dot1x authenticator interface (802.1X) (all [<i>interface-names</i>])]
Release Information	Statement introduced in Junos OS Release 9.3 for EX Series switches.
Description	<p>For EX Series switches configured for 802.1X authentication, specify that when the switch receives an Extensible Authentication Protocol Over LAN (EAPoL) Access-Reject message during the authentication process between the switch and the RADIUS authentication server, supplicants attempting access to the LAN are granted access and moved to a specific VLAN. Any VLAN name or VLAN ID sent by a RADIUS server as part of the EAPoL Access-Reject message is ignored.</p> <p>When you specify the VLAN ID or VLAN name, the VLAN must already be configured on the switch.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Default	None
Options	<p>vlan-id—Numeric identifier of the VLAN to which the supplicant is moved.</p> <p>vlan-name—Name of the VLAN to which the supplicant is moved.</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"> • show dot1x on page 2082 • Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378 • Example: Configuring Fallback Options on EX Series Switches for EAP-TTLS Authentication and Odyssey Access Clients on page 410 • Configuring RADIUS Server Fail Fallback (CLI Procedure) on page 437 • Understanding Server Fail Fallback and Authentication on Switches on page 436

server-timeout

Syntax	<code>server-timeout <i>seconds</i>;</code>
Hierarchy Level	[edit protocols dot1x authenticator interface (802.1X) (all [<i>interface-name</i>])
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	For 802.1X authentication, configure the amount of time a port will wait for a reply when relaying a response from the supplicant to the authentication server before timing out and invoking the server-fail action.
Default	30 seconds
Options	<i>seconds</i> —Number of seconds. Range: 1 through 60 seconds Default: 30 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">• show dot1x on page 2082• clear dot1x on page 1944• Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378• 802.1X for Switches Overview on page 354

server-timeout (Captive Portal)

Syntax	<code>server-timeout <i>seconds</i>;</code>
Hierarchy Level	<code>[edit services captive-portal interface (all <i>interface-names</i>)]]</code>
Release Information	Statement introduced in Junos OS Release 10.1 for EX Series switches.
Description	Configure the time in seconds an interface will wait for a reply when relaying a response from the client to the authentication server before timing out and invoking the server-fail action.
Options	<p><i>seconds</i>—Number of seconds.</p> <p>Range: 1–65535</p> <p>Default: 20</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"> • Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527 • Configuring Captive Portal Authentication (CLI Procedure) on page 532

servers

Syntax	<pre>servers server-address { port port-number; }</pre>
Hierarchy Level	[edit system services service-deployment]
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 IPv4 address for the Session and Resource Control (SRC) server.
Options	<p>server-address—The TCP port number.</p> <p>Default: 3333</p> <p>The remaining statements are explained separately.</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">• Configuring the Junos OS to Work with SRC Software on page 265

service (Service Accounting)

Syntax	<pre> service { accounting-order (activation-protocol local radius); accounting { statistics (time volume-time); update-interval <i>minutes</i>; } } </pre>
Hierarchy Level	[edit access profile <i>profile-name</i>]
Release Information	<p>Statement introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.</p> <p>accounting, update-interval, and statistics options added in Junos OS Release 14.2R1 for MX Series routers.</p>
Description	<p>Define the subscriber service accounting configuration.</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>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"> • <i>Configuring Service Accounting with JSRC</i> • <i>Service Accounting with JSRC</i> • <i>Configuring Service Accounting in Local Flat Files</i> • <i>Configuring Service Accounting</i> • <i>Configuring Per-Subscriber Session Accounting</i>

service-deployment

Syntax	<pre>service-deployment { servers server-address { port port-number; } source-address source-address; }</pre>
Hierarchy Level	[edit system services]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Enable Junos OS to work with the Session and Resource Control (SRC) software. The remaining statements are explained separately.
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 the Junos OS to Work with SRC Software on page 265

service-profile (DHCP Local Server)

Syntax	<code>service-profile <i>dynamic-profile-name</i>;</code>
Hierarchy Level	<pre>[edit system services dhcp-local-server], [edit system services dhcp-local-server dual-stack-group <i>dual-stack-group-name</i>], [edit system services dhcp-local-server dhcpv6], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i>], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> interface <i>interface-name</i>], [edit system services dhcp-local-server group <i>group-name</i>], [edit system services dhcp-local-server group <i>group-name</i> interface <i>interface-name</i>], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server ...], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server ...], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server ...]</pre>
Release Information	<p>Statement introduced in Junos OS Release 11.2.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Specify the default subscriber service or DHCP client management service, which is activated when the subscriber or client logs in and no other service is activated by a RADIUS server or a provisioning server.</p> <ul style="list-style-type: none"> To specify the default service for all DHCP local server clients, include the service-profile statement at the [edit system services dhcp-local-server] hierarchy level. To specify the default service for a named group of interfaces, include the service-profile statement at the [edit system services dhcp-local-server group <i>group-name</i>] hierarchy level. To specify the default service for a particular interface within a named group of interfaces, include the service-profile statement at the [edit system services dhcp-local-server group <i>group-name</i> interface <i>interface-name</i>] hierarchy level. For DHCPv6 clients, use the service-profile statement at the [edit system services dhcp-local-server dhcpv6] hierarchy level.
Options	<i>dynamic-profile-name</i> —Name of the dynamic profile that defines the service.
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"> Extended DHCP Local Server Overview on page 611 Default Subscriber Service Overview Configuring a Default Subscriber Service

service-profile (DHCP Relay Agent)

Syntax	<code>service-profile <i>dynamic-profile-name</i>;</code>
Hierarchy Level	<pre>[edit forwarding-options dhcp-relay], [edit forwarding-options dhcp-relay dhcpv6], [edit forwarding-options dhcp-relay dual-stack-group <i>dual-stack-group-name</i>], [edit forwarding-options dhcp-relay group <i>group-name</i>], [edit forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i>], [edit forwarding-options dhcp-relay dhcpv6 groupgroup-name], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> interface <i>interface-name</i>], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay ...], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ...]</pre>
Release Information	<p>Statement introduced in Junos OS Release 11.2.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Support at the <code>[edit ... dhcpv6 ...]</code> hierarchy levels introduced in Junos OS Release 11.4.</p> <p>Support at the <code>[edit ... dual-stack-group <i>dual-stack-group-name</i>]</code> hierarchy level introduced in Junos OS Release 15.1.</p>
Description	<p>Specify the default subscriber service (or the default DHCP client management service), which is activated when the subscriber (or client) logs in and no other service is activated by a RADIUS server or a provisioning server.</p> <ul style="list-style-type: none"> To specify the default service for all DHCP relay agent clients, include the service-profile statement at the <code>[edit forwarding-options dhcp relay]</code> hierarchy level. To specify the default service for a named group of interfaces, include the service-profile statement at the <code>[edit forwarding-options dhcp relay group <i>group-name</i>]</code> hierarchy level. To specify the default service for a particular interface within a named group of interfaces, include the service-profile statement at the <code>[edit forwarding-options dhcp relay group <i>group-name</i> interface <i>interface-name</i>]</code> hierarchy level.
Options	<i>dynamic-profile-name</i> —Name of the dynamic service profile.
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"> dhcp-relay on page 1294 Attaching Dynamic Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces on page 681 Grouping Interfaces with Common DHCP Configurations on page 704 Default Subscriber Service Overview

- *Configuring a Default Subscriber Service*

services (System Services)

```
Syntax  services {
    dhcp { # DHCP is not supported on a DCF
        dhcp_services;
    }
    dtcp-only
    flow-tap-dtcp {
        ssh {
            connection-limit limit;
            rate-limit limit;
        }
    }
    extension-service {
        request-response {
            grpc {
                ssl {
                    address ip-address;
                    local-certificate local-certificate;
                    port port;
                }
            }
            max-connections max-connections;
        }
    }
    notification {
        port port;
        max-connections max-connections;
        allow-clients {
            address ip-address;
        }
    }
    traceoptions {
        file <filename> <files number> <match regex> <size size> <world-readable |
            no-world-readable>;
        flag flag;
        no-remote-trace;
    }
}

finger {
    connection-limit limit;
    rate-limit limit;
}

ftp {
    authentication-order [authentication-methods];
    connection-limit limit;
    rate-limit limit;
}

service-deployment {
    servers address {
        port-number port-number;
    }
    source-address address;
}
```

```

ssh {
  authentication-order [authentication-methods];
  ciphers [ cipher-1 cipher-2 cipher-3 ...];
  client-alive-count-max seconds;
  client-alive-interval seconds;
  connection-limit limit;
  fingerprint-hash (md5 | sha2-256);
  hostkey-algorithm (algorithm | no-algorithm);
  key-exchange [algorithm];
  macs [algorithm];
  max-sessions-per-connection <number>;
  no-passwords;
  no-public-keys;
  no-tcp-forwarding;
  protocol-version [v1 v2];
  rate-limit limit;
  root-login (allow | deny | deny-password);
}
resource-monitor {
  free-fw-memory-watermark number;
  free-heap-memory-watermark number;
  free-nh-memory-watermark 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;
}
}
subscriber-management {

```

```

enable;
enforce-strict-scale-limit-license;
gres-route-flush-delay;
}
overrides {
  interfaces {
    family (inet | inet6) {
      layer2-liveness-detection;
    }
  }
  no-unsolicited-ra;
  ra-initial-interval-max seconds;
  ra-initial-interval-min seconds;
  shmlog {
    disable;
    file filename <files maximum-no-files> <size maximum-file-size>;
    filtering enable;
    log-name {
      all;
      logname {
        <brief | detail | extensive | none | terse>;
        <file-logging | no-file-logging>;
      }
    }
    log-type (debug | info | notice);
  }
}
traceoptions {
  file filename <files number> <match regular-expression> <size maximum-file-size>
    <world-readable | no-world-readable>;
  flag flag;
}
}
telnet {
  authentication-order [authentication-methods];
  connection-limit limit;
  rate-limit limit;
}
web-management {
  http {
    interfaces [ names ];
    port port;
  }
  https {
    interfaces [ names ];
    local-certificate name;
    port port;
  }
  session {
    idle-timeout [ minutes ];
    session-limit [ limit ];
  }
}
xnm-ssl {
  connection-limit limit;
}

```



```

    local-certificate name;
    rate-limit limit;
    ssl-renegotiation;
  }
}

```

Hierarchy Level [edit system]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.
extension-service option added in Junos OS Release 16.1 for MX80, MX104, MX240, MX480, MX960, MX2010, MX2020, vMX Series.
grpc option added in Junos OS Release 16.2 for MX80, MX104, MX240, MX480, MX960, MX2010, MX2020, vMX Series.

Description Configure the router or switch so that users on remote systems can access the local router or switch through the DHCP server, DTCP over SSH, finger, rlogin, SSH, telnet, Web management, Junos XML protocol SSL, and network utilities, or enable Junos OS to work with the Session and Resource Control (SRC) software. Also, enable configuration of third-party applications developed using the Juniper Extension Toolkit (JET) to run on Junos OS.

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 the Junos OS to Work with SRC Software on page 265](#)
- [Understanding JET Interaction with Junos OS](#)

services (Switches)

Syntax	<pre>services { service-deployment { servers <i>address</i> { port-number <i>port-number</i>; } source-address <i>address</i>; } ssh { connection-limit <i>limit</i>; protocol-version [v1 v2]; rate-limit <i>limit</i>; root-login (allow deny deny-password); } }</pre>
Hierarchy Level	[edit system]
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	<p>Configure the switch so that users on remote systems can access the local switch through SSH.</p> <p>The remaining statements are explained separately.</p>
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

services (System Services)

```
Syntax  services {
    dhcp { # DHCP is not supported on a DCF
        dhcp_services;
    }
    dtcp-only
    flow-tap-dtcp {
        ssh {
            connection-limit limit;
            rate-limit limit;
        }
    }
    extension-service {
        request-response {
            grpc {
                ssl {
                    address ip-address;
                    local-certificate local-certificate;
                    port port;
                }
            }
            max-connections max-connections;
        }
    }
    notification {
        port port;
        max-connections max-connections;
        allow-clients {
            address ip-address;
        }
    }
    traceoptions {
        file <filename> <files number> <match regex> <size size> <world-readable |
            no-world-readable>;
        flag flag;
        no-remote-trace;
    }
}

finger {
    connection-limit limit;
    rate-limit limit;
}

ftp {
    authentication-order [authentication-methods];
    connection-limit limit;
    rate-limit limit;
}

service-deployment {
    servers address {
        port-number port-number;
    }
    source-address address;
}
```

```

ssh {
  authentication-order [authentication-methods];
  ciphers [ cipher-1 cipher-2 cipher-3 ...];
  client-alive-count-max seconds;
  client-alive-interval seconds;
  connection-limit limit;
  fingerprint-hash (md5 | sha2-256);
  hostkey-algorithm (algorithm | no-algorithm);
  key-exchange [algorithm];
  macs [algorithm];
  max-sessions-per-connection <number>;
  no-passwords;
  no-public-keys;
  no-tcp-forwarding;
  protocol-version [v1 v2];
  rate-limit limit;
  root-login (allow | deny | deny-password);
}
resource-monitor {
  free-fw-memory-watermark number;
  free-heap-memory-watermark number;
  free-nh-memory-watermark 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;
}
}
subscriber-management {

```

```

enable;
enforce-strict-scale-limit-license;
gres-route-flush-delay;
}
overrides {
  interfaces {
    family (inet | inet6) {
      layer2-liveness-detection;
    }
  }
  no-unsolicited-ra;
  ra-initial-interval-max seconds;
  ra-initial-interval-min seconds;
  shmlog {
    disable;
    file filename <files maximum-no-files> <size maximum-file-size>;
    filtering enable;
    log-name {
      all;
      logname {
        <brief | detail | extensive | none | terse>;
        <file-logging | no-file-logging>;
      }
    }
    log-type (debug | info | notice);
  }
}
traceoptions {
  file filename <files number> <match regular-expression> <size maximum-file-size>
    <world-readable | no-world-readable>;
  flag flag;
}
}
telnet {
  authentication-order [authentication-methods];
  connection-limit limit;
  rate-limit limit;
}
web-management {
  http {
    interfaces [ names ];
    port port;
  }
  https {
    interfaces [ names ];
    local-certificate name;
    port port;
  }
  session {
    idle-timeout [ minutes ];
    session-limit [ limit ];
  }
}
xnm-ssl {
  connection-limit limit;
}

```

```
local-certificate name;  
rate-limit limit;  
ssl-renegotiation;  
}  
}
```

Hierarchy Level [edit system]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.
extension-service option added in Junos OS Release 16.1 for MX80, MX104, MX240, MX480, MX960, MX2010, MX2020, vMX Series.
grpc option added in Junos OS Release 16.2 for MX80, MX104, MX240, MX480, MX960, MX2010, MX2020, vMX Series.

Description Configure the router or switch so that users on remote systems can access the local router or switch through the DHCP server, DTCP over SSH, finger, rlogin, SSH, telnet, Web management, Junos XML protocol SSL, and network utilities, or enable Junos OS to work with the Session and Resource Control (SRC) software. Also, enable configuration of third-party applications developed using the Juniper Extension Toolkit (JET) to run on Junos OS.

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 the Junos OS to Work with SRC Software on page 265](#)
- [Understanding JET Interaction with Junos OS](#)


session (Time-out)

Syntax	<pre>session { idle-timeout <i>minutes</i>; session-limit <i>session-limit</i>; }</pre>
Hierarchy Level	[edit system services web-management]
Release Information	<p>Statement introduced in Junos OS Release 8.3.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Configure limits for the number of minutes a session can be idle before it times out, and configure the number of simultaneous J-Web user login sessions.
Options	<p>idle-timeout <i>minutes</i>—Configure the number of minutes a session can be idle before it times out.</p> <p>Range: 1 through 1440</p> <p>Default: 1440</p> <p>session-limit <i>session-limit</i>—Configure the maximum number of simultaneous J-Web user login sessions.</p> <p>Range: 1 through 1024</p> <p>Default: Unlimited</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>J-Web Interface User Guide</i>

session (Time-out)

Syntax	<pre>session { idle-timeout <i>minutes</i>; session-limit <i>session-limit</i>; }</pre>
Hierarchy Level	[edit system services web-management]
Release Information	Statement introduced in Junos OS Release 8.3. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure limits for the number of minutes a session can be idle before it times out, and configure the number of simultaneous J-Web user login sessions.
Options	<p>idle-timeout <i>minutes</i>—Configure the number of minutes a session can be idle before it times out.</p> <p>Range: 1 through 1440</p> <p>Default: 1440</p> <p>session-limit <i>session-limit</i>—Configure the maximum number of simultaneous J-Web user login sessions.</p> <p>Range: 1 through 1024</p> <p>Default: Unlimited</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>J-Web Interface User Guide</i>

session-expiry

Syntax	<code>session-expiry <i>seconds</i>;</code>
Hierarchy Level	<code>[edit services captive-portal interface (all <i>interface-names</i>)]]</code>
Release Information	Statement introduced in Junos OS Release 10.1 for EX Series switches.
Description	<p>The session-expiry statement is used to locally configure the number of seconds before the captive portal authentication session times out and the client must reattempt authentication.</p> <p>.....</p> <div>  <p>NOTE: If the authentication server sends an authentication session timeout to the client, this takes priority over the value configured locally using the session-expiry statement. The session timeout value is sent from the server to the client as an attribute of the RADIUS Access-Accept message.</p> <p>.....</p> </div>
Options	<p>seconds—Duration of session.</p> <p>Range: 1 through 65535</p> <p>Default: 3600</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"> • Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527 • Configuring Captive Portal Authentication (CLI Procedure) on page 532 • Understanding Authentication Session Timeout on page 516

session-mode

Syntax	<code>session-mode (automatic multihop singlehop);</code>
Hierarchy Level	<code>[edit system services dhcp-local-server liveness-detection method bfd],</code> <code>[edit system services dhcp-local-server dhcpv6 liveness-detection method bfd],</code> <code>[edit forwarding-options dhcp-relay liveness-detection], [edit forwarding-options dhcp-relay</code> <code> dhcpv6 liveness-detection method bfd],</code> <code>[edit system services dhcp-local-server group <i>group-name</i> liveness-detection method bfd],</code> <code>[edit system services dhcp-local-server dhcpv6 group <i>group-name</i> liveness-detection method</code> <code> bfd],</code> <code>[edit forwarding-options dhcp-relay group <i>group-name</i> liveness-detection method bfd],</code> <code>[edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> liveness-detection method</code> <code> bfd]</code>
Release Information	<p>Statement introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Configure the session mode.
Options	<p>Default: automatic</p> <p>automatic—Configure single-hop BFD sessions if the peer is directly connected to the router interface and multihop BFD sessions if the peer is not directly connected to the router interface.</p> <p>multihop—Configure multihop BFD sessions and passive DHCP clients.</p> <p>single-hop—Configure single hop BFD sessions and non-passive DHCP clients.</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"> • <i>Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients</i> • Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714

single-connection

Syntax	<code>single-connection;</code>
Hierarchy Level	<code>[edit system accounting destination tacplus server <i>server-address</i>]</code> <code>[edit system tacplus-server <i>server-address</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	Optimize attempts to connect to a TACACS+ server. The software maintains one open TCP connection to the server for multiple requests rather than opening a connection for each connection attempt.
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 TACACS+ Authentication on page 229 • Configuring TACACS+ System Accounting on page 242

single-connection

Syntax	<code>single-connection;</code>
Hierarchy Level	<code>[edit system accounting destination tacplus server <i>server-address</i>]</code> <code>[edit system tacplus-server <i>server-address</i>]</code>
Release Information	Statement introduced in Junos OS Release 8.5.
Description	Optimize the attempt to connect to a TACACS+ server. Junos OS maintains one open TCP connection to the server for multiple requests rather than opening a connection for each connection attempt.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

sip-server

Syntax	<code>sip-server [<i>address</i> <i>name</i>];</code>
Hierarchy Level	<code>[edit system services dhcp],</code> <code>[edit system services dhcp],</code> <code>[edit system services dhcp pool],</code> <code>[edit system services dhcp static-binding]</code>
Release Information	Statement introduced in Junos OS Release 10.1 for EX Series switches.
Description	Configure Session Initiation Protocol (SIP) server addresses or names for DHCP servers.
Options	<p><i>address</i>—IPv4 address of the SIP server. To configure multiple SIP servers, include multiple <i>address</i> options. This address must be accessible by all clients served within a specified range of addresses (based on an address pool or static binding).</p> <p><i>name</i>—Fully qualified domain name of the SIP server. To configure multiple SIP servers, include multiple <i>name</i> options. This domain name must be accessible by all clients served within a specified range of addresses (based on an address pool or static binding).</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">• Configuring a DHCP SIP Server (CLI Procedure) on page 678• Configuring a DHCP Server on Switches (CLI Procedure) on page 671

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"> • <i>Configuring the Maximum Size of the File</i>

snmp

List of Syntax Syntax: MX, M, T, ACX, PTX Series Routers and EX Series Switches on page 1770
 Syntax: QFX Series Switches, QFabric, OCX1100 and EX4600 on page 1770

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

- *Configuring SNMP on a Device Running Junos OS*
- *Understanding SNMP Implementation in Junos OS*
- *Configuring SNMP*

source-address (NTP, RADIUS, System Logging, or TACACS+)

Syntax `source-address source-address <routing-instance routing-instance-name>;`

Hierarchy Level [edit system accounting destination radius server server-address],
[edit system accounting destination tacplus server server-address],
[edit system ntp],
[edit system radius-server server-address],
[edit system syslog],
[edit system tacplus-server server-address]

Release Information Statement introduced before Junos OS Release 7.4.

Description Specify a source address for each configured TACACS+ server, RADIUS server, or NTP server, or the source address to record in system log messages that are directed to a remote machine.

Options *source-address*—A valid IP address configured on one of the SRX Series devices. For system logging, the address is recorded as the message source in messages sent to the remote machines specified in all **host hostname** statements at the [edit system syslog] hierarchy level, but not for messages directed to the other Routing Engine.

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


Related Documentation

- [ntp on page 1573](#)

source-address

Syntax	<code>source-address <i>source-address</i>;</code>
Hierarchy Level	<code>[edit access <i>radius-server</i> <i>server-address</i>];</code> <code>[edit access profile <i>profile-name</i> <i>radius-server</i> <i>server-address</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Support for IPv6 source-address introduced in Junos OS Release 16.1.
Description	Configure a source address for each configured RADIUS server. Each RADIUS request sent to a RADIUS server uses the specified source address.
Options	source-address —Valid IPv4 or IPv6 address configured on one of the router or switch interfaces. On M Series routers only, the source address can be an IPv6 address and the UDP source port is 514.
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"> • <i>Configuring Router or Switch Interaction with RADIUS Servers</i> • <i>Configuring Authentication and Accounting Parameters for Subscriber Access</i> • <i>Example: Configuring CHAP Authentication with RADIUS</i> • <i>Configuring RADIUS Authentication for L2TP</i>

source-address (NTP, RADIUS, System Logging, or TACACS+)

Syntax	<code>source-address <i>source-address</i> routing-instance <<i>routing-instance-name</i>>;</code>
Hierarchy Level	<code>[edit system accounting destination radius <i>server</i> <i>server-address</i>],</code> <code>[edit system accounting destination tacplus <i>server</i> <i>server-address</i>],</code> <code>[edit system ntp],</code> <code>[edit system <i>radius-server</i> <i>server-address</i>],</code> <code>[edit system syslog],</code> <code>[edit system <i>tacplus-server</i> <i>server-address</i>]</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>routing-instance option added in Junos OS Release 14.1</p>
Description	Specify a source address for each configured IPv4 or IPv6 TACACS+ server, RADIUS server, NTP server, or the source address to record in system log messages that are directed to a remote machine.
Options	<p>source-address—A valid IP address configured on one of the router or switch interfaces. For system logging, the address is recorded as the message source in messages sent to the remote machines specified in all host <i>hostname</i> statements at the [edit system syslog] hierarchy level, but not for messages directed to the other Routing Engine or to the TX Matrix router or TX Matrix Plus router in a routing matrix based on a TX Matrix router or TX Matrix Plus router.</p> <p>routing-instance <i>routing-instance-name</i>—(Optional) The routing instance name in which the source address is defined. (Not supported on EX series platforms)</p>
<div>  <p>NOTE: On MX Series platforms, this option is supported only under [edit system ntp] hierarchy level.</p> </div>	
Default: The primary address of the interface	
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"> • Configuring RADIUS Server Authentication on page 203 • Synchronizing and Coordinating Time Distribution Using NTP • Specifying an Alternative Source Address for System Log Messages

source-address (SRC Software)

Syntax	<code>source-address <i>source-address</i>;</code>
Hierarchy Level	[edit system services service-deployment]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Enable Junos OS to work with the Session and Resource Control (SRC) software.
Options	<i>source-address</i> — Local IPv4 address to be used as source address for traffic to the SRC server. The source address restricts traffic within the out-of-band network.
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 the Junos OS to Work with SRC Software on page 265

source-address-giaddr

Syntax	source-address-giaddr;
Hierarchy Level	[edit forwarding-options helpers bootp], [edit forwarding-options helpers bootp interface <i>interface-name</i>]
Release Information	Statement introduced in Junos OS Release 10.1 for EX Series switches.
Description	<p>Configure the gateway IP address (giaddr) as the source IP address of the switch for relayed DHCP packets when the switch is used as the DHCP relay agent.</p> <p>When this statement is entered in the [edit forwarding-options helpers bootp] hierarchy, the gateway IP address is configured as the source IP address of the switch for relayed DHCP packets exiting all interfaces on the switch.</p> <p>When this statement is entered in the [edit forwarding-options helpers bootp interface <i>interface-name</i>] hierarchy, the gateway IP address is configured as the source IP address of the switch for relayed DHCP packets exiting the specified interface of the switch.</p> <p>In Junos OS Release 10.1 for EX Series switches and later releases, the IP address of the interface that the DHCP packet exits on the switch acting as a DHCP relay agent is used as the source IP address for relayed DHCP packets by default.</p> <p>In Junos OS Releases 9.6 and 10.0 for EX Series switches, the gateway IP address of the switch is always used as the source IP address for relayed DHCP packets when the switch is used as the DHCP relay agent.</p> <p>In Junos OS Releases 9.3 through 9.5 for EX Series switches, the IP address of the interface that the DHCP packet exits on the switch acting as a DHCP relay agent is always used as the source IP address for relayed DHCP packets.</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">• DHCP/BOOTP Relay for Switches Overview on page 608

source-classes

Syntax	<pre>source-classes { source-class-name; }</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

source-ip-change (Forwarding Options)

Syntax	<pre>source-ip-change;</pre>
Hierarchy Level	[edit forwarding-options dhcp-relay]
Release Information	Statement changed from vpn to source-ip-change in Junos OS Release 15.1X49-D130 and later releases.
Description	For Dynamic Host Configuration Protocol (DHCP) client request forwarding, enable source IP change for the device to use address of egress interface as source IP address.
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"> • DHCP Server, Client, and Relay Agent Overview on page 742

source-port (Port Addresses)

Syntax	<code>source-port upper-limit <upper-limit>;</code>
Hierarchy Level	[edit system internet-options]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 11.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Configure the range of port addresses.
Options	<code>upper-limit upper-limit</code> —(Optional) The range of port addresses and can be a value from 5000 through 65,355.
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 Junos OS to Extend the Default Port Address Range</i>

ssh

Syntax	<pre>ssh { authentication-order [method 1 method2...]; ciphers [cipher-1 cipher-2 cipher-3 ...]; client-alive-count-max seconds; client-alive-interval seconds; connection-limit limit; fingerprint-hash (md5 sha2-256); hostkey-algorithm (algorithm no-algorithm); key-exchange [algorithm1 algorithm2...]; log-key-changes log-key-changes; macs [algorithm1 algorithm2...]; max-sessions-per-connection <number>; no-passwords; no-public-keys; no-tcp-forwarding; protocol-version [v2]; rate-limit limit; root-login (allow deny deny-password); } tcp-forwarding (JDM)</pre>
Hierarchy Level	[edit system services]
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>client-alive-interval and client-alive-max-count statements introduced in Junos OS Release 12.2.</p> <p>no-passwords statement introduced in Junos OS Release 13.3.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p> <p>no-public-keys statement introduced in Junos OS release 15.1.</p> <p>tcp-forwarding statement introduced in Junos OS Release 15.1X53-D50 for the NFX250 Network Services Platform.</p> <p>fingerprint-hash statement introduced in Junos OS Release 16.1.</p> <p>log-key-changes statement introduced in Junos OS Release 17.4R1.</p>
Description	<p>Allow SSH requests from remote systems to access the local router or switch.</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>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"> Configuring SSH Service for Remote Access to the Router or Switch on page 253

ssh

List of Syntax [Syntax on page 1782](#)
[Syntax \(EX Series Switch and the QFX Series\) on page 1782](#)

Syntax

```
ssh host
<bypass-routing>
<inet | inet6>
<interface interface-name>
<logical-system logical-system-name>
<routing-instance routing-instance-name>
<source address>
<v2>
<port port-number>
```

Syntax (EX Series Switch and the QFX Series)

```
ssh host
<bypass-routing>
<inet | inet6>
<interface interface-name>
<routing-instance routing-instance-name>
<source address>
<v2>
<port port-number>
```

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 Use the SSH program to open a connection between a local router or switch and a remote system and execute commands on the remote system. You can issue the **ssh** command from the Junos OS CLI to log in to a remote system or from a remote system to log in to the local router or switch. When executing this command, you include one or more CLI commands by enclosing them in quotation marks and separating the commands with semicolons:

```
ssh address 'cli-command1 ; cli-command2 '
```

Options **host**—Name or address of the remote system.

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.

inet | inet6—(Optional) Create an IPv4 or IPv6 connection, respectively.

interface *interface-name*—(Optional) Interface name for the SSH session. (This option does not work when *default-address-selection* is configured at the **[edit system]** hierarchy level, because this configuration uses the loopback interface as the source address for all locally generated IP packets.)

logical-system *logical-system-name*—(Optional) Name of a particular logical system for the SSH attempt.

routing-instance *routing-instance-name*—(Optional) Name of the routing instance for the SSH attempt.

source *address*—(Optional) Source address of the SSH connection.

v2—(Optional) Use SSH version 2 when connecting to a remote host.

port *port-number*—(Optional) Specify a port number for the SSH connection.

Additional Information To configure an SSH (version 2) key for your user account, include the **authentication dsa-rsa** statement at the **[edit system login user *user-name*]** hierarchy level.

You can limit the number of times a user can attempt to enter a password while logging in through SSH. To specify the number of times a user can attempt to enter a password to log in through SSH, include the **retry-options** statement at the **[edit system login]** hierarchy level.

Required Privilege Level network

Related Documentation • [Configuring SSH Host Keys for Secure Copying of Data on page 251](#)

List of Sample Output [ssh on page 1783](#)

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

ssh

```
user@switch> ssh user

Host key not found from the list of known hosts.
Are you sure you want to continue connecting (yes/no)? yes

Host 'user' added to the list of known hosts.
user@device's password:
Last login: Sun Jun 21 10:43:42 1998 from junos-router
% ...
```

ssh-known-hosts

Syntax	<pre>ssh-known-hosts { host <i>host-name</i> { fetch-from-server <i>host-name</i>; load-key-file <i>file-name</i>; } }</pre>
Hierarchy Level	[edit security ssh-known-hosts]
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 SSH support for known hosts and for administering SSH host key updates.
Options	<p>host <i>host-name</i>—Hostname of the SSH known host entry. This option has the following suboptions:</p> <ul style="list-style-type: none">• fetch-from-server <i>host-name</i>—Retrieve SSH public host key information from a specified server.• load-key-file <i>filename</i>—Import SSH host key information from the <code>/var/tmp/ssh-known-hosts</code> file.
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">• Understanding Security Features on the QFabric System• Configuring SSH Host Keys for Secure Copying of Data on page 251

ssh-known-hosts

Syntax

```
ssh-known-hosts {
  fetch-from-server server-name;
  host hostname {
    dsa-key dsa-key;
    ecdsa-sha2-nistp256-key ecdsa-sha2-nistp256-key;
    ecdsa-sha2-nistp384-key ecdsa-sha2-nistp384-key;
    ecdsa-sha2-nistp521-key ecdsa-sha2-nistp521-key;
    ed25519-key ed25519-key;
    rsa-key rsa-key;
    rsa1-key rsa1-key;
  }
  load-key-file key-file;
}
```

Hierarchy Level [edit security]

Release Information Statement modified in Junos OS Release 8.5.

Description Configure SSH support for known hosts and for administering SSH host key updates.

- Options**
- **fetch-from-server *server-name***—Retrieve SSH public host key information from a specified server.
 - **load-key-file *key-file***—Import SSH host-key information from the specified `/var/tmp/ssh-known-hosts` file.

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

ssh-dsa

Syntax	<code>ssh-dsa "<i>public-key</i>";</code>
Hierarchy Level	<code>[edit system root-authentication]</code> <code>[edit system login user authentication]</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 DSA (SSH version 2) public key. You can specify one or more public keys.
Options	<code>ssh-dsa "<i>public-key</i>"</code> —SSH version 2 authentication.
Required Privilege Level	<code>admin</code> —To view this statement in the configuration. <code>admin-control</code> —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Root Password on page 160• <i>authentication</i>• root-authentication on page 1714

ssh-rsa

Syntax	<code>ssh-dsa "public-key";</code>
Hierarchy Level	[edit system root-authentication] [edit system login user authentication]
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 RSA (SSH version 2) public key. You can specify one or more public keys.
Options	<code>ssh-rsa "public-key"</code> —SSH version 2 authentication. Specify the RSA (SSH version 2) public key. You can specify one or more public keys.
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 the Root Password on page 162 • <i>authentication</i> • root-authentication on page 1714

ssl-renegotiation

Syntax	<code>ssl-renegotiation;</code>
Hierarchy Level	[edit system services xnm-ssl]
Release Information	Statement introduced in Junos Os Release 13.3.
Description	Enable or disable SSL re-negotiation for xnm-ssl service.
Default	SSL re-negotiation for xnm-ssl service is disabled by default.
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 clear-text or SSL Service for Junos XML Protocol Client Applications on page 263

start-time

Syntax	<code>start-time <i>time</i>;</code>
Hierarchy Level	<code>[edit accounting-options file <i>filename</i>]</code>
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">• <i>Configuring the Start Time for File Transfer</i>

start-time (Authentication Key Transmission)

Syntax	<code>start-time (now yyyy-mm-dd.hh:mm:ss);</code>
Hierarchy Level	<code>[edit security authentication-key-chains key-chain <i>key-chain-name</i> key <i>key</i>]</code>
Release Information	<p>Statement introduced in Junos OS Release 7.6.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the BFD protocol introduced in Junos OS Release 9.6.</p> <p>Support for the BFD protocol introduced in Junos OS Release 9.6 for EX Series switches.</p> <p>Support for IS-IS introduced in Junos OS Release 11.2.</p> <p>Statement introduced in Junos OS Release 11.3 for QFX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
Description	<p>Specify a start time for key transmission. You do not need to specify an end time for the key. If a new key is present with a new start time, the keychain rolls over to the new one. The start time must be unique within the keychain.</p>
Options	<p>now—Start time as the current year, month, day, hour, minute, and second.</p> <p>daydays—Start time as the specified number of days after the current day. For example, if the current day is the 12th and you configure start-time 2day, the start time will be on the 14th, exactly two days after the configuration is entered.</p> <p>hourhours—Start time as the specified number of hours after the current hour. For example, if the current hour is 9:00 and you configure start-time 3hour, the start time will be in 12:00, exactly three hours after the configuration is entered.</p> <p>minuteminutes—Start time as the specified number of minutes after the current minute. For example, if the current minute is 27 minutes after the hour and you configure start-time 5min, the start time will be in 32 minutes after the hour, exactly five minutes after the configuration is entered.</p> <p>monthmonths—Start time as the specified number of months after the current month. For example, if the current month is March and you configure start-time 4month, the start time will be in July, exactly four months after the configuration is entered.</p> <p>secondseconds—Start time as the specified number of seconds after the current second. For example, if the current second is 10:20:40 and you configure start-time 10seconds, the start time will be 10:20:50, exactly 10 seconds after the configuration is entered.</p> <p>yearyears—Start time as the specified number of years after the current year. For example, if the current year is 2011 and you configure start-time 1year, the start time will be in 2012, exactly one year after the configuration is entered.</p> <p>yyyy-mm-dd.hh:mm:ss—Start time in UTC (Coordinated Universal Time). The start time must be unique within the keychain.</p>

Required Privilege Level	admin—To view this statement in the configuration.
	admin-control—To add this statement to the configuration.
Related Documentation	• Configuring Authentication Key Updates on page 284
	• <i>Example: Configuring BFD Authentication for Securing Static Routes</i>
	• <i>Example: Configuring BFD Authentication for Securing Static Routes</i>
	• <i>Example: Configuring Hitless Authentication Key Rollover for IS-IS</i>

static (Protocols 802.1X)

Syntax	<pre>static mac-address { interface interface-names; vlan-assignment (vlan-id vlan-name); }</pre>
Hierarchy Level	[edit protocols dot1x authenticator]
Release Information	<p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.</p>
Description	<p>Configure MAC addresses to exclude from 802.1X authentication. The static MAC list provides an authentication bypass mechanism for supplicants connecting to a port, permitting devices such as printers that are not 802.1X-enabled to be connected to the network on 802.1X-enabled ports.</p> <p>Using this 802.1X authentication-bypass mechanism, the supplicant connected to the MAC address is assumed to be successfully authenticated and the port is opened for it. No further authentication is done for the supplicant.</p> <p>You can optionally configure the VLAN that the supplicant is moved to or the interfaces on which the MAC address can gain access from.</p>
Options	<p>mac-address —The MAC address of the device for which 802.1X authentication should be bypassed and the device permitted access to the port.</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"> • show dot1x static-mac-address on page 2094 • Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch on page 509 • Configuring 802.1X Interface Settings (CLI Procedure) on page 357 • Configuring 802.1X Authentication (J-Web Procedure) on page 358 • Understanding Authentication on Switches on page 348

static (Protocols 802.1X)

Syntax	<pre>static mac-address { interface interface-names; vlan-assignment (vlan-id vlan-name); }</pre>
Hierarchy Level	[edit protocols dot1x authenticator]
Release Information	<p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.</p>
Description	<p>Configure MAC addresses to exclude from 802.1X authentication. The static MAC list provides an authentication bypass mechanism for supplicants connecting to a port, permitting devices such as printers that are not 802.1X-enabled to be connected to the network on 802.1X-enabled ports.</p> <p>Using this 802.1X authentication-bypass mechanism, the supplicant connected to the MAC address is assumed to be successfully authenticated and the port is opened for it. No further authentication is done for the supplicant.</p> <p>You can optionally configure the VLAN that the supplicant is moved to or the interfaces on which the MAC address can gain access from.</p>
Options	<p>mac-address —The MAC address of the device for which 802.1X authentication should be bypassed and the device permitted access to the port.</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"> • show dot1x static-mac-address on page 2094 • Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch on page 509 • Configuring 802.1X Interface Settings (CLI Procedure) on page 357 • Configuring 802.1X Authentication (J-Web Procedure) on page 358 • Understanding Authentication on Switches on page 348

static-binding

Syntax	<pre>static-binding <i>mac-address</i> { client-identifier (ascii <i>client-id</i> hexadecimal <i>client-id</i>); fixed-address { <i>address</i>; } host-name <i>client-hostname</i>; }</pre>
Hierarchy Level	<pre>[edit system services dhcp], [edit system services dhcp]</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>
Description	<p>For J Series Services routers and EX Series switches only. Set static bindings for DHCP clients. A static binding is a mapping between a fixed IP address and the client's MAC address or client identifier.</p>
Options	<p><i>mac-address</i>—The MAC address of the client. This is a hardware address that uniquely identifies a client on the network.</p> <p><i>fixed-address address</i>—Fixed IP address assigned to the client. Typically a client has one address assigned, but you can assign more.</p> <p><i>host-name client-hostname</i>—Hostname of the client requesting the DHCP server. The name can include the local domain name. Otherwise, the name is resolved based on the domain-name statement.</p> <p><i>client-identifier (ascii client-id hexadecimal client-id)</i>—Used by the DHCP server to index the database of address bindings. The client identifier is an ASCII string or hexadecimal number and can include a type-value pair as specified in RFC 1700, <i>Assigned Numbers</i>. Either a client identifier or the client's MAC address must be configured to uniquely identify the client on the network.</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	

static-subscribers

Syntax	<pre>static-subscribers { disable; }</pre>
Hierarchy Level	[edit system processes]
Release Information	Statement introduced in Junos OS Release 8.5.
Description	Associate subscribers with statically configured interfaces, and provide dynamic service activation for these subscribers.
Options	disable —Disable the static subscribers process.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

statistics (Access Profile)

Syntax	<pre>statistics (time volume-time);</pre>
Hierarchy Level	[edit access profile <i>profile-name</i> accounting]
Release Information	Statement introduced in Junos OS Release 9.1. Statement introduced in Junos OS Release 9.1 for EX Series switches. volume-time option added in Junos OS Release 9.4.
Description	Configure the router or switch to collect time statistics, or both volume and time statistics, for the sessions being managed by AAA.
Options	time —Collect uptime statistics only. volume-time —Collect both volume and uptime statistics.
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">• <i>Configuring Authentication and Accounting Parameters for Subscriber Access</i>

statistics-service

Syntax	<pre>statistics-service { command <i>binary-file-path</i>; disable; }</pre>
Hierarchy Level	[edit system processes]
Release Information	Statement introduced in Junos OS Release 8.5.
Description	Specify the Packet Forwarding Engine (PFE) statistics service management process.
Options	<ul style="list-style-type: none">• command <i>binary-file-path</i>—Path to the binary process.• disable—Disable the Packet Forwarding Engine (PFE) statistics service management process.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

strict (DHCP Local Server)

Syntax	strict;
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure]</p>
Release Information	<p>Statement introduced in Junos OS Release 10.4.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Specify whether the server denies a client to bind when the client does not indicate that it accepts reconfigure messages. This feature is available only for DHCPv6.
Default	Accept solicit messages from clients that do not support reconfiguration and permit them to bind.
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"> • Configuring Dynamic Client Reconfiguration of Extended Local Server Clients Overview on page 693 • Preventing Binding of Clients That Do Not Support Reconfigure Messages on page 630

sub-prefix-length

Syntax	<code>sub-prefix-length <i>sub-prefix-length</i>;</code>
Hierarchy Level	<pre>[edit interfaces interface-name unit logical-unit-number family family dhcpv6-client prefix-delegating] [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client prefix-delegating] [edit tenants <i>tenant-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client prefix-delegating]</pre>
Release Information	<p>Statement introduced in Junos OS Release 12.3X48-D30 and in Junos OS Release 15.1X49-D100.</p> <p>The logical-systems and tenants options are introduced in Junos OS Release 18.4R1.</p>
Description	Allows you to configure DHCPv6 client sub prefix length. The DHCPv6 client separates the delegated prefix according to sub-prefix lengths. If the delegated prefix is not enough for all interfaces, the client sends out a syslog message.
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"> • preferred-prefix-length on page 1629

subscriber-management-helper

Syntax	<pre>subscriber-management-helper { 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 subscriber management helper process.
Options	<ul style="list-style-type: none">• command <i>binary-file-path</i>—Path to the binary process.• disable—Disable the subscriber management helper 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.

supplicant

Syntax	supplicant (multiple single single-secure);
Hierarchy Level	[edit protocols dot1x authenticator interface (all [<i>interface-names</i>])], [edit services captive-portal interface (all <i>interface-names</i>)]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement added to the [edit services captive-portal interface] hierarchy in Junos OS Release 10.1 for EX Series switches Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	Configure the MAC-based method used to authenticate clients for 802.1X or captive portal authentication.
Default	single
Options	<p>single—Authenticates only the first client that connects to an authenticator port. All other clients connecting to the authenticator port after the first are permitted free access to the port without further authentication. If the first authenticated client logs out, all other supplicants are locked out until a client authenticates again.</p> <p>single-secure—Authenticates only one client to connect to an authenticator port. The host must be directly connected to the switch.</p> <p>multiple—Authenticates multiple clients individually on one authenticator port. You can configure the number of clients per port. If you also configure a maximum number of devices that can be connected to a port through port security settings, the lower of the configured values is used to determine the maximum number of clients allowed per port.</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"> • Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch on page 367 • Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527 • Understanding Authentication on Switches on page 348 • Configuring Captive Portal Authentication (CLI Procedure) on page 532

supplicant-timeout

Syntax	supplicant-timeout <i>seconds</i> ;
Hierarchy Level	[edit protocols dot1x authenticator interface (802.1X) (all [<i>interface-name</i>])
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	For 802.1X authentication, configure how long the port waits for a response when relaying a request from the authentication server to the supplicant before resending the request.
Default	30 seconds
Options	<i>seconds</i> —Number of seconds. Range: 1 through 60 seconds Default: 30 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">• supplicant on page 1799• Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch on page 367• Understanding Authentication on Switches on page 348

system

```
Syntax system {
  accounting {
    events [ login change-log interactive-commands ];
    destination {
      radius {
        {
          server server-address {
            accounting-port port-number;
            retry number;
            secret password;
            source-address address;
            timeout seconds;
          }
        }
      }
    }
    tacplus {
      server {
        server server-address {
          port port-number;
          secret password;
          single-connection;
          timeout seconds;
        }
      }
    }
  }
  archival {
    configuration {
      archive-sites {
        ftp://<username>:<password>@<host>:<port>/<url-path>;
        ftp://<username>:<password>@<host>:<port>/<url-path>;
      }
      transfer-interval interval;
      transfer-on-commit;
    }
  }
  arp {
    aging-timer minutes;
    interfaces;
  }
  authentication-order [ authentication-methods ];
  (compress-configuration-files | no-compress-configuration-files);
  default-address-selection;
  domain-name domain-name;
  domain-search [ domain-list ];
  host-name hostname;
  internet-options {
    icmpv4-rate-limit bucket-size bucket-size packet-rate packet-rate;
    source-port upper-limit <upper-limit>;
  }
}
```

```

location {
    altitude feet;
    building name;
    country-code code;
    floor number;
    hcoord horizontal-coordinate;
    lata service-area;
    latitude degrees;
    longitude degrees;
    npa-nxx number;
    postal-code postal-code;
    rack number;
    vcoord vertical-coordinate;
}
login {
    announcement text;
    class class-name {
        access-end;
        access-start;
        allow-configuration "regular-expression";
        allowed-days "regular-expression";
        deny-commands "regular-expression";
        deny-configuration "regular-expression";
        idle-timeout minutes;
        login-tip;
        permissions [ permissions ];
    }
    message text;
    password {
        change-type (set-transitions | character-set);
        format (md5 | sha1 | des);
        maximum-length length;
        minimum-changes number;
        minimum-length length;
    }
    retry-options {
        backoff-factor seconds;
        backoff-threshold number;
        minimum-time seconds;
        tries-before-disconnect number;
    }
    user username {
        authentication {
            (encrypted-password "password" | plain-text-password);
            load-key-file URL;
            remote-debug-permission (qfabric-admin | qfabric-operator | qfabric-user);
            ssh-rsa "public-key";
            ssh-dsa "public-key";
        }
        uid uid-value;
        class class-name;
        full-name complete-name;
    }
}
name-server {

```

```

    address;
}
no-multicast-echo;
no-redirects;
no-ping-record-route;
no-ping-time-stamp;
ntp {
    authentication-key number type type value password;
    server address <key key-number> <version value> <prefer>;
}
ports {
    auxiliary {
        disable;
        insecure;
        type terminal-type;
    }
    console {
        disable;
        insecure;
        log-out-on-disconnect;
        type terminal-type;
    }
}
radius-server server-address {
    accounting-port port-number;
    port number;
    retry number;
    secret password;
    source-address source-address;
    timeout seconds;
}
radius-options {
    password-protocol mschap-v2;
}
attributes {
    nas-ip-address ip-address;
}
root-authentication {
    (encrypted-password "password" | plain-text-password);
    ssh-rsa "public-key";
    ssh-dsa "public-key";
}
(saved-core-context | no-saved-core-context);
saved-core-files saved-core-files;
services {
    finger {
        connection-limit limit;
        rate-limit limit;
    }
    flow-tap-dtcp {
        ssh {
            connection-limit limit;
            rate-limit limit;
        }
    }
}

```

```
ftp {
    connection-limit limit;
    rate-limit limit;
}
service-deployment {
    servers server-address {
        port port-number;
    }
    source-address source-address;
}
ssh {
    root-login (allow | deny | deny-password);
    protocol-version [v1 v2];
    connection-limit limit;
    rate-limit limit;
}
telnet {
    connection-limit limit;
    rate-limit limit;
}
web-management {
    http {
        interfaces [ interface-names ];
        port port;
    }
    https {
        interfaces [ interface-names ];
        local-certificate name;
        port port;
    }
    session {
        idle-timeout [ minutes ];
        session-limit [ session-limit ];
    }
}
xnm-clear-text {
    connection-limit limit;
    rate-limit limit;
}
xnm-ssl {
    connection-limit limit;
    local-certificate name;
    rate-limit limit;
}
}
static-host-mapping {
    hostname {
        alias [ alias ];
        inet [ address ];
        sysid system-identifier;
    }
}
syslog {
    archive {
        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 {
    archive {
        files number;
        size maximum-file-size;
        start-time "YYYY-MM-DD.hh:mm";
        transfer-interval minutes;
        (world-readable | no-world-readable);
    }
    explicit-priority;
    facility severity;
    match "regular-expression";
    structured-data {
        brief;
    }
}
host (hostname | other-routing-engine | scc-master) {
    explicit-priority;
    facility-override facility;
    facility severity;
    log-prefix string;
    match "regular-expression";
}
source-address source-address;
time-format (millisecond | year | year millisecond);
user (username | *) {
    facility severity;
    match "regular-expression";
}
}
tacplus-options {
    service-name service-name;
    (no-cmd-attribute-value | exclude-cmd-attribute);
}
tacplus-server server-address {
    port
    secret password;
    single-connection;
    source-address source-address;
    timeout seconds;
}
time-zone (GMThour-offset | time-zone);
}
tracing {
    destination-override {
        syslog host;
    }
}
}

```

```
use-imported-time-zones;  
}
```

Hierarchy Level [edit]

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 system management properties.



NOTE: The `radius-server source-address` and `radius-options` statements are not available on the QFabric system.

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

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

- *System Management Configuration Statements*

system-generated-certificate

Syntax	system-generated-certificate;
Hierarchy Level	[edit system services web-management https]
Release Information	Command introduced in Junos OS Release 11.1 for EX Series switches.
Description	Configure the automatically generated self-signed certificate for enabling HTTPS services.
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">• Enabling HTTPS and XNM-SSL Services on Switches Using Self-Signed Certificates (CLI Procedure) on page 342

tacplus

Syntax	<pre> tacplus { server { server-address { port port-number; routing-instance (Accounting and Authentication) routing-instance; secret password; single-connection; timeout seconds; } } } </pre>
Hierarchy Level	[edit system accounting destination]
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>routing-instance option introduced in Junos OS Release 17.4R1.</p>
Description	Configure the Terminal Access Controller Access Control System Plus (TACACS++).
Options	<p>server-address—Address of the TACACS++ authentication server.</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"> Configuring TACACS+ System Accounting on page 242

tacplus

Syntax	<pre> tacplus { server <i>server-address</i> { port <i>port-number</i>; secret <i>password</i>; single-connection; source-address <i>source-address</i>; timeout <i>seconds</i>; } } </pre>
Hierarchy Level	[edit system accounting destination]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	Configure the TACACS+ accounting server.
Options	<ul style="list-style-type: none"> • <i>server-address</i>—Specify the address of the TACACS+ authentication server. • <i>port number</i>—Configure the port number on which to contact the TACACS+ server. • <i>single-connection</i>—Optimize attempts to connect to a TACACS+ server. The software maintains one open TCP connection to the server for multiple requests rather than opening a connection for each connection attempt. • <i>source-address address</i>—Configure a source address for each configured TACACS+ server. • <i>timeout seconds</i>—Configure the amount of time that the local device waits to receive a response from a TACACS+ server.
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"> • Example: Configuring a TACACS+ Server for System Authentication on page 233

tacplus-options


Syntax	<pre> tacplus-options { (exclude-cmd-attribute no-cmd-attribute-value); enhanced-accounting; strict-authorization service-name <i>service-name</i>; timestamp-and-timezone; } </pre>
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>no-cmd-attribute-value and exclude-cmd-attribute options introduced in Junos OS Release 9.3.</p> <p>Statement introduced in Junos OS Release 11.1 for QFX Series.</p> <p>timestamp-and-timezone option introduced in Junos OS Release 12.2.</p> <p>strict-authorization option introduced in Junos OS Release 13.3 for EX Series, M Series, MX Series, PTX Series, and T Series.</p> <p>enhanced-accounting option introduced in Junos OS Release 14.1.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p>
Description	Configure TACACS+ options for authentication and accounting.
Options	<p>enhanced-accounting—View the attribute values of a logged in user.</p> <p>exclude-cmd-attribute—Exclude the cmd attribute value completely from start and stop accounting records to enable logging of accounting records in the correct log file on a TACACS+ server.</p> <p>no-cmd-attribute-value—Set the cmd attribute value to an empty string in the TACACS+ accounting start and stop requests to enable logging of accounting records in the correct log file on a TACACS+ server.</p> <p>service-name <i>service-name</i>—Name of the authentication service used when you configure multiple TACACS+ servers to use the same authentication service.</p> <p>Default: junos-exec</p> <p>strict-authorization—Deny login if authorization request fails. When a user is logging in, Junos OS issues two TACACS+ requests—first the authentication request followed by the authorization request. By default, when the authorization request is rejected by the TACACS+ server, Junos OS ignores this and allows full access to the user. When the set system tacplus-options strict-authorization statement is set, Junos OS denies access to the user even on failure of the authorization request.</p>

timestamp-and-timezone—Include this statement if you want start time, stop time, and timezone attributes included in start/stop accounting records.

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">• Configuring the Same Authentication Service for Multiple TACACS+ Servers on page 232• Configuring TACACS+ Server Accounting on page 242• Junos OS Authentication Order for RADIUS, TACACS+, and Password Authentication on page 187• enhanced-accounting on page 1370
------------------------------	--

tacplus-server

Syntax	<pre>tacplus-server server-address { routing-instance (Accounting and Authentication) routing-instance; secret password; single-connection; source-address source-address; timeout seconds; }</pre>
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>routing-instance option introduced in Junos OS Release 17.4R1.</p>
Description	Configure the IPv4 or IPv6 TACACS++ server.
Options	<p>server-address—Address of the IPv4 or IPv6 TACACS++ authentication server.</p>
	<p> NOTE: Wildcard characters cannot be used in the TACACS+ server address or source address. This is because the TACACS+ server and source can accept both IPv4 and IPv6 addresses and, if you use wildcard characters for these addresses, Junos OS cannot validate mismatching server and source address families.</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"> Configuring TACACS+ Authentication on page 229

tacplus-server

Syntax `tacplus-server server-address {
 port port-number;
 secret password;
 single-connection;
 source-address source-address;
 timeoutseconds;
 }`

Hierarchy Level [edit system]

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 TACACS+ server.

Options • **server-address**—Address of the TACACS+ authentication server.



NOTE: Wildcard characters cannot be used in the TACACS server address or source address. This is because the TACACS server and source can accept both IPv4 and IPv6 addresses and, if you use wildcard characters for these addresses, Junos OS cannot validate mismatching server and source address families.

- **port**—Port number of TACACS+ authentication server.
- **secret**—Password to use with the RADIUS or TACACS+ server. The secret password used by the local router or switch must match that used by the server. Password to use; can include spaces included in quotation marks.
- **single-connection**—Optimize attempts to connect to a TACACS+ server. The software maintains one open TCP connection to the server for multiple requests rather than opening a connection for each connection attempt.
- **source-address**—Source address for each configured TACACS+ server, RADIUS server, NTP server, or the source address to record in system log messages that are directed to a remote machine. Configure a valid IP address on one of the device interfaces. For system logging, the address is recorded as the message source in messages sent to the remote machines specified in all **host *hostname*** statements at the **[edit system syslog]** hierarchy level.
- **timeout**—The amount of time that the local device waits to receive a response from a RADIUS or TACACS+ server. The timeout range is 1 through 90 seconds. The default is 3 seconds.

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

Related Documentation

- [Example: Configuring a TACACS+ Server for System Authentication on page 233](#)

targets

Syntax

```
targets {  
    address;  
}
```

Hierarchy Level [edit snmp trap-group *group-name*]

Release Information Statement introduced before Junos OS Release 7.4 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 14.1X53-D20 for OCX Series switches.
Statement introduced in Junos OS Release 11.1 for the QFX Series.

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 snmp—To view this statement in the configuration.
snmp-control—To add this statement to the configuration.

Related Documentation

- [Configuring SNMP Trap Groups](#)

[Configuring SNMP Trap Groups](#)

telnet

Syntax	<pre>telnet { authentication-order [authentication-methods]; connection-limit limit; rate-limit limit; }</pre>
Hierarchy Level	[edit system services]
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>Provide Telnet connections from remote systems to the local router or switch.</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"> • Configuring Telnet Service for Remote Access to a Router or Switch on page 248

telnet

List of Syntax [Syntax on page 1816](#)
 [Syntax \(EX Series Switches\) on page 1816](#)

Syntax `telnet host`
 `<8bit>`
 `<bypass-routing>`
 `<inet | inet6>`
 `<interface interface-name>`
 `<logical-system logical-system-name>`
 `<no-resolve>`
 `<port port-number>`
 `<routing-instance routing-instance-name>`
 `<source source-address>`

Syntax (EX Series Switches) `telnet host`
 `<8bit>`
 `<bypass-routing>`
 `<inet | inet6>`
 `<interface interface-name>`
 `<no-resolve>`
 `<port port-number>`
 `<routing-instance routing-instance-name>`
 `<source source-address>`

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 for EX Series switches.

Description Open a telnet session to a remote system. Type Ctrl+] to escape from the telnet session to the telnet command level, and then type **quit** to exit from telnet.

Options **host**—Name or address of the remote system.

8bit—(Optional) Use an 8-bit data path.

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.

inet | inet6—(Optional) Open an IPv4 or IPv6 session, respectively.

interface *interface-name*—(Optional) Interface name for the telnet session. (This option does not work when **default-address-selection** is configured at the **[edit system]** hierarchy level, because this configuration uses the loopback interface as the source address for all locally generated IP packets.)

logical-system *logical-system-name*—(Optional) Name of a particular logical system for the telnet attempt.

no-resolve—(Optional) Do not attempt to determine the hostname that corresponds to the IP address.

port *port-number*—(Optional) Port number or service name on the remote system.

routing-instance *routing-instance-name*—(Optional) Name of the routing instance for the telnet attempt.

source *source-address*—(Optional) Source address of the telnet connection.

Additional Information You can limit the number of times a user can attempt to enter a password while logging in through telnet. To specify the number of times a user can attempt to enter a password to log in through telnet, include the **retry-options** statement at the [edit system login] hierarchy level. For details, see the *Junos OS Administration Library*.

Required Privilege Level network

List of Sample Output [telnet on page 1817](#)

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output


telnet

```
user@host> telnet 192.154.1.254
Trying 192.154.169.254...
Connected to level5.company.net.
Escape character is '^]'.
ttypa
login:
```


tftp

Syntax	<pre>tftp { description <i>text-description</i>; interface <i>interface-name</i> { broadcast; description <i>text-description</i>; no-listen; server address <logical-system <i>logical-system-name</i>> <routing-instance <i>routing-instance-name</i>>; } server address <logical-system <i>logical-system-name</i>> <routing-instance <i>routing-instance-name</i>>; }</pre>
Hierarchy Level	[edit forwarding-options helpers]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Enable TFTP request packet forwarding. 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">• <i>Configuring DNS and TFTP Packet Forwarding</i>

threshold (detection-time)

Syntax	<code>threshold <i>milliseconds</i>;</code>
Hierarchy Level	<pre>[edit system services dhcp-local-server liveness-detection method bfd detection-time], [edit system services dhcp-local-server dhcpv6 liveness-detection method bfd detection-time], [edit forwarding-options dhcp-relay liveness-detection method bfd detection-time], [edit forwarding-options dhcp-relay dhcpv6 liveness-detection method bfd detection-time], [edit system services dhcp-local-server group <i>group-name</i> liveness-detection method bfd detection-time], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> liveness-detection method bfd detection-time], [edit forwarding-options dhcp-relay group <i>group-name</i> liveness-detection method bfd detection-time], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> liveness-detection method bfd detection-time]</pre>
Release Information	<p>Statement introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Specify the threshold for the adaptation of the detection time. When the BFD session detection time adapts to a value equal to or greater than the threshold, a single trap and a single system log message are sent.</p>
<div>  <p>NOTE: The threshold time must be greater than or equal to the minimum-interval or the minimum-receive-interval.</p> </div>	
Options	<p><i>milliseconds</i>— Value for the detection time adaptation threshold.</p> <p>Range: 1 through 255,000</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"> • Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients • Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714

threshold (transmit-interval)

Syntax	threshold <i>milliseconds</i> ;
Hierarchy Level	<p>[edit system services dhcp-local-server liveness-detection method bfd transmit-interval],</p> <p>[edit system services dhcp-local-server dhcpv6 liveness-detection method bfd transmit-interval],</p> <p>[edit forwarding-options dhcp-relay liveness-detection method bfd transmit-interval],</p> <p>[edit forwarding-options dhcp-relay dhcpv6 liveness-detection method bfd transmit-interval],</p> <p>[edit system services dhcp-local-server group <i>group-name</i> liveness-detection method bfd transmit-interval],</p> <p>[edit system services dhcp-local-server dhcpv6 group <i>group-name</i> liveness-detection method bfd transmit-interval],</p> <p>[edit forwarding-options dhcp-relay group <i>group-name</i> liveness-detection method bfd transmit-interval],</p> <p>[edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> liveness-detection method bfd transmit-interval]</p>
Release Information	Statement introduced in Junos OS Release 12.1.
Description	Specify the threshold for detecting the adaptation of the transmit interval. When the BFD session transmit interval adapts to a value greater than the threshold, a single trap and a single system message are sent.
Options	<p><i>milliseconds</i> — Threshold value.</p> <p>Range: 0 through 4,294,967,295 ($2^{32} - 1$)</p>
<div>  <p>NOTE: The threshold value specified in the threshold statement must be greater than the value specified in the minimum-interval statement for the transmit-interval statement.</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"> • Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients • Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714

timeout (System)

Syntax	<code>timeout <i>seconds</i>;</code>
Hierarchy Level	<code>[edit system radius-server <i>server-address</i>],</code> <code>[edit system tacplus-server <i>server-address</i>],</code> <code>[edit system accounting destination radius server <i>server-address</i>],</code> <code>[edit system accounting destination tacplus server <i>server-address</i>]</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>
Description	Configure the amount of time that the local router or switch waits to receive a response from a RADIUS or TACACS+ server.
Options	<p><i>seconds</i>—Amount of time to wait.</p> <p>Range: 1 through 90 seconds</p> <p>Default: 3 seconds</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"> • Configuring RADIUS Server Authentication on page 203 • Configuring TACACS+ Authentication on page 229 • retry on page 1706

timeout (DHCP Local Server)



Syntax	<code>timeout <i>timeout-value</i>;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit system services dhcp-local-server reconfigure],</p> <p>[edit system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure]</p>
Release Information	<p>Statement introduced in Junos OS Release 10.0.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Support at the [edit ... dhcpv6 ...] hierarchy levels introduced in Junos OS Release 10.4.</p>
Description	Configure the initial value in seconds between attempts to reconfigure all DHCP clients or only the DHCP clients serviced by the specified group of interfaces.
Options	<p><i>timeout-value</i>—Initial retry timeout value.</p> <p>Range: 1 through 10 seconds</p> <p>Default: 2 seconds</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"> Configuring Dynamic Client Reconfiguration of Extended Local Server Clients Overview on page 693

- [Configuring Dynamic Reconfiguration Attempts for DHCP Clients on page 696](#)

timeout (Access Control Service)

Syntax	<code>timeout <i>seconds</i>;</code>
Hierarchy Level	[edit services unified-access-control]
Release Information	Statement introduced in Junos OS Release 12.2 for EX Series switches.
Description	Configure the amount of time that the switch waits to receive a response from the Junos Pulse Access Control Service.
Options	<p><i>seconds</i>—Amount of time to wait.</p> <p>Range: 2 through 1000 seconds</p> <p>Default: 300 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 an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control (CLI Procedure) on page 519 • Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service (CLI Procedure) on page 522

timeout (RADIUS)

Syntax	timeout <i>seconds</i> ;
Hierarchy Level	[edit access radius-server <i>server-address</i>], [edit access profile <i>profile-name</i> radius-server <i>server-address</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 the amount of time that the local router or switch waits to receive a response from RADIUS authentication and accounting servers. You can override the timeout value for accounting servers with the <i>accounting-timeout</i> statement.
	<p> NOTE: To successfully set a timeout value for the accounting servers different from the authentication servers, you must configure both the <i>accounting-retry</i> and <i>accounting-timeout</i> statements. If you configure only one of these statements, then the value you configure is ignored in favor of the values configured with the <i>retry</i> and <i>timeout</i> statements.</p> <p> NOTE: The maximum retry duration (the number of retries times the length of the timeout) cannot exceed 2700 seconds. An error message is displayed if you configure a longer duration.</p>
Options	<p><i>seconds</i>—Amount of time to wait.</p> <p>Range: 1 through 1000 seconds</p> <p>Default: 3 seconds</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"> Configuring Router or Switch Interaction with RADIUS Servers Configuring Authentication and Accounting Parameters for Subscriber Access Example: Configuring CHAP Authentication with RADIUS Configuring RADIUS Authentication for L2TP


timeout (System)

Syntax	<code>timeout <i>seconds</i>;</code>
Hierarchy Level	<code>[edit system radius-server <i>server-address</i>],</code> <code>[edit system tacplus-server <i>server-address</i>],</code> <code>[edit system accounting destination radius server <i>server-address</i>],</code> <code>[edit system accounting destination tacplus server <i>server-address</i>]</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>
Description	Configure the amount of time that the local router or switch waits to receive a response from a RADIUS or TACACS+ server.
Options	<p><i>seconds</i>—Amount of time to wait.</p> <p>Range: 1 through 90 seconds</p> <p>Default: 3 seconds</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"> • Configuring RADIUS Server Authentication on page 203 • Configuring TACACS+ Authentication on page 229 • retry on page 1706

timeout-action (Access Control Service)

Syntax	timeout-action (close no-change);
Hierarchy Level	[edit services unified-access-control]
Release Information	Statement introduced in Junos OS Release 12.2 for EX Series switches.
Description	Specify the action to be taken when the timeout is reached for the switch's connection with the Junos Pulse Access Control Service.
Options	<p>close—Remove existing sessions and block further traffic.</p> <p>no-change—Preserve existing connections, but block new sessions.</p> <p>Default: close</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">• timeout (Access Control Service) on page 1823• Configuring an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control (CLI Procedure) on page 519• Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service (CLI Procedure) on page 522

tlv-filter

Syntax	<code>tlv-filter <i>tlv-name</i>;</code>
Hierarchy Level	<code>[edit protocols lldp],</code> <code>[edit protocols lldp-med],</code> <code>[edit protocols lldp interface <i>interface-name</i>],</code> <code>[edit protocols lldp-med interface <i>interface-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 18.3 for EX Series switches.
Description	<p>Select the type, length, and value (TLV) messages that should not be advertised by Link Layer Discovery Protocol (LLDP) or LLDP Media Endpoint Discovery (LLEP-MED) protocol. LLDP-capable devices transmit information in type, length, and value (TLV) messages to neighbor devices. Device information can include information such as chassis and port identification and system name and system capabilities.</p> <p>In multi-vendor networks, it might not be desirable to send TLV messages because they can contain sensitive information about a network device. You can configure LLDP or LLDP-MED to disable any non-mandatory TLV message. Mandatory TLVs are: chassis-id, port-id, and time-to-live.</p> <p>When you configure the tlv-filter statement, you specify the TLVs that you want to disable. This is useful when you want to allow most, but not all, TLVs.</p> <p>You can also disable TLVs using the tlv-select statement. When you configure the tlv-select statement, you specify the TLVs that you want to be advertised by LLDP or LLDP-MED. All other non-mandatory TLVs are disabled.</p>
	<p> NOTE: The tlv-select and tlv-filter are mutually exclusive and cannot be used on the same configuration stanza at the same time.</p>
Default	All TLVs for LLDP and LLDP-MED are enabled by default.
Options	<p>The following options can be configured using tlv-filter at the <code>[edit protocols lldp]</code> and <code>[edit protocols lldp interface <i>interface-name</i>]</code> hierarchy levels:</p> <p>port-description—The user-configured port description.</p> <p>system-name—The user-configured name of the local system.</p> <p>system-description—The user-configured name of the local system.</p>

system-capabilities—The primary function performed by the system. The capabilities that system supports are defined; for example, bridge or router. This information cannot be configured, but is based on the model of the product.

management-address— IP management address of the local system.

mac-phy-config-status—Advertises information about the physical interface, such as autonegotiation status and support and MAU (medium attachment unit) type.

power-vi-mdi—Advertises MDI (media dependent interface) power support, PSE (power sourcing equipment) power pair, and power class information.

link-aggregation—Advertises whether the port is aggregated and its aggregated port ID.

maximum-frame-size—The maximum transmission unit (MTU) of the interface sending LLDP frames.

jnpr-chassis-serial—The chassis serial number.

jnpr-vcp—Juniper virtual chassis port.

port-vid—Indicates the port VLAN ID that will be associated with an untagged or priority tagged data frame received on the VLAN port.

vlan-name—Indicates the assigned name of any VLAN at the device.

The following options can be configured using **tlv-filter** at the **[edit protocols lldp-med]** and **[edit protocols lldp-med interface *interface-name*]** hierarchy levels:

ext-power-via-mdi—The power type, power source, power priority, and power value of the port. It is the responsibility of the PSE device (network connectivity device) to advertise the power priority on a port.

location-id—The physical location of the endpoint.


med-capabilities—The primary function of the port.

network-policy—The port VLAN configuration and associated Layer 2 and Layer 3 attributes. Attributes include the policy identifier, application types, such as voice or streaming video, 802.1Q VLAN tagging, and 802.1p priority bits and Diffserv code points.

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">• show lldp on page 2109• Configuring LLDP (CLI Procedure) on page 556• Understanding LLDP and LLDP-MED on EX Series Switches on page 562
------------------------------	---

tlv-select

Syntax	<code>tlv-select <i>tlv-name</i>;</code>
Hierarchy Level	<code>[edit protocols lldp],</code> <code>[edit protocols lldp-med],</code> <code>[edit protocols lldp interface <i>interface-name</i>],</code> <code>[edit protocols lldp-med interface <i>interface-name</i>]</code>
Release Information	Statement introduced in Junos OS Release 18.3 for EX Series switches.
Description	<p>Select the type, length, and value (TLV) messages that should be advertised by Link Layer Discovery Protocol (LLDP) or LLDP Media Endpoint Discovery (LLEP-MED) protocol. LLDP-capable devices transmit information in type, length, and value (TLV) messages to neighbor devices. Device information can include information such as chassis and port identification and system name and system capabilities.</p> <p>In multi-vendor networks, it might not be desirable to send TLV messages because they can contain sensitive information about a network device. You can configure LLDP or LLDP-MED to disable any non-mandatory TLV message. Mandatory TLVs are: chassis-id, port-id, and time-to-live.</p> <p>When you configure the <code>tlv-select</code> statement, you specify the TLVs that should be advertised by LLDP or LLDP-MED. All other non-mandatory TLVs are disabled. This is useful when you want to disable most, but not all, TLVs.</p> <p>You can also disable TLVs using the <code>tlv-filter</code> statement. When you configure the <code>tlv-filter</code> statement, you specify the TLVs that should be disabled.</p>
	<p> NOTE: The <code>tlv-select</code> and <code>tlv-filter</code> are mutually exclusive and cannot be used on the same configuration stanza at the same time.</p>
Default	All TLVs for LLDP and LLDP-MED are enabled by default.
Options	<p>The following options can be configured using <code>tlv-select</code> at the <code>[edit protocols lldp]</code> and <code>[edit protocols lldp interface <i>interface-name</i>]</code> hierarchy levels:</p> <p>port-description—The user-configured port description.</p> <p>system-name—The user-configured name of the local system.</p> <p>system-description—The user-configured name of the local system.</p>

system-capabilities—The primary function performed by the system. The capabilities that system supports are defined; for example, bridge or router. This information cannot be configured, but is based on the model of the product.

management-address— IP management address of the local system.

mac-phy-config-status—Advertises information about the physical interface, such as autonegotiation status and support and MAU (medium attachment unit) type.

power-vi-mdi—Advertises MDI (media dependent interface) power support, PSE (power sourcing equipment) power pair, and power class information.

link-aggregation—Advertises whether the port is aggregated and its aggregated port ID.

maximum-frame-size—The maximum transmission unit (MTU) of the interface sending LLDP frames.

jnpr-chassis-serial—The chassis serial number.

jnpr-vcp—Juniper virtual chassis port.

port-vid—Indicates the port VLAN ID that will be associated with an untagged or priority tagged data frame received on the VLAN port.

vlan-name—Indicates the assigned name of any VLAN at the device.

The following options can be configured using **tlv-select** at the **[edit protocols lldp-med]** and **[edit protocols lldp-med interface *interface-name*]** hierarchy levels:

ext-power-via-mdi—The power type, power source, power priority, and power value of the port. It is the responsibility of the PSE device (network connectivity device) to advertise the power priority on a port.

location-id—The physical location of the endpoint.

med-capabilities—The primary function of the port.

network-policy—The port VLAN configuration and associated Layer 2 and Layer 3 attributes. Attributes include the policy identifier, application types, such as voice or streaming video, 802.1Q VLAN tagging, and 802.1p priority bits and Diffserv code points.

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">• show lldp on page 2109• Configuring LLDP (CLI Procedure) on page 556• Understanding LLDP and LLDP-MED on EX Series Switches on page 562
------------------------------	---

token (DHCP Local Server)

Syntax	<code>token <i>token-value</i>;</code>
Hierarchy Level	<pre> [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server reconfigure], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 reconfigure], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server reconfigure], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 reconfigure], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server reconfigure], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 reconfigure], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure], [edit system services dhcp-local-server reconfigure], [edit system services dhcp-local-server dhcpv6 reconfigure], [edit system services dhcp-local-server group <i>group-name</i> reconfigure], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure] </pre>
Release Information	<p>Statement introduced in Junos OS Release 10.0.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Support at the <code>[edit ... dhcpv6 ...]</code> hierarchy levels introduced in Junos OS Release 10.4.</p>
Description	<p>Configure a plain-text token for all DHCP clients or only the DHCP clients serviced by the specified group of interfaces. The token enables rudimentary entity authentication to protect against inadvertently instantiated DHCP servers. A null token (empty string) indicates that the configuration token functionality is not enabled. A group configuration takes precedence over a DHCP local server configuration. For more information about tokens, see RFC 3118, <i>Authentication for DHCP Messages</i>, section 4.</p>
Options	<p><i>token-value</i>—Plain-text alphanumeric string.</p> <p>Default: null (empty string)</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 Dynamic Client Reconfiguration of Extended Local Server Clients Overview on page 693](#)
 - [Configuring a Token for DHCP Local Server Authentication on page 620](#)

trace (DHCP Relay Agent)

Syntax	trace;
Hierarchy Level	<pre>[edit forwarding-options dhcp-relay dhcpv6 group group-name interface interface-name], [edit forwarding-options dhcp-relay group group-name interface interface-name], [edit logical-systems logical-system-name forwarding-options dhcp-relay dhcpv6 group group-name interface interface-name], [edit logical-systems logical-system-name forwarding-options dhcp-relay group group-name interface interface-name], [edit logical-systems logical-system-name routing-instances routing-instance-name forwarding-options dhcp-relay dhcpv6 group group-name interface interface-name], [edit logical-systems logical-system-name routing-instances routing-instance-name forwarding-options dhcp-relay group group-name interface interface-name], [edit routing-instances routing-instance-name forwarding-options dhcp-relay dhcpv6 group group-name interface interface-name], [edit routing-instances routing-instance-name forwarding-options dhcp-relay group group-name interface interface-name]</pre>
Release Information	<p>Statement introduced in Junos OS Release 10.4.</p> <p>Support at the [edit ... dhcpv6] hierarchy levels introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.1 for EX Series switches.</p>
Description	<p>Enable trace operations for a group of interfaces or for a specific interface within a group. Use the statement at the [edit ... dhcpv6] hierarchy levels to configure DHCPv6 support.</p> <p>EX Series switches do not support DHCPv6.</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 an Extended DHCP Relay Server on EX Series Switches (CLI Procedure) on page 626 • Tracing Extended DHCP Operations on page 729 • Tracing Extended DHCP Operations for Specific Interfaces on page 734

traceoptions

Syntax

```
traceoptions {
  file filename <files number> <size size>;
  flag all;
  flag certificates;
  flag database;
  flag general;
  flag ike;
  flag parse;
  flag policy-manager;
  flag routing-socket;
  flag timer;
  level
  no-remote-trace
}
```

Hierarchy Level [edit security],
[edit services ipsec-vpn]

Trace options can be configured at either the [edit security] or the [edit services ipsec-vpn] hierarchy level, but not at both levels.

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 security trace options.

To specify more than one trace option, include multiple **flag** statements. Trace option output is recorded in the `/var/log/kmd` file.



NOTE: The `traceoptions` statement is not supported on QFabric systems.

Options **files *number***—(Optional) Maximum number of trace files. When a trace file (for example, `kmd`) reaches its maximum size, it is renamed `kmd.0`, then `kmd.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 must also specify a maximum file size with the **size** option.

Range: 2 through 1000 files

Default: 0 files

size *size*—(Optional) Maximum size of each trace file, in kilobytes (KB). When a trace file (for example, **kmd**) reaches this size, it is renamed, **kmd.0**, then **kmd.1** and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

Default: 1024 KB

flag *flag*—Trace operation to perform. To specify more than one trace operation, include multiple **flag** statements.

- **all**—Trace all security events.
- **certificates**—Trace certificate events.
- **database**—Trace database events.
- **general**—Trace general events.
- **ike**—Trace IKE module processing.
- **parse**—Trace configuration processing.
- **policy-manager**—Trace policy manager processing.
- **routing-socket**—Trace routing socket messages.
- **timer**—Trace internal timer events.

level *level*—(Optional) Set traceoptions level.

- **all**—match all levels.
- **error**—Match error conditions.
- **info**—Match informational messages.
- **notice**—Match conditions that should be handled specially.
- **verbose**—Match verbose messages.
- **warning**—Match warning messages.

no-remote-trace—(Optional) Disable remote tracing

Required Privilege	admin—To view the configuration.
Level	admin-control—To add this statement to the configuration.

Related Documentation	<ul style="list-style-type: none">• <i>Configuring Tracing Operations</i>
------------------------------	---

traceoptions (DNS, Port, and TFTP Packet Forwarding)

Syntax	<pre> traceoptions { file <i>filename</i> <files <i>number</i>> <match <i>regular-expression</i>> <size <i>bytes</i>> <world-readable no-world-readable>; flag <i>flag</i>; level <i>level</i>; <no-remote-trace>; } </pre>
Hierarchy Level	[edit forwarding-options helpers]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement standardized and match option introduced in Junos OS Release 8.0.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Configure tracing operations for BOOTP, DNS, TFTP, or custom UDP port packet forwarding.
Default	If you do not include this statement, no tracing operations are performed.
Options	<p>file <i>filename</i>—Name of the file to receive the output of the tracing operation. Enclose the name in quotation marks (" "). All files are placed in a file named fud in the directory /var/log. If you include the file statement, you must specify a filename.</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. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the size option and a filename.</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"> • address—Trace address management events • all—Trace all events • bootp—Trace BOOTP or DHCP services events • config—Trace configuration events • domain—Trace DNS service events • ifdb—Trace interface database operations

- **io**—Trace I/O operations
- **main**—Trace main loop events
- **port**—Trace arbitrary protocol events
- **rtsock**—Trace routing socket operations
- **tftp**—Trace TFTP service events
- **trace**—Trace tracing operations
- **ui**—Trace user interface operations
- **util**—Trace miscellaneous utility operations

match *regular-expression*—(Optional) Refine the output to include lines that contain the regular expression.

no-remote-trace—(Optional) Disable remote tracing globally or for a specific tracing operation.

no-world-readable—(Optional) Restrict file access to the owner.

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** file again reaches its maximum size, **trace-file.0** is renamed **trace-file.1** and **trace-file** is renamed **trace-file.0**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option and filename.

Syntax: *xk* to specify KB, *xm* to specify MB, or *xg* to specify GB

Range: 0 bytes through 4,294,967,295 KB

Default: 128 KB

world-readable—(Optional) Enable unrestricted file access.

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>Tracing BOOTP, DNS, and TFTP Forwarding Operations</i>
------------------------------	---

traceoptions (802.1X)

Syntax	<pre> traceoptions { file <i>filename</i> <files <i>number</i>> <size <i>size</i>> <world-readable no-world-readable> <match <i>regex</i>>; flag <i>flag</i>; } </pre>
Hierarchy Level	[edit protocols dot1x]
Release Information	<p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the dot1x-event and dot1x-ipc options introduced in Junos OS Release 13.2X50 for EX Series switches.</p>
Description	Define tracing operations for the 802.1X protocol.
Default	Tracing operations are disabled.
Options	<p>file <i>filename</i>—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.</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. Then the oldest trace file is overwritten. If you specify a maximum number of files, you also must specify a maximum file size by using 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—All tracing operations. • config-internal—Trace internal configuration operations. • dot1x-event—(Switches with ELS only) Trace 802.1x events. • dot1x-debug—(Switches without ELS) Trace 802.1x events. • dot1x-ipc—(Switches with ELS only) Trace IPC interactions. • eapol—Trace EAPOL packets transmitted and received. • esw-if—(Switches without ELS) Trace ESW interactions. • general—Trace general operations. • normal—Trace normal operations.

- **parse**—Trace reading of the configuration.
- **regex-parse**—Trace regular-expression parsing operations.
- **state**—Trace protocol state changes.
- **task**—Trace protocol task operations.
- **timer**—Trace protocol timer operations.
- **vlan**—Trace VLAN transactions.

match *regex*—(Optional) Refine the output to include lines that contain the regular expression.

no-world-readable—(Optional) Restrict file access to the user who created the file.

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**, 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 with the **files** option, you also must specify a maximum file size.

Syntax: *xk* to specify KB, *xm* to specify MB, or *xg* to specify GB

Range: 10 KB through 1 GB

Default: 128 KB

world-readable—(Optional) Enable unrestricted file access.

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">• show lldp on page 2109• Configuring 802.1X Interface Settings (CLI Procedure) on page 357• 802.1X for Switches Overview on page 354
------------------------------	---

traceoptions (Address-Assignment Pool)

Syntax	<pre> traceoptions { file <i>filename</i> { files <i>number</i>; size <i>maximum-file-size</i>; match <i>regex</i>; (world-readable no-world-readable); } flag address-assignment; flag all; flag configuration; flag framework; flag ldap; flag local-authentication; flag radius; } </pre>
Hierarchy Level	[edit system processes general-authentication-service]
Release Information	<p>Flag for tracing address-assignment pool operations introduced in Junos OS Release 9.0.</p> <p>option-name option introduced in Junos OS Release 8.3.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Configure tracing options.
Options	<p>file <i>filename</i>—Name of the file that receives the output of the tracing operation. Enclose the name in quotation marks. All files are placed in the directory /var/log.</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. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the size option and a filename.</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"> • address-assignment—All address-assignment events • all—All tracing operations • configuration—Configuration events • framework—Authentication framework events

- **ldap**—LDAP authentication events
- **local-authentication**—Local authentication events
- **radius**—RADIUS authentication events

match *regex*—(Optional) Refine the output to include lines that contain the regular expression.

no-world-readable—(Optional) Restrict access to the originator of the trace operation only.

size *size*—(Optional) Maximum size of each trace file, in 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 and filename.

Syntax: **xk** to specify KB, **xm** to specify MB, or **xg** to specify GB

Range: 10 KB through 1 GB


Default: 128 KB

world-readable—(Optional) Enable unrestricted file access.

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

Related Documentation	<ul style="list-style-type: none">• <i>Address-Assignment Pool Configuration Overview</i>
------------------------------	---

traceoptions (DHCP)

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>; level (all error info notice verbose warning); no-remote-trace; } </pre>
Hierarchy Level	<p>[edit system processes dhcp-service] [edit security dynamic-address]</p>
Release Information	<p>Statement introduced in Junos OS Release 11.4. Statement introduced in Junos OS Release 12.1 for EX Series switches. Statement introduced in Junos OS Release 18.4R1.</p>
Description	<p>Define global tracing operations for extended DHCP local server and extended DHCP relay agent processes.</p> <p>This statement replaces the deprecated traceoptions statements at the [edit forwarding-options dhcp-relay] and [edit system services dhcp-local-server] hierarchy levels.</p>
<div style="display: flex; align-items: center;">  <p>NOTE: Traceoptions does not differentiate between a logical system and tenant system, and can be configured under the root logical system.</p> </div>	
Options	<p>file <i>filename</i>—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.</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.</p> <p>Range: 2 through 1000 Default: 3 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—Trace all events. • auth—Trace authentication events. • database—Trace database events. • fwd—Trace firewall process events.

- **general**—Trace miscellaneous events.
- **ha**—Trace high availability-related events.
- **interface**—Trace interface operations.
- **io**—Trace I/O operations.
- **liveness-detection**—Trace liveness detection operations.
- **packet**—Trace packet and option decoding operations.
- **performance**—Trace performance measurement operations.
- **profile**—Trace profile operations.
- **rpd**—Trace routing protocol process events.
- **rtsock**—Trace routing socket operations.
- **security-persistence**—Trace security persistence events.
- **session-db**—Trace session database events.
- **state**—Trace changes in state.
- **statistics**—Trace baseline statistics.
- **ui**—Trace user interface operations.

level—Level of tracing to perform; also known as severity level. The option you configure enables tracing of events at that level and all higher (more restrictive) levels. You can specify any of the following levels:

- **all**—Match messages of all levels.
- **error**—Match error messages.
- **info**—Match informational messages.
- **notice**—Match notice messages about conditions requiring special handling.
- **verbose**—Match verbose messages. This is the lowest (least restrictive) severity level; when you configure **verbose**, messages at all higher levels are traced. Therefore, the result is the same as when you configure **all**.
- **warning**—Match warning messages.

Default: **error**

match *regular-expression*—(Optional) Refine the output to include lines that contain the regular expression.

no-remote-trace—Disable remote tracing.

no-world-readable—(Optional) Disable unrestricted file access, allowing only the user **root** and users who have the Junos OS **maintenance** permission to access the trace files.

size *maximum-file-size*—(Optional) Maximum size of each trace file. By default, the number entered is treated as bytes. Alternatively, you can include a suffix to the number to indicate kilobytes (*maximum-file-sizek*), megabytes (*maximum-file-sizem*), or gigabytes (*maximum-file-sizeg*). If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

Range: 10,240 through 1,073,741,824

Default: 128 KB

world-readable—(Optional) Enable unrestricted file access.

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

Related Documentation	<ul style="list-style-type: none">• Tracing Extended DHCP Operations on page 729
------------------------------	--

traceoptions (DHCP Server)

Syntax	<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>; }</pre>
Hierarchy Level	[edit system services dhcp]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Define tracing operations for DHCP processes.
Options	<p>file <i>filename</i>—Name of the file that receives the output of the tracing operation. Enclose the name in quotation marks. All files are placed in the directory <code>/var/log</code>.</p> <p>files <i>number</i>—(Optional) Maximum number of trace files. When a trace file named <i>trace-file</i> reaches its maximum size, it is renamed <i>trace-file.0</i>, then <i>trace-file.1</i>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the size option and a filename.</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—All tracing operations• binding—Trace binding operations• config—Log reading of configuration• conflict—Trace user-detected conflicts for IP addresses• event—Trace important events• ifdb—Trace interface database operations• io— Trace I/O operations• lease—Trace lease operations• main—Trace main loop operations• misc— Trace miscellaneous operations• packet—Trace DHCP packets

- **options**—Trace DHCP options
- **pool**—Trace address pool operations
- **protocol**—Trace protocol operations
- **rtsock**—Trace routing socket operations
- **scope**—Trace scope operations
- **signal**—Trace DHCP signal operations
- **trace**—All tracing operations
- **ui**—Trace user interface operations

match *regex*—(Optional) Refine the output to include lines that contain the regular expression.

- **all**—All tracing operations
- **binding**—Trace binding operations
- **config**—Log reading of configuration
- **conflict**—Trace user-detected conflicts for IP addresses
- **event**—Trace important events
- **ifdb**—Trace interface database operations
- **io**—Trace I/O operations
- **lease**—Trace lease operations
- **main**—Trace main loop operations
- **match *regex***—Refine the output to include lines that contain the regular expression.
- **misc**—Trace miscellaneous operations
- **packet**—Trace DHCP packets
- **options**—Trace DHCP options
- **pool**—Trace address pool operations
- **protocol**—Trace protocol operations
- **rtsock**—Trace routing socket operations
- **scope**—Trace scope operations
- **signal**—Trace DHCP signal operations
- **trace**—All tracing operations
- **ui**—Trace user interface operations

no-world-readable—(Optional) Disable unrestricted file access.

size size—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named **trace-file** reaches this size, it is renamed **trace-file.0**. When the **trace-file** again reaches its maximum size, **trace-file.0** is renamed **trace-file.1** and **trace-file** is renamed **trace-file.0**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option and filename.

Syntax: **xk** to specify KB, **xm** to specify MB, or **xg** to specify GB

Range: 10 KB through 1 GB


Default: 128 KB

world-readable—(Optional) Enable unrestricted file access.

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">• Configuring Tracing Operations for DHCP Processes on page 586• <i>System Management Configuration Statements</i>
------------------------------	---

traceoptions (LLDP)

Syntax	<pre> traceoptions { file <i>filename</i> <files <i>number</i>> <size <i>size</i>> <world-readable no-world-readable> <no-stamp> <replace>; flag <i>flag</i> <disable>; } </pre>
Hierarchy Level	[edit protocols lldp]
Release Information	<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 tracing operations for the Link Layer Discovery Protocol (LLDP). You can trace messages under LLDP for LLDP and PTOPO MIBs.
	<div>  <p>NOTE: The traceoptions statement is not supported on the QFX3000 QFabric system.</p> </div>
Default	Tracing operations are disabled.
Options	<p>file <i>filename</i>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <code>/var/log</code>.</p> <p>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 xk to specify KB, xm to specify MB, or xg 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 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—All tracing operations. • configuration—Trace configuration operations. • interface—Trace interface update events. • netbios—Trace NetBIOS events.

- **packet**—Trace packet events.
- **rtsock**—Trace routing socket operations.
- **snmp**—Trace SNMP configuration operations.
- **vlan**—Trace VLAN update events.

no-stamp—(Optional) Do not timestamp the trace file.

Default: If you omit this option, timestamp information is placed at the beginning of each line of the tracing output.

no-world-readable—(Optional) Restrict file access to the user who created the file.

replace—(Optional) Replace an existing trace file if there is one rather than appending output to it.

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**, 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.

Syntax: **xk** to specify KB, **xm** to specify MB, or **xg** to specify GB

Range: 10 KB through 1 GB

Default: 128 KB

Default: If you do not include this option, tracing output is appended to an existing trace file.

world-readable—(Optional) Enable unrestricted file access.



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

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 LLDP-MED (CLI Procedure) on page 566• Understanding LLDP and LLDP-MED on EX Series Switches on page 562• Understanding LLDP on page 555
------------------------------	---

traceoptions (Outbound SSH)

Syntax	<pre> traceoptions { file { filename ; files <i>number</i>; match <i>regular-expression</i>; size <i>maximum-file-size</i>; (world-readable no-world-readable); } flag <i>flag</i>; no-remote-trace; } </pre>
Hierarchy Level	[edit system services outbound-ssh]
Release Information	Statement introduced in Junos OS Release 10.4.
Description	Set the trace options.
Options	<ul style="list-style-type: none"> file—Configure the trace file information. <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 <i>number</i>—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. <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 files</p> match <i>regular-expression</i>—Refine the output to include lines that contain the regular expression. size <i>maximum-file-size</i>—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 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>If you specify a maximum number of files, you also must specify a maximum file size with the size option and a filename.</p>

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**—Specify the tracing operation to perform. To specify more than one tracing operation, include multiple flag statements. You can include the following flags.
 - **all**—Trace all events.
 - **configuration**—Trace configuration events.
 - **connectivity**—Trace TCP connection handling.
- **no-remote-trace**—Disable remote tracing.

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

Related Documentation	<ul style="list-style-type: none">• <i>Displaying Log and Trace Files</i>
------------------------------	---

traceoptions (SBC Configuration Process)

Syntax	<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>; } </pre>
Hierarchy Level	[edit system processes sbc-configuration-process]
Release Information	<p>Statement introduced in Junos OS Release 9.5.</p> <p>Statement introduced in Junos OS Release 9.5 for EX Series switches.</p>
Description	Configure trace options for the session border controller (SBC) process of the border signaling gateway (BSG).
Options	<p>file <i>filename</i>—Name of the file that receives the output of the tracing operation. Enclose the name in quotation marks. All files are placed in the directory /var/log. You can include the following file options:</p> <ul style="list-style-type: none"> 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. Then the oldest trace file is overwritten. <p>If you specify a maximum number of files, you must also specify a maximum file size with the size option and a filename.</p> <p>Range: 2 through 1000</p> <p>Default: 3 files</p> <ul style="list-style-type: none"> match <i>regex</i>—(Optional) Refine the output to include lines that contain the regular expression. no-world-readable—(Optional) Disable unrestricted file access. 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 this size, it is renamed trace-file.0. When the trace-file again reaches its maximum size, trace-file.0 is renamed trace-file.1 and trace-file is renamed trace-file.0. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten. If you specify a maximum file size, you also must specify a maximum number of trace files with the files option and filename. <p>Syntax: xk to specify KB, xm to specify MB, or xg to specify GB.</p> <p>Range: 10 KB through 1 GB</p> <p>Default: 128 KB</p>

- **world-readable**—(Optional) Enable unrestricted file access.

flag flag—Tracing operation to perform. To specify more than one tracing operation, include multiple **flag** statements. You can include the following flags:

- **all trace-level**—Trace all SBC process operations.
- **common trace-level**—Trace common events.
- **configuration trace-level**—Trace configuration events.
- **device-monitor trace-level**—Trace device monitor events.
- **ipc trace-level**—Trace IPC events.
- **memory—pool trace-level**—Trace memory pool events.
- **trace-level**—Trace level options are related to the severity of the event being traced. When you choose a trace level, messages at that level and higher levels are captured. Enter one of the following trace levels as the **trace-level**:
 - **debug**—Log all code flow of control.
 - **error**—Log failures with a short-term effect.
 - **info**—Log summary for normal operations, such as the policy decisions made for a call.
 - **trace**—Log program trace START and EXIT macros.
 - **warning**—Log failure recovery events or failure of an external entity.
- **ui trace-level**—Trace user interface operations.

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">• See “Troubleshooting the IMSG” in the <i>Junos Multiplay Solutions Guide</i>• <i>System Management Configuration Statements</i>
------------------------------	--

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">• <i>Configuring the Transfer Interval of the File</i>

transfer-interval (Configuration)



Syntax	<code>transfer-interval <i>interval</i>;</code>
Hierarchy Level	[edit system archival configuration]
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 14.1X53-D20 for OCX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Configure the router or switch to periodically transfer its currently active configuration to an archive site.
Options	<i>interval</i> —Interval at which to transfer the current configuration to an archive site. Range: 15 through 2880 minutes



NOTE: The [edit system archival] hierarchy is not available on QFabric systems.

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 the Periodic Transfer of the Active Configuration to an Archive Site</i>• <i>archive</i>• configuration on page 1254• transfer-on-commit on page 1855

transfer-on-commit

Syntax	<code>transfer-on-commit;</code>
Hierarchy Level	<code>[edit system archival configuration]</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 OCX Series switches.</p>
Description	<p>Configure the router or switch to transfer its currently active configuration to an archive site each time you commit a candidate configuration.</p> <p>.....</p> <p> NOTE: When specifying a URL in a Junos OS statement using an IPv6 host address, you must enclose the entire URL in quotation marks (") and enclose the IPv6 host address in brackets ([]). For example, <code>"ftp://username<:password>@[ipv6-host-address]<:port>/url-path"</code>.</p> <p>.....</p> <p> NOTE: The <code>[edit system archival]</code> hierarchy is not available on QFabric systems.</p> <p>.....</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 the Transfer of the Currently Active Configuration When a Configuration Is Committed</i> • <i>archive</i> • configuration on page 1254 • transfer-interval on page 1854

transmit-interval

Syntax	<pre>transmit-interval { threshold milliseconds; minimum-interval milliseconds; }</pre>
Hierarchy Level	<p>[edit system services dhcp-local-server liveness-detection method bfd], [edit system services dhcp-local-server dhcpv6 liveness-detection method bfd], [edit forwarding-options dhcp-relay liveness-detection method bfd], [edit forwarding-options dhcp-relay dhcpv6 liveness-detection method bfd], [edit system services dhcp-local-server group <i>group-name</i> liveness-detection method bfd], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> liveness-detection method bfd], [edit forwarding-options dhcp-relay group <i>group-name</i> liveness-detection method bfd], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> liveness-detection method bfd]</p>
Release Information	<p>Statement introduced in Junos OS Release 12.1. Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Configure the Bidirectional Forwarding Detection (BFD) transmit interval.</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>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"> • <i>Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients</i> • Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714

transmit-period

Syntax	<code>transmit-period <i>seconds</i>;</code>
Hierarchy Level	[edit protocols <code>dot1x authenticator interface (802.1X)</code> (all [<i>interface-name</i>])
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	For 802.1X authentication, how long the port waits before retransmitting the initial EAPOL PDUs to the supplicant.
Default	30 seconds
Options	<i>seconds</i> —Number of seconds the port waits before retransmitting the initial EAPOL PDUs to the supplicant. Range: 1 through 65,535 seconds Default: 30 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 802.1X Interface Settings (CLI Procedure) on page 357 • 802.1X for Switches Overview on page 354

transmit-delay

Syntax	<code>transmit-delay <i>seconds</i>;</code>
Hierarchy Level	[edit protocols lldp]
Release Information	Statement introduced in Junos OS Release 11.1 for EX Series switches.
Description	<p>Specify the number of seconds the device delays before sending advertisements to neighbors after a change is made in a TLV (type, length, or value) element in the Link Layer Discovery Protocol (LLDP) or in the state of the local system, such as a change in hostname or management address. You can set this value to reduce the delay in notifying neighbors of a change in the local system.</p> <p>The advertisement-interval value must be greater than or equal to four times the transmit-delay value, or an error will be returned when you attempt to commit the configuration.</p>
Default	Enabled
Options	<p>seconds—Delay after a change to the local TLVs or system state before LLDP advertisements are sent.</p> <p>Range: 1 through 8192 seconds</p> <p>Default:</p> <ul style="list-style-type: none">• 2 seconds if the advertisement-interval value is set to 8 seconds or more• 1 second if the advertisement-interval value is set to less than 8 seconds
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">• show lldp on page 2109• Configuring LLDP (CLI Procedure) on page 556• Understanding LLDP and LLDP-MED on EX Series Switches on page 562

trap-group

List of Syntax	<p>Syntax: MX, M, T, ACX and PTX Series routers, OCX1100, EX and QFX Series Switches and SRX and vSRX firewalls on page 1859</p> <p>Syntax: QFX and EX Series Switches and OCX1100 on page 1859</p>
<p>Syntax: MX, M, T, ACX and PTX Series routers, OCX1100, EX and QFX Series Switches and SRX and vSRX firewalls</p>	<pre> trap-group <i>group-name</i> { categories { <i>category</i>; } destination-port <i>port-number</i>; routing-instance <i>instance</i>; targets { <i>address</i>; } version (all v1 v2); }</pre>
<p>Syntax: QFX and EX Series Switches and OCX1100</p>	<pre> trap-group <i>group-name</i> { categories { <i>category</i>; } destination-port <i>port-number</i>; targets { <i>address</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 and vSRX 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 QFX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p>
Description	<p>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.</p>
Options	<p><i>group-name</i>—Name of the trap group. If the name includes spaces, enclose it in quotation marks (" ").</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>

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

Related • *Configuring SNMP Trap Groups*
Documentation • *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 1861</p> <p>QFX Series Switches, EX4600, OCX1100 on page 1861</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 <i>logical-system-name</i> { routing-instance <i>routing-instance-name</i> { source-address <i>address</i>; } } routing-instance <i>routing-instance-name</i> { source-address <i>address</i>; } } </pre>
QFX Series Switches, EX4600, OCX1100	<pre> trap-options { agent-address outgoing-interface; source-address <i>address</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> <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	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">• <i>Configuring SNMP Trap Options</i>
------------------------------	--

trigger (DHCP Local Server)

Syntax	<pre>trigger { radius-disconnect; }</pre>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure],</p> <p>[edit system services dhcp-local-server reconfigure],</p> <p>[edit system services dhcp-local-server dhcpv6 reconfigure],</p> <p>[edit system services dhcp-local-server group <i>group-name</i> reconfigure],</p> <p>[edit system services dhcp-local-server dhcpv6 group <i>group-name</i> reconfigure]</p>
Release Information	<p>Statement introduced in Junos OS Release 10.0.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Support at the [edit ... dhcpv6 ...] hierarchy levels introduced in Junos OS Release 10.4.</p>
Description	<p>Configure behavior in response to a trigger for all DHCP clients or only the DHCP clients serviced by the specified group of interfaces.</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>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"> Configuring Dynamic Client Reconfiguration of Extended Local Server Clients Overview on page 693

- [Configuring Reconfiguration of the Client on Receipt of RADIUS-Initiated Disconnect on page 697](#)
- [radius-disconnect on page 1661](#)

tries-before-disconnect

Syntax	<code>tries-before-disconnect <i>number</i>;</code>
Hierarchy Level	<code>[edit system login retry-options]</code>
Release Information	Statement introduced in Junos OS Release 8.0.
Description	Configure the maximum number of times the user is allowed to enter a password to attempt to log in to the router through SSH or Telnet.
Options	<p><i>number</i>—Maximum number of times a user is allowed to attempt to enter a password to log in through SSH or Telnet.</p> <p>Range: 1 through 10</p> <p>Default: 10</p>
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">• Limiting the Number of User Login Attempts for SSH and Telnet Sessions on page 87• retry-options on page 1707

trust-option-82

Syntax	trust-option-82;
Hierarchy Level	<p>[edit forwarding-options dhcp-relay overrides], [edit forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay overrides], [edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> overrides], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides]</p>
Release Information	<p>Statement introduced in Junos OS Release 8.3.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Enable processing of DHCP client packets that have a gateway IP address (giaddr) of 0 (zero) and contain option 82 information. By default, the DHCP relay agent treats such packets as if they originated at an untrusted source, and drops them without further processing.</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"> • Enable Processing of Untrusted Packets So Option 82 Information Can Be Used on page 666 • Overriding the Default DHCP Relay Configuration Settings on page 638

trusted-key

Syntax	<code>trusted-key [<i>key-numbers</i>];</code>
Hierarchy Level	<code>[edit system <i>ntp</i>]</code>
Release Information	Statement introduced before Junos OS Release 7.4.
Description	For NTP, configure the keys you are allowed to use when you configure the SRX Series device to synchronize its time with other systems on the network.
Options	key-numbers —One or more key numbers. Each key can be any 32-bit unsigned integer except 0.
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">• ntp on page 1573

uac-policy

Syntax	<code>uac-policy;</code>
Hierarchy Level	<code>[edit ethernet-switching-options]</code>
Release Information	Statement introduced in Junos OS Release 12.2 for EX Series switches.
Description	Configure Junos Pulse Access Control Service as the access policy to authenticate and authorize users connected to the switch for admission to the network and for access to protected network resources.
Default	The Access Control Service access policy is disabled.
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 an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control (CLI Procedure) on page 519• Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service (CLI Procedure) on page 522

uac-service

Syntax	<pre>uac-service { timeout { timeout-action {</pre>
Hierarchy Level	[edit system processes]
Release Information	Statement introduced in Junos OS Release 12.2 for EX Series switches.
Description	Configure Junos Pulse Access Control Service as one of the system processes.
Default	Junos Pulse Access Control Service process is disabled.
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 an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control (CLI Procedure) on page 519• Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service (CLI Procedure) on page 522• Understanding Centralized Network Access Control and EX Series Switches on page 545


uac-service

Syntax	<pre>uac-service { 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 unified access control daemon process.
Options	<ul style="list-style-type: none">• command <i>binary-file-path</i>—Path to the binary process.• disable—Disable the unified access control daemon 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">• <i>Firewall User Authentication Overview</i>

uid

Syntax	<code>uid <i>uid-value</i>;</code>
Hierarchy Level	[edit system login user]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Numeric identifier associated with the user account name, either assigned by an administrator or assigned automatically when you commit the user configuration. It is used by applications that request numeric identifiers, such as some RADIUS queries or secure applications such as flow-tap monitoring.
Options	<i>uid-value</i> —Number associated with the login account. This value must be unique on the router or switch. Range: 100 through 64000
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 Junos OS User Accounts by Using a Configuration Group on page 84


unattended-boot

Syntax	unattended-boot;
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 13.2X51-D20 for EX Series switches.
Description	<p>Set the switch to unattended mode for U-Boot to prevent unauthorized access to the system before the JUNOS OS login prompt appears. In unattended mode, access to the loader CLI is blocked, as well as recovery mechanisms such as password recovery by using single-user mode and booting the switch by using a USB flash drive. In order to access the CLI in U-Boot mode, the user must enter a boot-loader password that has been previously configured.</p> <div><p>NOTE: If the root password is lost while the switch is in unattended mode, the switch must be reset to the factory default configuration using the LCD panel. For more information see <i>Reverting to the Default Factory Configuration for the EX Series Switch</i>.</p></div>
Default	Unattended mode is not enabled by default.
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 Unattended Mode for U-Boot to Prevent Unauthorized Access on page 288• boot-loader-authentication on page 1209

unified-access-control

Syntax	<pre> unified-access-control { infranet-controller <i>hostname</i> { address <i>ip-address</i>; interface <i>interface-name</i>; password <i>password</i>; port <i>port-number</i>; } </pre>
Hierarchy Level	[edit services]
Release Information	Statement introduced in Junos OS Release 12.2 for EX Series switches.
Description	<p>Configure Junos Pulse Access Control Service to authenticate and authorize users connected to the switch for admission to the network and for access to protected network resources.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Default	Junos Pulse Access Control Service is disabled.
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 an EX Series Switch to Use Junos Pulse Access Control Service for Network Access Control (CLI Procedure) on page 519 • Configuring the EX Series Switch for Captive Portal Authentication with Junos Pulse Access Control Service (CLI Procedure) on page 522

update-interval

Syntax	<code>update-interval <i>minutes</i>;</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</i> accounting]</code>
Release Information	Statement introduced in Junos OS Release 9.1. Statement introduced in Junos OS Release 9.1 for EX Series switches.
Description	<p>Enable interim accounting updates and configure the amount of time that the router or switch waits before sending a new accounting update.</p> <p>Interim accounting updates are included in the exchange of messages between the client and the accounting server. In RADIUS accounting, the client is the network access server (NAS), which can be the router or switch. The NAS sends Accounting-Request messages to the server, which acknowledges receipt of the requests with Accounting-Response messages. Interim accounting updates are sent in Accounting-Request packets with the Acct-Status-Type attribute set to Interim-Update.</p> <p>When a user is authenticated, the authentication server issues an Access-Accept message in response to a successful Access-Request message. The interval between interim updates can be configured directly on the server using the Acct-Interim-Interval attribute of the Access-Accept message. However, if the update interval is configured on the NAS using update-interval, then the locally configured value overrides the value found in an Access-Accept message from the server.</p>
	<p> NOTE: All information in an interim update message is cumulative from the beginning of the session, not from the last interim update message.</p>
Default	No interim updates are sent from the client to the accounting server.
Options	<p>minutes—Amount of time between updates, in minutes. All values are rounded to the next higher multiple of 10. For example, the values 811 through 819 are all accepted by the CLI, but are all rounded up to 820.</p> <p>Range: 10 through 1440 minutes</p>
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"> <i>Configuring Authentication and Accounting Parameters for Subscriber Access</i> <i>Configuring Immediate Interim Accounting Updates to RADIUS in Response to ANCP Notifications</i>

update-router-advertisement

Syntax	<code>update-router-advertisement (interface <i>interface-name</i>);</code>
Hierarchy Level	<pre>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcpv6-client] [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client] [edit tenants <i>tenant-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6 dhcpv6-client]</pre>
Release Information	<p>Statement introduced in Junos OS Release 12.1X45-D10.</p> <p>The logical-systems and tenant options are introduced in Junos OS Release 18.4R1.</p>
Description	Specify the interface used to delegate prefixes.
Options	interface <i>interface-name</i> —Interface on which to delegate prefixes
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	

update-server

Syntax	update-server;
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet dhcp]
Release Information	Statement introduced in Junos OS Release 8.5 for J Series devices. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 9.2 for SRX Series devices. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Propagate TCP/IP settings learned from an external DHCP server to the DHCP server running on the switch, router, or device.
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 DHCP Client (CLI Procedure) on page 677• Example: Configuring the Device as a DHCP Client on page 784• <i>interfaces</i>• <i>unit</i>• <i>family</i>

update-server (dhcp-client)

Syntax	update-server;
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcp-client]
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Propagate DHCP options to a local DHCP server.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	

update-server (dhcpv6-client)

Syntax	update-server;
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcpv6-client]
Release Information	Statement introduced in Junos OS Release 12.1X45-D10 for SRX300, SRX320, SRX340, SRX550M, and SRX1500 devices.
Description	Propagate TCP/IP settings to the DHCPv6 server.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	

use-interface

Syntax	use-interface-description {logical device};
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcp-client client-identifier]
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	The description configured at the physical or logical interface level is used for client identification.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	

use-interface-description

Syntax	<code>use-interface-description (logical device);</code>
Hierarchy Level	<pre>[edit forwarding-options dhcp-relay dhcpv6 (relay-agent-interface-id relay-agent-remote-id)], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> (relay-agent-interface-id relay-agent-remote-id)], [edit forwarding-options dhcp-relay relay-option-82 (circuit-id remote-id)], [edit forwarding-options dhcp-relay group <i>group-name</i> relay-option-82 (circuit-id remote-id)], [edit logical-systems <i>logical-system-name</i> ... forwarding-options dhcp-relay dhcpv6 (relay-agent-interface-id relay-agent-remote-id)], [edit logical-systems <i>logical-system-name</i> ... forwarding-options dhcp-relay ... relay-option-82 (circuit-id remote-id)], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 (relay-agent-interface-id relay-agent-remote-id)], [edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay ... relay-option-82 (circuit-id remote-id)], [edit vlans <i>vlan-name</i> forwarding-options dhcp-security dhcpv6-options option-18], [edit vlans <i>vlan-name</i> forwarding-options dhcp-security dhcpv6-options option-37]</pre>
Release Information	<p>Statement introduced in Junos OS Release 9.6.</p> <p>Support at the <code>[edit ... dhcpv6]</code> hierarchy levels introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.3 for EX Series switches.</p> <p>Support at the <code>[edit ... relay-agent-remote-id]</code> and <code>[edit ... remote-id]</code> hierarchy levels introduced in Junos OS Release 14.1.</p> <p>Support at the <code>[edit vlans <i>vlan-name</i> dhcp-security dhcpv6-options option-18]</code> and <code>[edit vlans <i>vlan-name</i> dhcp-security dhcpv6-options option-37]</code> hierarchy levels introduced in Junos OS Release 14.1X53-D10 for EX Series switches.</p>
Description	<p>Use the textual interface description instead of the interface identifier in the DHCP base option 82 Agent Circuit ID (suboption 1) or Agent Remote ID (suboption 2) information, or in the DHCPv6 option 18 (Relay Agent Interface ID) or option 37 (Relay Agent Remote ID) information in DHCP packets that the DHCP relay agent sends to a DHCP server.</p>



NOTE: For integrated routing and bridging (IRB) interfaces, the option 82 field must be able to uniquely identify the incoming interface based on either the Agent Circuit ID or Agent Remote ID. You can modify the information in the textual interface description to match the raw IFD (physical interface without a subunit) name and configure the option 82 field to use the interface description.

The textual description is configured using the **description** statement at the `[edit interfaces interface-name]` hierarchy level. If you specify that the textual description be used and no description is configured for the interface, DHCP relay defaults to using the Layer 2

interface name. When you use the interface description rather than the interface name, the interface description has to be specified under interface unit ("set interfaces ge-0/0/0 unit 0 description "client"). If you do not do this, then the interface name is used.

In the case of integrated routing and bridging (IRB) interfaces, the textual description of the Layer 2 interface is used instead of the IRB interface. If there is no description configured, the Layer 2 logical interface name is used. To include the IRB interface description instead of the Layer 2 interface description, configure the **use-interface-description** and the **no-vlan-interface-name** statements. If no description is configured for the IRB interface, DHCP relay defaults to using the IRB interface name.



NOTE: The **use-interface-description** statement is mutually exclusive with the **use-vlan-id** statement.

If you specify the textual interface description, rather than accepting the default syntax, the identification is for packets returned from the server, and only for instances where that identification would be required by the DHCP relay, such as a stateless pass-through.



NOTE: By default, DHCP relay accepts a maximum of 253 ASCII characters. If the textual interface description exceeds 253 characters, DHCP relay drops the packet, which results in the DHCP client failing to bind.

Options **logical**—Use the textual description that is configured for the logical interface.
 device—Use the textual description that is configured for the device interface.

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

Related Documentation

- *Including a Textual Description in DHCP Options*
- [Using DHCP Relay Agent Option 82 Information on page 657](#)
- *Configuring DHCPv6 Relay Agent Options*

use-primary (DHCP Local Server)

Syntax	<code>use-primary <i>primary-profile-name</i>;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dynamic-profile <i>profile-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> dynamic-profile <i>profile-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dynamic-profile <i>profile-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group <i>group-name</i> dynamic-profile <i>profile-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dynamic-profile <i>profile-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group <i>group-name</i> dynamic-profile <i>profile-name</i>],</p> <p>[edit system services dhcp-local-server dynamic-profile <i>profile-name</i>],</p> <p>[edit system services dhcp-local-server group <i>group-name</i> dynamic-profile <i>profile-name</i>]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.3.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Specify the dynamic profile to configure as the primary dynamic profile. The primary dynamic profile is instantiated when the first subscriber or DHCP client logs in. Subsequent subscribers (or clients) are not assigned the primary dynamic profile; instead, they are assigned the dynamic profile specified for the interface. When the first subscriber (or client) logs out, the next subscriber (or client) that logs in is assigned the primary dynamic profile.
Options	<i>primary-profile-name</i> —Name of the dynamic profile to configure as the primary dynamic profile
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"> • Attaching Dynamic Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces on page 681

use-primary (DHCP Relay Agent)

Syntax	<code>use-primary <i>primary-profile-name</i>;</code>
Hierarchy Level	<p>[edit forwarding-options dhcp-relay dhcpv6 dynamic-profile <i>profile-name</i>],</p> <p>[edit forwarding-options dhcp-relay dynamic-profile <i>profile-name</i>],</p> <p>[edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> dynamic-profile <i>profile-name</i>],</p> <p>[edit forwarding-options dhcp-relay dual-stack-group <i>dual-stack-group-name</i> dynamic-profile <i>profile-name</i>],</p> <p>[edit forwarding-options dhcp-relay group <i>group-name</i> dynamic-profile <i>profile-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 dynamic-profile <i>profile-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dynamic-profile <i>profile-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dynamic-profile <i>profile-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> dynamic-profile <i>profile-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> dynamic-profile <i>profile-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 dynamic-profile <i>profile-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dynamic-profile <i>profile-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> dynamic-profile <i>profile-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> dynamic-profile <i>profile-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 dynamic-profile <i>profile-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dynamic-profile <i>profile-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> dynamic-profile <i>profile-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> dynamic-profile <i>profile-name</i>]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.3.</p> <p>Support at the [edit ... dhcpv6] hierarchy levels introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.1 for EX Series switches.</p> <p>Support at the [edit ... dual-stack-group <i>dual-stack-group-name</i>] hierarchy level introduced in Junos OS Release 15.1.</p>
Description	<p>Specify the dynamic profile to configure as the primary dynamic profile. The primary dynamic profile is instantiated when the first subscriber logs in. Subsequent subscribers are not assigned the primary dynamic profile; instead, they are assigned the dynamic profile specified for the interface. When the first subscriber logs out, the next subscriber that logs in is assigned the primary dynamic profile.</p> <p>Use the statement at the [edit ... dhcpv6] hierarchy levels to configure DHCPv6 support.</p> <p>EX Series switches do not support DHCPv6.</p>

Options *primary-profile-name*—Name of the dynamic profile to configure as the primary dynamic profile

Required Privilege system—To view this statement in the configuration.

Level system-control—To add this statement to the configuration.

Related Documentation • [Attaching Dynamic Profiles to DHCP Subscriber Interfaces or DHCP Client Interfaces on page 681](#)

use-vlan-id

Syntax	<code>use-vlan-id;</code>
For Platforms with Enhanced Layer 2 Software (ELS)	<code>[edit forwarding-options helpers bootp dhcp-option82-circuit-id]</code> <code>[edit forwarding-options helpers bootp interface <i>interface-name</i> dhcp-option82-circuit-id]</code>
For MX Series Platforms	<code>[edit bridge-domains <i>bridge-domain-name</i> forwarding-options dhcp-security option-82 circuit-id]</code>
Release Information	<p>Statement introduced in Junos OS Release 9.3 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Hierarchy level <code>[edit vlans <i>vlan-name</i> forwarding-options dhcp-security]</code> introduced in Junos OS Release 13.2X50-D10. (See <i>Using the Enhanced Layer 2 Software CLI</i> for information about ELS.)</p> <p>Hierarchy level <code>[edit bridge-domains <i>bridge-domain-name</i> forwarding-options dhcp-security]</code> introduced in Junos OS Release 14.1 for the MX Series.</p>



NOTE: The EX Series switches that support the `use-vlan-id` statement are the EX4300, EX4600, and EX9200 switches.

Description Use the VLAN ID rather than the VLAN name (the default) in the circuit ID or remote ID value in the DHCP option 82 information.



NOTE: The `use-vlan-id` statement is mutually exclusive with the `use-interface-description` and `no-vlan-interface-name` statements.

The `use-vlan-id` statement only applies to interfaces in a bridge domain. The format of the Agent Circuit ID or Agent Remote ID information for Fast Ethernet or Gigabit Ethernet interfaces is as follows:

```
(fe | ge)-fpc/pic/port.subunit:svlan_id-vlan_id
```



NOTE: The *subunit* is required and used to differentiate the interface for remote systems, and *svlan_id-vlan_id* represents the VLANs associated with the bridge domain.

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: Setting Up DHCP Option 82 with a Switch with No Relay Agent Between Clients and a DHCP Server</i> • <i>Example: Setting Up DHCP Option 82 with a Switch as a Relay Agent Between Clients and a DHCP Server</i> • <i>Setting Up DHCP Option 82 on the Switch with No Relay Agent Between Clients and DHCP Server (CLI Procedure)</i> • <i>Setting Up DHCP Option 82 with the Switch as a Relay Agent Between Clients and DHCP Server (CLI Procedure)</i> • RFC 3046, <i>DHCP Relay Agent Information Option</i>, at http://tools.ietf.org/html/rfc3046.

user (Access)

Syntax	<pre> user username { authentication { (encrypted-password "password" plain-text-password); load-key-file URL; remote-debug-permission (qfabric-admin qfabric-operator qfabric-user); ssh-dsa "public-key" <from hostname>; ssh-rsa "public-key" <from hostname>; } class class-name; full-name "complete-name"; uid uid-value; } </pre>
Hierarchy Level	[edit system login]
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 access permission for individual users.
Options	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	<ul style="list-style-type: none"> • Configuring Junos OS User Accounts on page 67 • class on page 1238

user (Access)

Syntax	<pre> user username { authentication { cli { prompt name; } class class-name; (encrypted-password "password" plain-text-password); full-name complete-name; load-key-file URL filename; ssh-dsa "public-key" <from hostname>; ssh-rsa "public-key" <from hostname>; uid uid-value; } } </pre>
Hierarchy Level	[edit system login]
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>Configure access permission for individual users. Starting in Junos OS Release 18.3R1, the ssh-dsa hostkey algorithm is deprecated— rather than immediately removed—to provide backward compatibility and a chance to bring your configuration into compliance with the new configuration.</p>
Options	<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>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 Junos OS User Accounts by Using a Configuration Group on page 84 • class on page 1236

user-defined-option-82

Syntax	<code>user-defined-option-82 <i>string</i>;</code>
Hierarchy Level	<p>[edit forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides user-defined-option82 <i>string</i>],</p> <p>[edit forwarding-options dhcp-relay group <i>group-name</i> overrides user-defined-option82 <i>string</i>],</p> <p>[edit forwarding-options dhcp-relay overrides user-defined-option82 <i>string</i>]</p>
Release Information	Statement introduced in Junos OS Release 17.2 for QFX Series switches.
Description	<p>Configure a custom text string to use as the interface description in the DHCP option 82 Agent Circuit ID (suboption 1) information. This text string is defined independently of the interface description that is configured using the description statement at the [edit interfaces <i>interface-name</i>] hierarchy level.</p> <p>The custom text string is configured using the user-defined-option-82 statement at the following hierarchy levels:</p> <ul style="list-style-type: none"> To configure a custom string on an interface level: <div>[edit forwarding-options dhcp-relay group <i>group-name</i> interface <i>interface-name</i> overrides user-defined-option82 <i>string</i>]</div> To configure a custom string at the group level: <div>[edit forwarding-options dhcp-relay group <i>group-name</i> overrides user-defined-option82 <i>string</i>]</div> To configure a custom string globally: <div>[edit forwarding-options dhcp-relay overrides user-defined-option82 <i>string</i>]</div> <p>You can define a custom string up to 251 characters in length. To include the custom string in the DHCP option 82 Agent Circuit ID, you must configure the user-defined statement at the [edit forwarding-options dhcp-relay group <i>group-name</i> relay-option-82 circuit-id] hierarchy level.</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"> Including a Textual Description in DHCP Options Using DHCP Relay Agent Option 82 Information on page 657

user-id

Syntax	<code>user-id {ascii <i>ascii</i> hexadecimal <i>hexadecimal</i>};</code>
Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcp-client client-identifier]
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Specify an ASCII or hexadecimal user ID for the Dynamic Host Configuration Protocol (DHCP) client.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	

usb-control

Syntax	<code>usb-control { command <i>binary-file-path</i>; disable; }</code>
Hierarchy Level	[edit system processes]
Release Information	Statement introduced in Junos OS Release 8.5 for SRX300, SRX320, SRX340, SRX345, and SRX550M devices.
Description	Specify the universal serial bus (USB) supervise process.
Options	<ul style="list-style-type: none"> command <i>binary-file-path</i>—Path to the binary process. disable—Disable the universal serial bus (USB) supervise process.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

user-keepalive

Syntax	<code>user-keepalive <i>minutes</i>;</code>
Hierarchy Level	[edit services captive-portal interface (all <i>interface-names</i>)]
Release Information	Statement introduced in Junos OS Release 16.1 for EX Series switches.
Description	The user-keepalive statement is used to extend a captive portal authentication session after the MAC table aging timer expires. The keep-alive timer is started when the MAC address of the authenticated host ages out of the Ethernet switching table. If traffic is received within the keep-alive timeout period, the timer is deleted. If there is no traffic within the keep-alive timeout period, the session is deleted, and the host must re-authenticate.
Default	Disabled. The captive portal authentication session ends when the associated MAC address ages out of the Ethernet switching table.
Options	minutes —Duration of keep-alive period. Range: 7 through 65535
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: Setting Up Captive Portal Authentication on an EX Series Switch on page 527• Configuring Captive Portal Authentication (CLI Procedure) on page 532• Understanding Authentication Session Timeout on page 516

user-prefix (DHCP Local Server)

Syntax	<code>user-prefix <i>user-prefix-string</i>;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server group group-name authentication username-include],</p> <p>[edit system services dhcp-local-server authentication username-include],</p> <p>[edit system services dhcp-local-server dhcpv6 authentication username-include],</p> <p>[edit system services dhcp-local-server dhcpv6 group group-name authentication username-include],</p> <p>[edit system services dhcp-local-server group group-name authentication username-include]</p>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Specify the user prefix that is concatenated with the username during the subscriber authentication or DHCP client authentication process.
Options	<i>user-prefix-string</i> —User prefix string.

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">• Using External AAA Authentication Services with DHCP on page 682

username-include (DHCP Local Server)

Syntax	<pre>username-include { circuit-type; client-id; delimiter <i>delimiter-character</i>; domain-name <i>domain-name-string</i>; interface-description (device-interface logical-interface); interface-name; logical-system-name; mac-address; option-60; option-82 <circuit-id> <remote-id>; relay-agent-interface-id; relay-agent-remote-id; relay-agent-subscriber-id; routing-instance-name; user-prefix <i>user-prefix-string</i>; vlan-tags; }</pre>
Hierarchy Level	<pre>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> system services dhcp-local-server ...], [edit logical-systems <i>logical-system-name</i> system services dhcp-local-server ...], [edit routing-instances <i>routing-instance-name</i> system services dhcp-local-server ...], [edit system services dhcp-local-server authentication], [edit system services dhcp-local-server dhcpv6 authentication], [edit system services dhcp-local-server dhcpv6 group group-name authentication], [edit system services dhcp-local-server group group-name authentication]</pre>
Release Information	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>vlan-tags option added in Junos OS Release 18.3R1 on MX Series routers.</p>
Description	<p>Configure the username that the router or switch passes to the external AAA server. You must include at least one of the optional statements for the username to be valid. If you do not configure a username, the router (or switch) accesses the local authentication service only and does not use external authentication services, such as RADIUS.</p> <p>The following statements are not supported in the DHCPv6 hierarchy levels:</p> <ul style="list-style-type: none"> • option-60 • option-82 <p>The following statements are supported in the DHCPv6 hierarchy levels only:</p> <ul style="list-style-type: none"> • client-id • relay-agent-interface-id • relay-agent-remote-id

- relay-agent-subscriber-id

Options **vlan-tags**—Include the subscriber session VLAN tags in the username for interactions with an external authority. Both single-tagged and double-tagged VLANs are supported: The tags are added in the format ***outer-vlan-tag-inner-vlan-tag***. The outer tag is always included; the inner tag is included for double-tagged VLANs.

Use this option instead of the **interface-name** option when the outer VLAN tag is unique across the system and you do not need the underlying physical interface name to be part of the format.

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

- [Using External AAA Authentication Services with DHCP on page 682](#)
- [Creating Unique Usernames for DHCP Clients on page 684](#)

username-include (DHCP Relay Agent)

Syntax

```
username-include {
  circuit-type;
  client-id;
  delimiter delimiter-character;
  domain-name domain-name-string;
  interface-description (device-interface | logical-interface);
  interface-name;
  logical-system-name;
  mac-address;
  option-60;
  option-82 <circuit-id> <remote-id>;
  relay-agent-interface-id;
  relay-agent-remote-id;
  relay-agent-subscriber-id;
  routing-instance-name;
  user-prefix user-prefix-string;
  vlan-tags;
}
```

Hierarchy Level

```
[edit forwarding-options dhcp-relay authentication],
[edit forwarding-options dhcp-relay dhcpv6 authentication],
[edit forwarding-options dhcp-relay dhcpv6 group group-name authentication],
[edit forwarding-options dhcp-relay dual-stack-group dual-stack-group-name authentication],
[edit forwarding-options dhcp-relay group group-name authentication],
[edit logical-systems logical-system-name forwarding-options dhcp-relay ...],
[edit logical-systems logical-system-name routing-instances routing-instance-name
 forwarding-options dhcp-relay ...],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay ...]
```

Release Information

Statement introduced in Junos OS Release 9.1.

Statement introduced in Junos OS Release 12.3R2 for EX Series switches.

Support at the **[edit ... dhcpv6]** hierarchy levels introduced in Junos OS Release 11.4.

Support at the **[edit ... dual-stack-group dual-stack-group-name]** hierarchy level introduced in Junos OS Release 15.1.

vlan-tags option added in Junos OS Release 18.3R1 on MX Series routers.

Description

Configure the username that the router (or switch) passes to the external AAA server. You must include at least one of the optional statements for the username to be valid. If you do not configure a username, the router (or switch) accesses the local authentication service only and does not use external authentication services, such as RADIUS. Use the statement at the **[edit...dhcpv6]** hierarchy levels to configure DHCPv6 support.

The following statements are not supported in the DHCPv6 hierarchy levels:

- **option-60**
- **option-82**

The following statements are supported in the DHCPv6 hierarchy levels only:

- **client-id**
- **relay-agent-interface-id**
- **relay-agent-remote-id**
- **relay-agent-subscriber-id**

Options **vlan-tags**—Include the subscriber session VLAN tags in the username for interactions with an external authority. Both single-tagged and double-tagged VLANs are supported: The tags are added in the format ***outer-vlan-tag-inner-vlan-tag***. The outer tag is always included; the inner tag is included for double-tagged VLANs.

Use this option instead of the **interface-name** option when the outer VLAN tag is unique across the system and you do not need the underlying physical interface name to be part of the format.

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 interface—To view this statement in the configuration.
 interface-control—To add this statement to the configuration.

Related Documentation • [Creating Unique Usernames for DHCP Clients on page 684](#)
 • [Using External AAA Authentication Services with DHCP on page 682](#)

vendor-id

Syntax	<code>vendor-id <i>vendor-id</i>;</code>
Hierarchy Level	<code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> dhcp-client]</code>
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Configure a vendor class ID for the Dynamic Host Configuration Protocol (DHCP) client.
Options	vendor-id —Vendor class ID.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	

vendor-option

Syntax

```
vendor-option {  
  default-local-server-group local-server-group-name |  
  default-relay-server-group server-group-name  
  drop;  
  equals  
  starts-with  
}
```

Hierarchy Level [edit forwarding-options dhcp-relay relay-option-60]

Release Information Statement introduced before Junos OS Release 12.1 for EX Series switches.
Statement deprecated in Junos OS Release 12.3 for EX Series switches.

Description Configure the match criteria when you use the DHCP vendor class identifier option (option 60) in DHCP client packets to forward client traffic to specific DHCP servers. The extended DHCP relay agent compares the option 60 vendor-specific strings received in DHCP client packets against the match criteria that you specify. If there is a match, you can define certain actions for the associated DHCP client packets.



NOTE: The `vendor-option` statement has been deprecated and might be removed from future product releases. We recommend that you phase out its use. See [option-number](#).

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

Related Documentation

- [Configuring an Extended DHCP Relay Server on EX Series Switches \(CLI Procedure\) on page 626](#)
- [Understanding the Extended DHCP Relay Agent for EX Series Switches on page 634](#)

vendor-option

Syntax

```
vendor-option {
  (default-relay-server-group server-group-name | default-local-server-group
   local-server-group-name | drop);
  (equals | starts-with) (ascii match-string | hexadecimal match-hex) {
    (drop | local-server-group local-server-group-name | relay-server-group
     server-group-name);
  }
}
```

Hierarchy Level

```
[edit forwarding-options dhcp-relay relay-option-60],
[edit forwarding-options dhcp-relay group group-name relay-option-60],
[edit logical-systems logical-system-name forwarding-options dhcp-relay relay-option-60],
[edit logical-systems logical-system-name forwarding-options dhcp-relay group group-name
 relay-option-60],
[edit logical-systems logical-system-name routing-instances routing-instance-name
 forwarding-options dhcp-relay relay-option-60],
[edit logical-systems logical-system-name routing-instances routing-instance-name
 forwarding-options dhcp-relay group group-name relay-option-60],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay
 relay-option-60],
[edit routing-instances routing-instance-name forwarding-options dhcp-relay group
 group-name relay-option-60]
```

Release Information Statement introduced in JUNOS Release 9.0.

Description Configure the match criteria when you use the DHCP vendor class identifier option (option 60) in DHCP client packets to forward client traffic to specific DHCP servers. The extended DHCP relay agent compares the option 60 vendor-specific strings received in DHCP client packets against the match criteria that you specify. If there is a match, you can define certain actions for the associated DHCP client packets.

The **vendor-option** statement enables you to specify either an exact, left-to-right match (with the **equals** statement) or a partial match (with the **starts-with** statement), and configure either an ASCII match string (with the **ascii** statement) or a hexadecimal match string (with the **hexadecimal** statement).

You can configure an unlimited number of match strings. Match strings do not support the use of wildcard attributes.

Options **equals**—Exact, left-to-right match of the ASCII or hexadecimal match string with the option 60 string.

starts-with—Partial match of the ASCII or hexadecimal match string with the option 60 string. The option 60 string can contain a superset of the ASCII or hexadecimal match string, provided that the leftmost characters of the option 60 string entirely match the characters in the configured match string. When you use the **starts-with**

statement, the longest match rule applies; that is, the router matches the string "test123" before it matches the string "test".

ascii *match-string*—ASCII match string of 1 through 255 alphanumeric characters.

hexadecimal *match-hex*—Hexadecimal match string of 1 through 255 hexadecimal characters (0 through 9, a through f, A through F).

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">• <i>Using Option 60 Information to Forward Client Traffic to Specific DHCP Servers</i>
------------------------------	---

version (BFD)

Syntax	<code>version (0 1 automatic);</code>
Hierarchy Level	<pre>[edit logical-systems <i>logical-system-name</i> protocols ldp oam bfd-liveness-detection], [edit logical-systems <i>logical-system-name</i> protocols ldp oam fec <i>address</i> bfd-liveness-detection], [edit system services dhcp-local-server liveness-detection method <i>bfd</i>], [edit system services dhcp-local-server dhcpv6 liveness-detection method <i>bfd</i>], [edit forwarding-options dhcp-relay liveness-detection method <i>bfd</i>], [edit forwarding-options dhcp-relay dhcpv6 liveness-detection method <i>bfd</i>], [edit system services dhcp-local-server group <i>group-name</i> liveness-detection method <i>bfd</i>], [edit system services dhcp-local-server dhcpv6 group <i>group-name</i> liveness-detection method <i>bfd</i>], [edit forwarding-options dhcp-relay group <i>group-name</i> liveness-detection method <i>bfd</i>], [edit forwarding-options dhcp-relay dhcpv6 group <i>group-name</i> liveness-detection method <i>bfd</i>], [edit protocols ldp oam bfd-liveness-detection], [edit protocols ldp oam fec <i>address</i> bfd-liveness-detection]</pre>
Release Information	<p>Statement introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	Configure the BFD protocol version to detect.
Options	<p>0—Use BFD protocol version 0.</p> <p>1—Use BFD protocol version 1.</p> <p>automatic—Autodetect the BFD protocol version.</p> <p>Default: automatic</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"> • <i>Example: Configuring Group Liveness Detection with BFD for DHCP Local Server Clients</i> • Example: Configuring Global Liveness Detection with BFD for DHCP Relay Agent Clients on page 714 • <i>Configuring BFD for LDP LSPs</i>

version (SNMP)

Syntax	version (all v1 v2);
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, 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	all—Send an SNMPv1 and SNMPv2 trap for every trap condition.
Options	<p>all—Send an SNMPv1 and SNMPv2 trap for every trap condition.</p> <p>v1—Send SNMPv1 traps only.</p> <p>v2—Send SNMPv2 traps only.</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 Trap Groups• Configuring SNMP Trap Groups

view-configuration

	Can view all of the configuration (not including secrets).
Commands	No associated CLI commands.
Configuration Hierarchy Levels	No associated CLI configuration hierarchy levels and statements.
Related Documentation	<ul style="list-style-type: none">• Understanding Junos OS Access Privilege Levels on page 107• Example: Configuring User Permissions with Access Privilege Levels on page 113

- [Example: Configuring User Permissions with Access Privileges for Operational Mode Commands on page 125](#)
- [Example: Configuring User Permissions with Access Privileges for Configuration Statements and Hierarchies on page 138](#)

vlan (VoIP)

Syntax	<code>vlan (<i>vlan-id</i> <i>vlan-name</i> untagged);</code>
Hierarchy Level	[edit ethernet-switching-options voip interface (VoIP) (all [<i>interface-name</i> access-ports])
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	(EX Series switches only) Specify the VLAN name or VLAN tag identifier associated with the VLAN to be sent from the authenticating server to the IP phone.
Options	<p><i>vlan-name</i>—Name of a VLAN.</p> <p><i>vlan-id</i>—The VLAN tag identifier.</p> <p>Range: 0 through 4095. Tags 0 and 4095 are reserved by Junos OS; do not configure them.</p> <p><i>untagged</i>—Allow untagged VLAN traffic.</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"> • Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455 • Example: Configuring VoIP on an EX Series Switch Without Including 802.1X Authentication on page 468 • Example: Configuring VoIP on an EX Series Switch Without Including LLDP-MED Support on page 463

vlan-assignment

Syntax	<code>vlan-assignment (vlan-id vlan-name);</code>
Hierarchy Level	<code>[edit protocols dot1x authenticator authentication-profile-name static (Protocols 802.1X) mac-address];</code> <code>[edit ethernet-switching-options authentication-whitelist];</code> <code>[edit switch-options authentication-whitelist]</code>
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement added to the <code>[edit ethernet-switching-options authentication-whitelist]</code> hierarchy in Junos OS Release 10.1 for EX Series switches. Statement added to the <code>[edit switch-options authentication-whitelist]</code> hierarchy in Junos OS Release 13.2X50-D10 for EX Series switches. Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	Configure the VLAN that is associated with the list of MAC addresses that are excluded from RADIUS authentication.
Options	<code>vlan-id vlan-name</code> —The name of the VLAN or the VLAN tag identifier to associate with the device. The VLAN already exists on the switch.
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">• show dot1x static-mac-address on page 2094• Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch on page 509• Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527• Understanding Authentication on Switches on page 348• Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527• Configuring Captive Portal Authentication (CLI Procedure) on page 532

vlan-nas-port-stacked-format

Syntax	<code>vlan-nas-port-stacked-format;</code>
Hierarchy Level	<code>[edit access profile <i>profile-name</i> radius options]</code>
Release Information	Statement introduced in Junos OS Release 9.1. Statement introduced in Junos OS Release 9.1 for EX Series switches.
Description	Configure RADIUS attribute 5 (NAS-Port) to include the S-VLAN ID, in addition to the VLAN ID, for subscribers on Ethernet interfaces.
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"> • <i>Configuring RADIUS Server Options for Subscriber Access</i> • <i>Configuring Authentication and Accounting Parameters for Subscriber Access</i>

vpn (Forwarding Options)

Syntax	<code>vpn;</code>
Hierarchy Level	<code>[edit forwarding-options dhcp-relay]</code>
Release Information	Statement introduced in Junos OS Release 9.0. Statement changed from vpn to source-ip-change in Junos OS Release 15.1X49-D130 and later releases.
Description	For Dynamic Host Configuration Protocol (DHCP) client request forwarding, enable source IP change for the device to use address of egress interface as source IP address.
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"> • DHCP Server, Client, and Relay Agent Overview on page 742

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	all —Send an SNMPv1 and SNMPv2 trap for every trap condition.
Options	<p>all—Send an SNMPv1 and SNMPv2 trap for every trap condition.</p> <p>v1—Send SNMPv1 traps only.</p> <p>v2—Send SNMPv2 traps only.</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">• <i>Configuring SNMP Trap Groups</i>• <i>Configuring SNMP Trap Groups</i>

versioning

Syntax	versioning;
Hierarchy Level	[edit system dynamic-profile-options]
Release Information	Statement introduced in Junos OS Release 11.4.
Description	Enable version support for dynamic profiles on the system.
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>Enabling Dynamic Profiles to Use Multiple Versions</i>

voip

Syntax	<pre> voip { interface (all [<i>interface-name</i> access-ports]) { vlan <i>vlan-name</i> ; forwarding-class <assured-forwarding best-effort expedited-forwarding network-control>; } } </pre>
Hierarchy Level	<pre> [edit ethernet-switching-options]; [edit switch-options] </pre>
Release Information	<p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 14.1X53-D30 for the QFX Series.</p>
Description	<p>Configure VoIP interfaces.</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"> • Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455 • Example: Configuring VoIP on an EX Series Switch Without Including 802.1X Authentication on page 468 • Example: Configuring VoIP on an EX Series Switch Without Including LLDP-MED Support on page 463

what

Syntax	<code>what <i>number</i>;</code>
Hierarchy Level	[edit protocols lldp-med interface (all <i>interface-name</i>) location civic-based]
Release Information	Statement introduced in Junos OS Release 9.0 for EX Series switches. Modified in Junos OS Release 9.2 for EX Series switches to display new default.
Description	<p>For Link Layer Discovery Protocol–Media Endpoint Device (LLDP-MED), configure the location to which the DHCP entry refers. This information is advertised, along with other location information, from the switch to the MED. It is used during emergency calls to identify the location of the MED.</p> <p>Options 0 and 1 should not be used unless it is known that the DHCP client is in close physical proximity to the server or network element.</p>
Default	1
Options	<p><i>number</i>—Location:</p> <ul style="list-style-type: none"> • 0—Location of the DHCP server. • 1—Location of a network element believed to be closest to the client. • 2—Location of the client.
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"> • show lldp on page 2109 • Example: Setting Up VoIP with 802.1X and LLDP-MED on an EX Series Switch on page 455 • Configuring LLDP-MED (CLI Procedure) on page 566

wait-for-acct-on-ack (Access Profile)

Syntax	wait-for-acct-on-ack;
Hierarchy Level	[edit access profile <i>profile-name</i> accounting]
Release Information	<p>Statement introduced in Junos OS Release 12.3.</p> <p>Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.</p>
Description	<p>Configure the router's authd process to wait for an Acct-On-Ack response message from RADIUS before sending new authentication and accounting updates to the RADIUS server. This configuration ensures that when a new subscriber session starts, the authentication and accounting information for the new session does not get deleted when RADIUS clears previously existing session state information.</p> <p>At subscriber session startup, the Junos OS authd process sends an Acct-On message to the RADIUS server and the new session starts authentication and accounting operations. However, in some service provider environments, upon receipt of the Acct-On message, the RADIUS server cleans up the previous session state and removes accounting statistics. In this scenario, the RADIUS server's cleanup operation can inadvertently delete the new session's authentication and accounting information, which might include customer billing information.</p> <p>To ensure that the new session's authentication and accounting information is not deleted, you can include the wait-for-acct-on-ack statement to configure authd to wait for an Acct-On-Ack response message from the RADIUS accounting server, so the RADIUS cleanup can finish before authd sends any new authentication and accounting updates.</p>
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">• <i>Configuring RADIUS Server Parameters for Subscriber Access</i>• <i>Configuring Per-Subscriber Session Accounting</i>

watchdog

Syntax

```
watchdog {  
  disable;  
  enable;  
  timeout value;  
}
```

Hierarchy Level [edit system processes]

Release Information Statement introduced in Junos OS Release 8.5.

Description Enable or disable the watchdog timer when Junos OS encounters a problem.

- Options**
- **disable**—Disable the watchdog timer.
 - **enable**—Enable the watchdog timer.
 - **timeout *value***—Specify amount of time to wait in seconds.
Range: 1 through 3600 seconds.

Required Privilege Level

system	—To view this statement in the configuration.
system-control	—To add this statement to the configuration.

web-management

Syntax	<pre>web-management { http { interfaces [<i>interface-names</i>]; port <i>port</i>; } https { interfaces [<i>interface-names</i>]; local-certificate <i>name</i>; port <i>port</i>; } }</pre>
Hierarchy Level	[edit system services]
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>Configure settings for HTTP or HTTPS access. HTTP access allows management of the router or switch using the browser-based J-Web graphical user interface. HTTPS access allows secure management of the router or switch using the J-Web interface. With HTTPS access, communication between the router or switch Web server and your browser is encrypted.</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"> • <i>Configuring Management Access for the EX Series Switch (J-Web Procedure)</i> • <i>J-Web Interface User Guide</i> • http on page 1424 • https on page 1425 • port on page 1621

web-management

Syntax	<pre>web-management { 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 Web management process.
Options	<ul style="list-style-type: none"> • disable—Disable the Web management 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.

web-management (System Services)

```
Syntax web-management {
    http {
        interfaces interface-names ;
        port port;
    }
    https {
        interfaces interface-names;
        local-certificate name;
        pki-local-certificate name;
        system-generated-certificate name;
        port port;
    }
    management url management url;
    session {
        idle-timout minutes;
        session-limit number;
    }
    traceoptions {
        file {
            filename;
            files number;
            match regular-expression;
            size maximum-file-size;
            (no-world-readable | world-readable);
        }
        flag flag;
        level level;
        no-remote-trace;
    }
}
```

Hierarchy Level [edit system services]

Release Information Statement introduced in Junos OS Release 9.0.
Support for **https** introduced for SRX5400, SRX5600, and SRX5800 devices starting from Junos OS Release 12.1X44-D10 and on vSRX, SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices starting from Junos OS Release 15.1X49-D40.

Description Configure settings for HTTP or HTTPS access. HTTP access allows management of the device using the J-Web interface. HTTPS access allows secure management of the device using the J-Web interface. With HTTPS access, communication is encrypted between your browser and the webserver for your device.



NOTE: On SRX340 and SRX345 devices, the factory-default configuration has a generic HTTP configuration. To use ge and fxp0 ports as management ports, you must use the set system services web-management http command.

The Web management HTTP and HTTPS interfaces are changed to fxp0.0 and from ge-0/0/1.0 through ge-0/0/7.0.

.....

Options **control**—Disable the SBC process.

- **max-threads**—Maximum simultaneous threads to handle requests.

Range: 0 through 16

http—Configure HTTP.

- **interface** *[value]*—Interface value that accepts HTTP access.
- **port** *number*—TCP port for incoming HTTP connections.

Range: 1 through 65,535

https—Configure HTTPS.

- **interface** *[value]*—Interface value that accept HTTP access.
 - **port** *number*—TCP port for incoming HTTP connections.
- Range:** 1 through 65,535
- **local-certificate**—X.509 certificate to use from the configuration.
 - **pki-local-certificate**—X.509 certificate to use from the PKI local store.
 - **system-generated-certificate**—X.509 certificate generated automatically by the system.

management url *management url*—URL path for Web management access.

session—Configure the Web-management session.

- **idle-timeout** *minutes*—Default timeout of Web-management sessions in minutes.
- **session-limit** *number*—Maximum number of Web-management sessions to allow.

traceoptions—Set the trace options.

- **file**—Configure the trace file information.
 - *filename*—Name of the file to receive the output of the tracing operation. Enclose the name in 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 **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 **size** *maximum file-size* option.

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).

Range: 10 KB through 1 GB

Default: 128 KB

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files *number*** option.

- **(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 *flag***—Specify which tracing operation to perform. To specify more than one tracing operation, include multiple **flag** statements. You can include the following flags.
 - **all**—Trace all areas.
 - **configuration**—Trace configuration.
 - **dynamic-vpn**—Trace dynamic VPN events.
 - **init**—Trace the daemon init process.
 - **mgd**—Trace MGD requests.
 - **webauth**—Trace Web authentication requests.
- **level *level*** —Specify the level of debugging output.
 - **all**—Match all levels.
 - **error**—Match error conditions.
 - **info**—Match informational messages.
 - **notice**—Match conditions that should be handled specially.
 - **verbose**—Match verbose messages.
 - **warning**—Match warning messages.
- **no-remote-trace**—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**
- *Firewall User Authentication Overview*
 - *Dynamic VPN Overview*

wins-server (System)

Syntax	<pre>wins-server { address; }</pre>
Hierarchy Level	<pre>[edit system services dhcp], [edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]</pre>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	For J Series Services Routers and EX Series switches only. Specify one or more NetBIOS Name Servers. When a DHCP client is added to the network and assigned an IP address, the NetBIOS Name Server manages the Windows Internet Name Service (WINS) database that matches IP addresses (such as 192.168.1.3) to Windows NetBIOS names (such as \\Marketing). List servers in order of preference.
Options	address —IPv4 address of the NetBIOS Name Server running WINS. To configure multiple servers, include multiple address options.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	

wins-server (System)

Syntax	<pre>wins-server { address; }</pre>
Hierarchy Level	[edit system services dhcp], [edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	For J Series Services Routers and EX Series switches only. Specify one or more NetBIOS Name Servers. When a DHCP client is added to the network and assigned an IP address, the NetBIOS Name Server manages the Windows Internet Name Service (WINS) database that matches IP addresses (such as 192.168.1.3) to Windows NetBIOS names (such as \\Marketing). List servers in order of preference.
Options	address —IPv4 address of the NetBIOS Name Server running WINS. To configure multiple servers, include multiple address options.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	

xnm-clear-text

Syntax	<pre>xnm-clear-text { connection-limit <i>limit</i>; rate-limit <i>limit</i>; }</pre>
Hierarchy Level	[edit system services]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	<p>Allow Junos XML protocol clear-text requests from remote systems to the local router.</p> <p>The remaining statements are explained separately.</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">• Configuring clear-text or SSL Service for Junos XML Protocol Client Applications on page 263

xnm-ssl

Syntax

```
xnm-ssl {
  connection-limit limit;
  rate-limit limit;
  ssl-renegotiation ;
}
```

Hierarchy Level [edit system services]

Release Information Statement introduced before Junos OS Release 7.4.
Support for the **ssl-renegotiation** statement added in Junos OS Release 13.3.

Description Allow Junos XML protocol SSL requests from remote systems to the local router.
The remaining statements are explained separately.



WARNING: Starting with Junos OS Release 15.1, the **sslv3-support** option is not available for configuration with the **set system services xnm-ssl** and **file copy** commands. SSLv3 is no longer supported and available.

For all releases prior to and including Junos OS Release 14.2, SSLv3 is disabled by default at runtime. The **sslv3-support** option is hidden and deprecated in Junos OS Release 14.2 and earlier releases. However, you can use the **set system services xnm-ssl sslv3-support** command to enable SSLv3 for a Junos XML protocol client application to use as the protocol to connect to the Junos XML protocol server on a router, and you can use the **file copy source destination sslv3-support** command to enable the copying of files from an SSLv3 URL.

Using SSLv3 presents a potential security vulnerability, and we recommend that you not use SSLv3. For more details about this security vulnerability, go to <https://kb.juniper.net/InfoCenter/index?page=content&id=JSA10656>.

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

Related Documentation

- [Configuring clear-text or SSL Service for Junos XML Protocol Client Applications on page 263](#)

CHAPTER 27

Operational Commands

- clear captive-portal
- clear dhcp client binding
- clear dhcp client statistics
- clear dhcp relay binding
- clear dhcp relay statistics
- clear dhcp server binding
- clear dhcp server statistics
- clear dhcpv6 client binding
- clear dhcpv6 client statistics
- clear dhcpv6 relay binding
- clear dhcpv6 relay statistics
- clear dhcpv6 server binding
- clear dhcpv6 server binding (Local Server)
- clear dhcpv6 server statistics
- clear dhcpv6 server statistics (Local Server)
- clear dot1x
- clear lldp neighbors
- clear lldp statistics
- clear lldp neighbors
- clear lldp statistics
- clear security pki local-certificate
- clear security ssh key-pair-identity
- clear system login logout
- clear system services dhcp binding
- clear system services dhcp conflict
- clear system services dhcp statistics
- request component login
- request dhcp client renew

- [request dhcp server reconfigure](#)
- [request dhcpv6 server reconfigure](#)
- [request dhcpv6 client renew](#)
- [request ipsec switch](#)
- [request message](#)
- [request security certificate enroll \(Signed\)](#)
- [request security certificate enroll \(Unsigned\)](#)
- [request security key-pair](#)
- [request security pki generate-key-pair](#)
- [request security pki local-certificate generate-self-signed](#)
- [request security ssh key-pair-identity generate](#)
- [request security tpm master-encryption-password set](#)
- [request system autorecovery state](#)
- [request system decrypt password](#)
- [request system download abort](#)
- [request system download clear](#)
- [request system download pause](#)
- [request system download resume](#)
- [request system download start](#)
- [request system firmware upgrade](#)
- [request system license update](#)
- [request system power-off fpc](#)
- [request system reboot](#)
- [request system reboot \(SRX Series\)](#)
- [request system services dhcp](#)
- [request system snapshot \(Maintenance\)](#)
- [request system software abort in-service-upgrade \(ICU\)](#)
- [request system software add \(Maintenance\)](#)
- [request system software rollback \(SRX Series\)](#)
- [request system zeroize](#)
- [Show SNMP on page 2005](#)
- [show captive-portal authentication-failed-users](#)
- [show captive-portal firewall](#)
- [show captive-portal interface](#)
- [show ethernet-switching interfaces](#)
- [show chassis routing-engine \(View\)](#)
- [show cli authorization](#)

- `show cli directory`
- `show dhcp client binding`
- `show dhcp client statistics`
- `show dhcp relay binding`
- `show dhcp relay statistics`
- `show dhcp server binding`
- `show dhcp server statistics`
- `show dhcpv6 client binding`
- `show dhcpv6 client statistics`
- `show dhcpv6 relay binding`
- `show dhcpv6 relay statistics`
- `show dhcpv6 server binding`
- `show dhcpv6 server binding (View)`
- `show dhcpv6 server statistics`
- `show dhcpv6 server statistics (View)`
- `show firewall (View)`
- `show dot1x`
- `show dot1x accounting attribute`
- `show dot1x authentication-failed-users`
- `show dot1x firewall`
- `show dot1x static-mac-address`
- `show dot1x statistics`
- `show ethernet-switching interfaces`
- `show ethernet-switching interface`
- `show lldp`
- `show lldp local-information`
- `show lldp neighbors`
- `show lldp neighbors`
- `show lldp statistics`
- `show lldp statistics`
- `show lldp remote-global-statistics`
- `show network-access aaa statistics accounting`
- `show network-access aaa statistics authentication`
- `show network-access aaa statistics dynamic-requests`
- `show route extensive`
- `show route instance`
- `show route protocol`

- `show security tpm status`
- `show security ssh key-pair-identity`
- `show security pki local-certificate`
- `show services unified-access-control authentication-table`
- `show services unified-access-control policies`
- `show services unified-access-control status`
- `show snmp statistics`
- `show ssl-certificates`
- `show subscribers`
- `show system autorecovery state`
- `show system license (View)`
- `show system login logout`
- `show system download`
- `show system services dhcp binding`
- `show system services dhcp client`
- `show system services dhcp conflict`
- `show system services dhcp global`
- `show system services dhcp pool`
- `show system services dhcp relay-statistics`
- `show system services dhcp statistics`
- `show system services service-deployment`
- `show system snapshot media`
- `show system storage partitions`
- `show system users`
- `test access profile`
- `test access radius-server`

clear captive-portal

Syntax	<code>clear captive-portal (firewall [<i>interface-names</i>] interface (802.1X) (all [<i>interface-names</i>]) mac-address [<i>mac-addresses</i>])</code>
Release Information	Command introduced in Junos OS Release 10.1 for EX Series switches. Command introduced in Junos OS Release 14.2 for MX240, MX480, and MX960 routers in enhanced LAN mode.
Description	Reset the authentication state of a captive portal interface or captive portal firewall statistics on one or more interfaces.
Options	<p>firewall [<i>interface-names</i>]—Resets captive portal statistics on all interfaces or on the specified interface.</p> <p>interface (all <i>interface-names</i>)—Resets the authentication state of users connected to all interfaces or the specified interfaces.</p> <p>mac-address <i>mac-addresses</i>—Resets the authentication state for the specified MAC addresses.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show captive-portal authentication-failed-users on page 2007 • show captive-portal interface on page 2011 • show captive-portal firewall on page 2009 • Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527 • Configuring Captive Portal Authentication (CLI Procedure) on page 532
List of Sample Output	clear captive-portal interface on page 1924 clear captive-portal interface on page 1924 clear captive-portal mac-address on page 1924 clear captive-portal firewall on page 1924
Output Fields	Table 63 on page 1923 lists the output fields for the clear captive-portal interface command. (The clear captive-portal firewall and clear captive-portal mac-address commands have no output). Output fields are listed in the approximate order in which they appear.

Table 63: clear captive-portal interface Output Fields

Field Name	Field Description
Interface	Interface on which captive portal has been configured.

Table 63: clear captive-portal interface Output Fields (continued)

Field Name	Field Description
State	<p>The state of the port:</p> <ul style="list-style-type: none"> • Authenticated—The client has been authenticated through the RADIUS server or has been permitted access through server fail fallback. • Authenticating—The client is authenticating through the RADIUS server. • Connecting—Switch is attempting to contact the RADIUS server. • Initialize—The interface link is down. • Held—An action has been triggered through server fail fallback during a RADIUS server timeout. A supplicant is denied access, permitted access through a specified VLAN, or maintains the authenticated state granted to it before the RADIUS server timeout occurred.
MAC address	The MAC address of the connected client on the interface.
User	Users connected to the captive portal interface.

Sample Output

clear captive-portal interface

```
user@switch> clear captive-portal interface
ge-0/0/3.0
```

clear captive-portal interface

```
user@switch> clear captive-portal interface

Captive Portal Information:
Interface      State      MAC address      User
ge-0/0/3.0     Authenticated  00:03:47:e1:ba:b9  ac1allow
ge-0/0/5.0     Connecting
ge-0/0/7.0     Connecting
ge-0/0/9.0     Connecting
```

clear captive-portal mac-address

```
user@switch> clear captive-portal mac-address 00:03:47:e1:ba:b9
This command has no output.
```

clear captive-portal firewall

```
user@switch> clear captive-portal firewall
This command has no output.
```


clear dhcp client binding

Syntax	clear dhcp client binding [all interface <interface-name>] [routing-instance <routing-instance-name>]
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Clear the binding state of a Dynamic Host Configuration Protocol (DHCP) client from the DHCP client table.
Options	<p>all—(Optional) Clear the binding state for all DHCP clients.</p> <p>interface <interface-name>—(Optional) Clear the binding state for DHCP clients on the specified interface.</p> <p>routing-instance <routing-instance-name>—(Optional) Clear the binding state for DHCP clients on the specified routing instance. If you do not specify a routing instance, binding state is cleared for DHCP clients on the default routing instance.</p>
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none"> • show dhcp client binding on page 2029
Output Fields	This command produces no output.

clear dhcp client statistics

Syntax	<code>clear dhcp client statistics</code> <code><all></code> <code><interface></code> <code><routing-instance></code>
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Clear all Dynamic Host Configuration Protocol (DHCP) client statistics.
Options	<p>all—(Optional) Clear all the DHCP client statistics.</p> <p>interface—(Optional) Clear the statistics for DHCP clients on the specified interface.</p> <p>routing-instance —(Optional) Clear the statistics for DHCP clients on the specified routing instance. If you do not specify a routing instance, statistics are cleared for the default routing instance.</p>
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none">• show dhcp client statistics on page 2032
Output Fields	This command produces no output.

clear dhcp relay binding

Syntax	<pre>clear dhcp relay binding <all ip-address mac-address> <interface interface-name> <routing-instance routing-instance-name></pre>
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Clear the binding state of a Dynamic Host Configuration Protocol (DHCP) client from the client table.
Options	<p>all—(Optional) Clear the binding state for all DHCP clients.</p> <p>ip-address— (Optional) Clear the binding state for the DHCP client, using the specified IP address.</p> <p>mac-address—(Optional) Clear the binding state for the DHCP client, using the specified MAC address.</p> <p>interface interface-name—(Optional) Clear the binding state for DHCP clients on the specified interface</p> <p>routing-instance routing-instance-name—(Optional) Clear the binding state for DHCP clients on the specified routing instance. If you do not specify a routing instance, the binding state is cleared for the default routing instance.</p>
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none"> • show dhcp relay binding on page 2035
Output Fields	This command produces no output.

clear dhcp relay statistics

Syntax	<code>clear dhcp relay statistics <routing-instance routing-instance-name></code>
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Clear all Dynamic Host Configuration Protocol (DHCP) relay statistics.
Options	routing-instance routing-instance-name —(Optional) Clear the DHCP relay statistics on the specified routing instance. If you do not specify a routing instance name, statistics are cleared for the default routing instance.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none">• show dhcp relay statistics on page 2038
Output Fields	This command produces no output.

clear dhcp server binding

Syntax	<pre>clear dhcp server binding <all ip-address mac-address> <interface interface-name> <routing-instance routing-instance-name></pre>
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Clear the binding state of a Dynamic Host Configuration Protocol (DHCP) client from the client table on the DHCP local server.
Options	<p>all—(Optional) Clear the binding state for all DHCP clients.</p> <p>ip-address— (Optional) Clear the binding state for the DHCP client, using the specified IP address.</p> <p>mac-address—(Optional) Clear the binding state for the DHCP client, using the specified MAC address.</p> <p>interface interface-name—(Optional) Clear the binding state for DHCP clients on the specified interface.</p> <p>routing-instance routing-instance-name—(Optional) Clear the binding state for DHCP clients on the specified routing instance.</p>
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none"> • show dhcp server binding on page 2040
Output Fields	This command produces no output.

clear dhcp server statistics

Syntax	<code>clear dhcp server statistics <routing-instance routing-instance-name></code>
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Clear all Dynamic Host Configuration Protocol (DHCP) local server statistics.
Options	routing-instance routing-instance-name —(Optional) Clear the statistics for DHCP clients on the specified routing instance. If you do not specify a routing instance, statistics are cleared for the default routing instance.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none">• show dhcp server statistics on page 2042
Output Fields	This command produces no output.

clear dhcpv6 client binding

Syntax	clear dhcpv6 client binding [all interface <i>interface-name</i>] [routing-instance <i>routing-instance-name</i>]
Release Information	Statement introduced in Junos OS Release 12.1X45-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Clear the binding state of a Dynamic Host Configuration Protocol (DHCPv6) client from the DHCPv6 client table.
Options	<p>all—(Optional) Clear the binding state for all DHCPv6 clients.</p> <p>interface <i>interface-name</i>—(Optional) Clear the binding state for DHCPv6 clients on the specified interface.</p> <p>routing-instance <i>routing-instance-name</i>—(Optional) Clear the binding state for DHCPv6 clients on the specified routing instance. If you do not specify a routing instance, the binding state is cleared for DHCPv6 clients on the default routing instance.</p>
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none"> • show dhcpv6 client binding on page 2044
Output Fields	This command produces no output.

clear dhcpv6 client statistics

Syntax	<code>clear dhcpv6 client statistics</code> <code>routing-instance <i>routing-instance-name</i></code>
Release Information	Statement introduced in Junos OS Release 12.1X45-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Clear all DHCPv6 client statistics.
Options	routing-instance <i>routing-instance-name</i> —(Optional) Clear the statistics for DHCPv6 clients on the specified routing instance. If you do not specify a routing instance, statistics are cleared for the default routing instance.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none">• show dhcpv6 client statistics on page 2046
Output Fields	This command produces no output.

clear dhcpv6 relay binding

Syntax	<pre>clear dhcpv6 relay binding <address> <all> <dual-stack> <interface interface-name> <interfaces-vlan> <interfaces-wildcard> <logical-system logical-system-name> <routing-instance routing-instance-name></pre>
Release Information	<p>Command introduced in Junos OS Release 11.4.</p> <p>Command introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Options <i>interfaces-vlan</i> and <i>interfaces-wildcard</i> added in Junos OS Release 12.1.</p> <p>Command introduced in Junos OS Release 12.1X48R3 for PTX Series Packet Transport Routers.</p> <p>Option dual-stack added in Junos OS Release 15.1.</p>
Description	Clear the binding state of Dynamic Host Configuration Protocol for IPv6 (DHCPv6) clients from the client table.
Options	<p>address—(Optional) Clear the binding state for the DHCPv6 client, using one of the following entries:</p> <ul style="list-style-type: none"> • <i>CID</i>—The specified Client ID (CID). • <i>ipv6-prefix</i>—The specified IPv6 prefix. • <i>session-id</i>—The specified session ID. <p>all—(Optional) Clear the binding state for all DHCPv6 clients.</p> <p>dual-stack—(Optional) Clear the binding state for DHCPv6 clients and the associated DHCPv4 bindings in the single-session DHCP dual stack. DHCPv4 clients created in a DHCPv4-only stack are not affected.</p> <p>interfaces-vlan—(Optional) Clear the binding state on the interface VLAN ID and S-VLAN ID.</p> <p>interfaces-wildcard—(Optional) The set of interfaces on which to clear bindings. This option supports the use of the wildcard character (*).</p> <p>interface interface-name—(Optional) Clear the binding state for DHCPv6 clients on the specified interface.</p> <p>logical-system logical-system-name—(Optional) Clear the binding state for DHCPv6 clients on the specified logical system.</p>

routing-instance *routing-instance-name*—(Optional) Clear the binding state for DHCPv6 clients on the specified routing instance.

Required Privilege Level view

Related Documentation

- [Viewing and Clearing DHCP Bindings](#)
- [show dhcpv6 relay binding on page 2049](#)

List of Sample Output

- [clear dhcpv6 relay binding on page 1934](#)
- [clear dhcpv6 relay binding <prefix> on page 1934](#)
- [clear dhcpv6 relay binding all on page 1935](#)
- [clear dhcpv6 relay binding dual-stack all on page 1935](#)
- [clear dhcpv6 relay binding interface on page 1935](#)
- [clear dhcpv6 relay binding <interfaces-vlan> on page 1935](#)
- [clear dhcpv6 relay binding <interfaces-wildcard> on page 1935](#)

Output Fields See [show dhcpv6 relay binding](#) for an explanation of output fields.

Sample Output

clear dhcpv6 relay binding

The following sample output displays the DHCPv6 bindings before and after the **clear dhcpv6 relay binding** command is issued.

```
user@host> show dhcpv6 relay binding
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:db8:3c4d:15::/64	1	83720	BOUND	ge-1/0/0.0	
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:01					
2001:db8:3c4d:16::/64	2	83720	BOUND	ge-1/0/0.0	
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:02					
2001:db8:3c4d:17::/64	3	83720	BOUND	ge-1/0/0.0	
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:03					
2001:db8:3c4d:18::/64	4	83720	BOUND	ge-1/0/0.0	
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:04					
2001:db8:3c4d:19::/64	5	83720	BOUND	ge-1/0/0.0	
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:05					
2001:db8:3c4d:20::/64	6	83720	BOUND	ge-1/0/0.0	
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:06					

clear dhcpv6 relay binding <prefix>

```
user@host> clear dhcpv6 relay binding 2001:db8:3c4d:15::/64
```

```
user@host> show dhcpv6 relay binding
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:db8:3c4d:16::/64	2	83720	BOUND	ge-1/0/0.0	
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:02					
2001:db8:3c4d:17::/64	3	83720	BOUND	ge-1/0/0.0	

```

LL_TIME0x1-0x4bfa26af-00:10:94:00:00:03
2001:db8:3c4d:18::/64      4      83720      BOUND      ge-1/0/0.0
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:04
2001:db8:3c4d:19::/64      5      83720      BOUND      ge-1/0/0.0
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:05
2001:db8:3c4d:20::/64      6      83720      BOUND      ge-1/0/0.0
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:06

```

clear dhcpv6 relay binding all

The following command clears all DHCP relay agent bindings:

```
user@host> clear dhcpv6 relay binding all
```

clear dhcpv6 relay binding dual-stack all

The following command clears all DHCPv6 relay agent bindings for all DHCPv6 clients and the associated DHCPv4 bindings in the single-session DHCP dual stack. DHCPv4 clients created in a DHCPv4-only stack are not affected.

```
user@host> clear dhcpv6 relay binding dual-stack all
```

clear dhcpv6 relay binding interface

The following command clears DHCPv6 relay agent bindings on a specific interface:

```
user@host> clear dhcpv6 relay binding interface fe-0/0/2
```

clear dhcpv6 relay binding <interfaces-vlan>

The following command uses the *interfaces-vlan* option to clear all DHCPv6 relay agent bindings on top of the underlying interface **ae0**, which clears DHCPv6 bindings on all demux VLANs on top of **ae0**:

```
user@host> clear dhcpv6 relay binding interface ae0
```

clear dhcpv6 relay binding <interfaces-wildcard>

The following command uses the *interfaces-wildcard* option to clear all DHCPv6 relay agent bindings over a specific interface:

```
user@host> clear dhcpv6 relay binding ge-1/0/0.*
```

clear dhcpv6 relay statistics

Syntax	<pre>clear dhcpv6 relay statistics <bulk-leasequery-connections> <logical-system <i>logical-system-name</i>> <routing-instance <i>routing-instance-name</i>></pre>
Release Information	<p>Command introduced in Junos OS Release 11.4.</p> <p>Command introduced in Junos OS Release 12.1X48R3 for PTX Series Packet Transport Routers.</p> <p>bulk-leasequery-connections option introduced in Junos OS Release 16.1.</p>
Description	Clear all Dynamic Host Configuration Protocol for IPv6 (DHCPv6) relay statistics.
Options	<p>bulk-leasequery-connections—(Optional) Clear bulk leasequery statistics.</p> <p>logical-system <i>logical-system-name</i>—(Optional) Perform this operation on the specified logical system. If you do not specify a logical system name, statistics are cleared for the default logical system.</p> <p>routing-instance <i>routing-instance-name</i>—(Optional) Perform this operation on the specified routing instance. If you do not specify a routing instance name, statistics are cleared for the default routing instance.</p>
Required Privilege Level	view
List of Sample Output	clear dhcpv6 relay statistics on page 1936
Output Fields	See show dhcpv6 relay statistics for an explanation of output fields.

Sample Output

clear dhcpv6 relay statistics

The following sample output displays the DHCPv6 relay statistics before and after the **clear dhcpv6 relay statistics** command is issued.

```
user@host> show dhcpv6 relay statistics
```

```
DHCPv6 Packets dropped:
  Total                0
  Lease Time Violated  1

Messages received:
  DHCPV6_DECLINE        0
  DHCPV6_SOLICIT       10
  DHCPV6_INFORMATION_REQUEST  0
  DHCPV6_RELEASE        0
  DHCPV6_REQUEST       10
```

DHCPV6_CONFIRM	0
DHCPV6_RENEW	0
DHCPV6_REBIND	0
DHCPV6_RELAY_REPL	0

Messages sent:

DHCPV6_ADVERTISE	0
DHCPV6_REPLY	0
DHCPV6_RECONFIGURE	0
DHCPV6_RELAY_FORW	0

```
user@host> clear dhcpv6 relay statistics
```

```
user@host> show dhcpv6 relay statistics
```

DHCPv6 Packets dropped:

Total	0
-------	---

Messages received:

DHCPV6_DECLINE	0
DHCPV6_SOLICIT	0
DHCPV6_INFORMATION_REQUEST	0
DHCPV6_RELEASE	0
DHCPV6_REQUEST	0
DHCPV6_CONFIRM	0
DHCPV6_RENEW	0
DHCPV6_REBIND	0
DHCPV6_RELAY_REPL	0

Messages sent:

DHCPV6_ADVERTISE	0
DHCPV6_REPLY	0
DHCPV6_RECONFIGURE	0
DHCPV6_RELAY_FORW	0

clear dhcpv6 server binding

Syntax `clear dhcpv6 server binding`
 `<address>`
 `<all>`
 `<interface interface-name>`
 `<interfaces-vlan>`
 `<interfaces-wildcard>`
 `<logical-system logical-system-name>`
 `<routing-instance routing-instance-name>`
 `<dual-stack>`

Release Information Command introduced in Junos OS Release 9.6.
 Options *interfaces-vlan* and *interfaces-wildcard* added in Junos OS Release 12.1.
 Command updated with **dual-stack** statement in Junos OS Release 17.3.

Description Clear the binding state of a Dynamic Host Configuration Protocol for IPv6 (DHCPv6) client from the client table on the extended DHCPv6 local server.

Options **address**—(Optional) Clear the binding state for the DHCPv6 client, using one of the following entries:

- *CID*—The specified Client ID (CID).
- *ipv6-prefix*—The specified IPv6 prefix.
- *session-id*—The specified session ID.

all—(Optional) Clear the binding state for all DHCPv6 clients.

interface *interface-name*—(Optional) Clear the binding state for DHCPv6 clients on the specified interface.

interfaces-vlan—(Optional) Clear the binding state on the interface VLAN ID and S-VLAN ID.

interfaces-wildcard—(Optional) Clear bindings on a set of interfaces. This option supports the use of the wildcard character (*).

logical-system *logical-system-name*—(Optional) Clear the binding state for DHCPv6 clients on the specified logical system.

routing-instance *routing-instance-name*—(Optional) Clear the binding state for DHCPv6 clients on the specified routing instance.

dual-stack—(Optional) Remove either both arms or single arm of dual-stack.

**NOTE:**

- The **dual-stack** command is added in the syntax removes both arms of the dual-stack with a single command entry.
- When the **dual-stack** command is not added in the syntax, the **clear dhcpv6 server binding** command clears only the family specific arm of the dual-stack.

Required Privilege Level clear

Related Documentation

- [Viewing and Clearing DHCP Bindings](#)
- [show dhcpv6 server binding on page 2062](#)

List of Sample Output

[clear dhcpv6 server binding all on page 1939](#)
[clear dhcpv6 server binding <ipv6-prefix> on page 1939](#)
[clear dhcpv6 server binding interface on page 1939](#)
[clear dhcpv6 server binding <interfaces-vlan> on page 1940](#)
[clear dhcpv6 server binding <interfaces-wildcard> on page 1940](#)
[clear dhcpv6 server binding dual-stack all on page 1940](#)

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear dhcpv6 server binding all

The following command clears all DHCPv6 local server bindings:

```
user@host> clear dhcpv6 server binding all
```

clear dhcpv6 server binding <ipv6-prefix>

The following command clears DHCPv6 local server bindings for a specific IPv6 prefix:

```
user@host> clear dhcpv6 server binding 14/0x00010001/0x02b3be8f/0x00109400/0x0005
```

clear dhcpv6 server binding interface

The following command clears DHCPv6 local server bindings on a specific interface:

```
user@host> clear dhcpv6 server binding interface fe-0/0/2
```

`clear dhcpv6 server binding <interfaces-vlan>`

The following command uses the *interfaces-vlan* option to clear all DHCPv6 local server bindings on top of the underlying interface **ae0**, which clears DHCPv6 bindings on all demux VLANs on top of **ae0**:

```
user@host> clear dhcpv6 server binding interface ae0
```

`clear dhcpv6 server binding <interfaces-wildcard>`

The following command uses the *interfaces-wildcard* option to clear all DHCPv6 local server bindings over a specific interface:

```
user@host> clear dhcpv6 server binding ge-1/0/0.*
```

`clear dhcpv6 server binding dual-stack all`

The following command clears all the dual-stack local server bindings.

```
user@host> clear dhcpv6 server binding dual-stack all
```


clear dhcpv6 server binding (Local Server)

Syntax `clear dhcpv6 server binding
<all | client-id | ip-address | session-id>
<interface interface-name>
<routing-instance routing-instance-name>`

Release Information Command introduced in Junos OS Release 10.4.

Description Clear the binding state of a DHCPv6 client from the client table on the DHCPv6 local server.

- Options**
- *all*—(Optional) Clear the binding state for all DHCPv6 clients.
 - *client-id*—(Optional) Clear the binding state for the DHCPv6 client with the specified client ID (option 1).
 - *ip-address*—(Optional) Clear the binding state for the DHCPv6 client with the specified address.
 - *session-id*—(Optional) Clear the binding state for the DHCPv6 client with the specified session ID.
 - interface *interface-name*—(Optional) Clear the binding state for DHCPv6 clients on the specified interface.
 - routing-instance *routing-instance-name*—(Optional) Clear the binding state for DHCPv6 clients on the specified routing instance.

Required Privilege Level clear

Related Documentation • [show dhcpv6 server binding \(View\) on page 2069](#)

clear dhcpv6 server statistics

Syntax	<pre>clear dhcpv6 server statistics <bulk-leasequery-connections> <interface <i>interface-name</i>> <logical-system <i>logical-system-name</i>> <routing-instance <i>routing-instance-name</i>></pre>
Release Information	Command introduced in Junos OS Release 9.6. bulk-leasequery-connections option introduced in Junos OS Release 16.1.
Description	Clear all extended Dynamic Host Configuration Protocol for IPv6 (DHCPv6) local server statistics.
Options	bulk-leasequery-connections —(Optional) Clear bulk leasequery statistics. logical-system <i>logical-system-name</i> —(Optional) Clear the statistics for DHCPv6 clients on the specified logical system. If you do not specify a logical system, statistics are cleared for the default logical system. routing-instance <i>routing-instance-name</i> —(Optional) Clear the statistics for DHCPv6 clients on the specified routing instance. If you do not specify a routing instance, statistics are cleared for the default routing instance.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none">• show dhcpv6 server statistics on page 2073
List of Sample Output	clear dhcpv6 server statistics on page 1942
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear dhcpv6 server statistics

```
user@host> clear dhcpv6 server statistics
```

clear dhcpv6 server statistics (Local Server)

Syntax	<pre>clear dhcpv6 server statistics <logical-system <i>logical-system-name</i>> <routing-instance <i>routing-instance-name</i>></pre>
Release Information	Command introduced in Junos OS Release 10.4.
Description	Clear all DHCPv6 local server statistics.
Options	<p>logical-system <i>logical-system-name</i>—(Optional) Clear the statistics for DHCPv6 clients on the specified logical system. If you do not specify a logical system, statistics are cleared for the default logical system.</p> <p>routing-instance <i>routing-instance-name</i>—(Optional) Clear the statistics for DHCPv6 clients on the specified routing instance. If you do not specify a routing instance, statistics are cleared for the default routing instance.</p>
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none">• show dhcpv6 server statistics (View) on page 2077

clear dot1x

Syntax `clear dot1x (firewall <counter-name> | interface <[interface-name]> | mac-address [mac-addresses] | statistics <interface interface-name>)`

Release Information Command introduced in Junos OS Release 9.0 for EX Series switches.
firewall option added in Junos OS Release 9.5 for EX Series switches.
Command introduced in Junos OS Release 14.2 for MX240, MX480, and MX960 routers in enhanced LAN mode.
Command introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Support for **eapol-block** introduced in Junos OS Releases 14.1X53-D40 and 15.1X53-D51 for EX Series switches.

Description Reset the authentication state of an interface or delete 802.1X statistics from the switch. When you reset an interface using the **interface** or **mac-address** options, reauthentication on the interface is also triggered. The switch sends out a multicast message on the interface to restart the authentication of all connected supplicants. If a MAC address is reset, then the switch sends out a unicast message to that specific MAC address to restart authentication.

If a supplicant is sending traffic when the **clear dot1x interface** command is issued, the authenticator immediately initiates reauthentication. This process happens quickly, and it might seem that reauthentication did not occur. To verify that reauthentication has happened, issue the **show dot1x interface detail** command. The values for **Reauthentication due** and **Reauthentication interval** will be about the same.



CAUTION: When you clear the learned MAC addresses from an interface using the **clear dot1x interface** command, all MAC addresses are cleared, including those in static MAC bypass list.

If you have enabled Media Access Control Security (MACsec) using static secure association key (SAK) security mode on an EX Series switch, the SAKs are rotated when the **clear dot1x** command is entered. The **clear dot1x** command has no impact on MACsec when MACsec is enabled using static connectivity association keys (CAK) or any other security mode.

Options **eapol-block**—Clear EAPOL block on the interface and allow the switch to receive EAPOL messages from a supplicant connected to that interface.

firewall <counter-name>—Clear 802.1X firewall counter statistics. If the *counter-name* option is specified, clear 802.1X firewall statistics for that counter.

interface <[interface-name]>—Reset the authentication state of all the supplicants (also, clears all the authentication bypassed clients) connected to the specified

interface (when the interface is an authenticator) or reset the authentication state for the interface itself (when the interface is a supplicant).

mac-address [*mac-addresses*]—Reset the authentication state of the specified MAC addresses.

statistics <interface *interface-name*>—Clear 802.1X statistics on all 802.1X-enabled interfaces. If the **interface** option is specified, clear 802.1X firewall statistics for that interface or interfaces.

Required Privilege Level

view

Related Documentation

- [show dot1x on page 2082](#)
- [Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch on page 367](#)
- [Filtering 802.1X Supplicants by Using RADIUS Server Attributes on page 388](#)

List of Sample Output

[clear dot1x firewall on page 1945](#)
[clear dot1x interface \(Specific Interfaces\) on page 1945](#)
[clear dot1x mac-address \(Specific MAC Address\) on page 1945](#)
[clear dot1x statistics interface \(Specific Interface\) on page 1945](#)
[clear dot1x eapol-block on page 1945](#)

Sample Output

clear dot1x firewall

```
user@switch> clear dot1x firewall c1
```

clear dot1x interface (Specific Interfaces)

```
user@switch> clear dot1x interface ge-1/0/0 ge-2/0/0 ge-2/0/0 ge5/0/0
```

clear dot1x mac-address (Specific MAC Address)

```
user@switch> clear dot1x mac-address 00:04:ae:cd:23:5f
```

clear dot1x statistics interface (Specific Interface)

```
user@switch> clear dot1x statistics interface ge-1/0/1
```

clear dot1x eapol-block

```
user@switch> clear dot1x eapol-block
```

clear lldp neighbors

Syntax	<code>clear lldp neighbors</code> <code><interface <i>interface</i>></code>
Release Information	Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Clear the learned remote neighbor information on all or selected interfaces.
Options	none —Clear the remote neighbor information on all interfaces. interface <i>interface</i> —(Optional) Clear the remote neighbor information from one or more selected interfaces.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• show lldp on page 2109• Configuring LLDP (CLI Procedure) on page 556• Understanding LLDP and LLDP-MED on EX Series Switches on page 562
List of Sample Output	clear lldp neighbors on page 1946 clear lldp neighbors interface ge-0/1/1.0 on page 1946

Sample Output

clear lldp neighbors

```
user@switch> clear lldp neighbors
```

clear lldp neighbors interface ge-0/1/1.0

```
user@switch> clear lldp neighbors interface ge-0/1/1.0
```

clear lldp statistics

Syntax	<code>clear lldp statistics</code> <code><interface <i>interface</i>></code>
Release Information	Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Clear LLDP statistics on one or more interfaces.
Options	<p>none—Clears LLDP statistics on all interfaces.</p> <p>interface <i>interface-names</i>—(Optional) Clear LLDP statistics on one or more interfaces.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • Configuring LLDP (CLI Procedure) on page 556 • Understanding LLDP and LLDP-MED on EX Series Switches on page 562
List of Sample Output	<p>clear lldp statistics on page 1947</p> <p>clear lldp statistics interface ge-0/1/1.0 on page 1947</p>

Sample Output

clear lldp statistics

```
user@switch> clear lldp statistics
```

clear lldp statistics interface ge-0/1/1.0

```
user@switch> clear lldp statistics interface ge-0/1/1.0
```

clear lldp neighbors

Syntax	<code>clear lldp neighbors <interface <i>interface</i>></code>
Release Information	Command introduced in Junos OS Release 14.1X53-D20 for OCX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series.
Description	Clear the learned remote neighbor information on all or selected interfaces.
Options	none —Clear the remote neighbor information on all interfaces. interface <i>interface</i> —(Optional) Clear the remote neighbor information from the selected interface.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• Understanding LLDP on page 555
List of Sample Output	clear lldp neighbors on page 1948 clear lldp neighbors interface on page 1948

Sample Output

clear lldp neighbors

```
user@switch> clear lldp neighbors
```

clear lldp neighbors interface

```
user@switch> clear lldp neighbors interface ge-0/1/1.0
```


clear lldp statistics

Syntax	<code>clear lldp statistics</code> <code><interface <i>interface</i>></code>
Release Information	Command introduced in Junos OS Release 14.1X53-D20 for OCX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series.
Description	Clear LLDP statistics on one or more interfaces.
Options	none —Clears LLDP statistics on all interfaces. interface <i>interface-names</i> —(Optional) Clear LLDP statistics on an interface.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • Understanding LLDP on page 555
List of Sample Output	clear lldp statistics on page 1949 clear lldp statistics interface on page 1949

Sample Output

clear lldp statistics

```
user@switch> clear lldp statistics
```

clear lldp statistics interface

```
user@switch> clear lldp statistics interface ge-0/1/1.0
```

clear security pki local-certificate

Syntax clear security pki local-certificate
<all | certificate-id *certificate-id-name* | system-generated>

Release Information Command introduced in Junos OS Release 11.1 for EX Series switches.

Description Delete local digital certificates, certificate requests, and the corresponding public/private key pairs from the switch.

Options all—(Optional) Delete all local digital certificates, certificate requests, and the corresponding public and private key pairs from the router.



NOTE: This option does not delete the automatically generated self-signed certificate or its public/private key pair.

certificate-id *certificate-id-name*—(Optional) Delete the specified local digital certificate and corresponding public and private key pair.

system-generated—(Optional) Delete the automatically generated self-signed certificate.

Required Privilege Level clear

Related Documentation

- [Deleting Self-Signed Certificates \(CLI Procedure\) on page 333](#)

List of Sample Output [clear security pki local-certificate all on page 1950](#)

Output Fields This command produces no output.

Sample Output

clear security pki local-certificate all

```
user@switch> clear security pki local-certificate all
```

clear security ssh key-pair-identity

Syntax	clear security ssh key-pair-identity <all> <identity-name>
Release Information	Command introduced in Junos OS Release 15.1X49-D70.
Description	Clear private and public SSH key pair for the specified files.
Options	<ul style="list-style-type: none"> • all— Clear all the key-pair files. • identity-name—Clear identity name.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none"> • request security ssh key-pair-identity generate on page 1973 • show security ssh key-pair-identity on page 2181
List of Sample Output	clear security ssh key-pair-identity sample on page 1951
Output Fields	

Sample Output

clear security ssh key-pair-identity sample

```
user@host> clear security ssh key-pair-identity sample
SSH key sample was removed
```

clear system login lockout

Syntax clear system login lockout
 <all>
 <user *username*>

Release Information Command introduced in Junos OS Release 11.2.

Description Unlock the user account locked as a result of invalid login attempts.

Options **all**—Clear all locked user accounts.

 user *username*—Clear the specified locked user account.

Required Privilege Level clear

Related Documentation

- [lockout-period on page 1503](#)
- [show system login lockout on page 2241](#)

Output Fields This command produces no output.

clear system services dhcp binding

Syntax	<code>clear system services dhcp binding <address></code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	(EX Series switches only) Remove obsolete IP address bindings on a Dynamic Host Configuration Protocol (DHCP) server and return them to the IP address pool.
Options	address —(Optional) Remove a specific IP address binding and return it to the address pool.
Required Privilege Level	view and system
Related Documentation	<ul style="list-style-type: none"> • show system services dhcp binding on page 2244
List of Sample Output	clear system services dhcp binding on page 1953
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear system services dhcp binding

```
user@host> clear system services dhcp binding
```

clear system services dhcp conflict

Syntax	<code>clear system services dhcp conflict <address></code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	(J Series routers and EX Series switches only) Remove IP addresses from the Dynamic Host Configuration Protocol (DHCP) server conflict list and return them to the IP address pool.
Options	address —(Optional) Remove a specific IP address from the conflict list and return it to the address pool.
Required Privilege Level	view and system
Related Documentation	<ul style="list-style-type: none">• show system services dhcp conflict on page 2250
List of Sample Output	clear system services dhcp conflict on page 1954
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear system services dhcp conflict

```
user@host> clear system services dhcp conflict
```

clear system services dhcp statistics

Syntax	clear system services dhcp statistics
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	(J Series routers and EX Series switches only) Clear Dynamic Host Configuration Protocol (DHCP) server statistics.
Options	This command has no options.
Required Privilege Level	view and system
Related Documentation	<ul style="list-style-type: none"> • show system services dhcp statistics on page 2258
List of Sample Output	clear system services dhcp statistics on page 1955
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear system services dhcp statistics

```
user@host> clear system services dhcp statistics
```

request component login

Syntax	<code>request component login <i>component-name</i></code>
Release Information	Command introduced in Junos OS Release 14.1X53-D20 for OCX Series switches. Command introduced in Junos OS Release 11.3 for the QFX Series.
Description	(QFabric systems only) Log in to a QFabric system component. To gain access to individual components by way of the request component login command, you must first provide the qfabric-admin or qfabric-operator class privilege to your user (for more information, see: remote-debug-permission).
Options	<i>component-name</i> —Specify the QFabric system component to which you wish to log in.
Required Privilege Level	admin
Related Documentation	<ul style="list-style-type: none"> remote-debug-permission on page 1694
List of Sample Output	request component login (with qfabric-admin Privileges) on page 1956 request component login (with qfabric-operator Privileges) on page 1957 request component login (with qfabric-user Privileges) on page 1957

Sample Output

The three sample output displays show the results of attempts to log in to Node device EE3093. The results differ depending on the privilege level assigned to the user.

request component login (with qfabric-admin Privileges)

```
admin@qfabric> request component login EE3093
Warning: Permanently added 'qfabric-node-ee3093,192.0.2.0' (RSA) to the list of
known hosts.
--- JUNOS 11.3I built 2011-11-04 12:46:16 UTC
{master}
qfabric-admin@node-ee3093> ?
Possible completions:
clear          Clear information in the system
file           Perform file operations
help           Provide help information
load           Load information from file
monitor        Show real-time debugging information
mtrace         Trace multicast path from source to receiver
op             Invoke an operation script
ping           Ping remote target
quit           Exit the management session
request        Make system-level requests
restart        Restart software process
save           Save information to file
```



```

set          Set CLI properties, date/time, craft interface message
show         Show system information
ssh          Start secure shell on another host
start        Start shell
telnet       Telnet to another host
test         Perform diagnostic debugging
traceroute   Trace route to remote host{master}
qfabric-admin@node-ee3093>

```

request component login (with qfabric-operator Privileges)

```

operator@qfabric> request component login EE3093

Warning: Permanently added 'qfabric-node-EE3093,192.0.2.0' (RSA) to the list of
known hosts.
--- JUNOS 11.3I built 2011-11-04 12:46:16 UTC
{master}
qfabric-operator@node-EE3093> ?
Possible completions:
  file          Perform file operations
  help          Provide help information
  load          Load information from file
  op            Invoke an operation script
  quit          Exit the management session
  request       Make system-level requests
  save          Save information to file
  set           Set CLI properties, date/time, craft interface message
  show          Show system information
  start         Start shell
  test          Perform diagnostic debugging
{master}
qfabric-operator@node-ee3093>

```

request component login (with qfabric-user Privileges)

```

user0@qfabric> request component login EE3093

error: User user0 does not have sufficient permissions to login to device ee3093

```

request dhcp client renew

Syntax	<code>request dhcp client renew</code> <code>[all interface <interface-name>]</code> <code>routing-instance <routing-instance-name></code>
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Initiates a renew request for the specified clients if they are in the bound state.
Options	<p>all—Initiate renew requests for all DHCP clients. If you specify a routing instance, renew requests are initiated for all DHCP clients within that routing instance.</p> <p>interface <interface-name>—Initiate renew requests for DHCP clients on the specified interface.</p> <p>routing-instance <routing-instance-name>—Initiate renew requests for DHCP clients in the specified routing instance. If you do not specify a routing instance, renew requests are initiated on the default routing instance.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• request dhcpv6 client renew on page 1963
Output Fields	This command produces no output.

request dhcp server reconfigure

Syntax `request dhcp server reconfigure (all | address | interface interface-name | logical-system logical-system-name | routing-instance routing-instance-name)`

Release Information Command introduced in Junos OS Release 10.0.
Command introduced in Junos OS Release 12.3R2 for EX Series switches.

Description Initiate reconfiguration processing for the specified DHCP clients if they are in the bound state. If the clients are in the reconfiguring state, this command has no effect. If the clients are in any state other than bound or reconfiguring, this command has the same effect as the **clear dhcp server binding** command.

When the local server state machine starts the reconfiguration process on a bound client, the client transitions to the reconfiguring state and the local server sends a forcerenew message to the client. Because the client was in the bound state before entering the reconfiguring state, all subscriber (or DHCP client) services, such as forwarding and statistics, continue to work. An exponential back-off timer determines the interval at which the forcerenew message is sent. If the final attempt is unsuccessful, the client is returned to its original state by default. You can optionally include the **clear-on-abort** statement to configure the client to be cleared when reconfiguration fails.

Options **all**—Initiate reconfiguration for all DHCP clients.

address—Initiate reconfiguration for DHCP client with the specified IP address or MAC address.

interface *interface-name*—Initiate reconfiguration for all DHCP clients on this logical interface (clients whose initial login requests were received over the specified interface).



NOTE: You cannot use the **interface *interface-name*** option with the **request dhcp server reconfigure** command for DHCP passive clients (clients that are added as a result of DHCP snooped packets). For passive clients, the interface is not guaranteed to be the next-hop interface to the client, as is the case for active clients.

logical-system *logical-system-name*—Initiate reconfiguration for all DHCP clients on the specified logical system.

routing-instance *routing-instance-name*—Initiate reconfiguration reconfigured for all DHCP clients in the specified routing instance.

Required Privilege Level view

Related Documentation

- [Configuring Dynamic Client Reconfiguration of Extended Local Server Clients Overview on page 693](#)

List of Sample Output [request dhcp server reconfigure on page 1960](#)

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

[request dhcp server reconfigure](#)

```
user@host> request dhcp server reconfigure interface fe-0/0/0.100
```

request dhcpv6 server reconfigure

Syntax	<code>request dhcpv6 server reconfigure (all <i>address</i> <i>client-id</i> interface <i>interface-name</i> logical-system <i>logical-system-name</i> routing-instance <i>routing-instance-name</i> <i>session-id</i>)</code>
Release Information	<p>Command introduced in Junos OS Release 10.4.</p> <p>Command introduced in Junos OS Release 12.3R2 for EX Series switches.</p>
Description	<p>Initiate reconfiguration processing for the specified DHCPv6 clients if they are in the bound state. If the clients are in the reconfiguring state, this command has no effect. If the clients are in any state other than bound or reconfiguring, this command has the same effect as the clear dhcpv6 server binding command.</p> <p>When the local server state machine starts the reconfiguration process on a bound client, the client transitions to the reconfigure state and the local server sends a reconfigure message to the client. Because the client was in the bound state before entering the reconfiguring state, all subscriber (or DHCP client) services, such as forwarding and statistics, continue to work. An exponential back-off timer determines the interval at which the reconfigure message is sent. If the final attempt is unsuccessful, the client is returned to its original state by default. You can optionally include the clear-on-abort statement to configure the client to be cleared when reconfiguration fails.</p>
Options	<p>all—Initiate reconfiguration for all DHCPv6 clients.</p> <p><i>address</i>—Initiate reconfiguration for DHCPv6 client with the specified IPv6 address.</p> <p><i>client-id</i>—Initiate reconfiguration for DHCPv6 client with the specified client ID.</p> <p>interface <i>interface-name</i>—Initiate reconfiguration for all DHCPv6 clients on this logical interface (clients whose initial login requests were received over the specified interface).</p> <p>logical-system <i>logical-system-name</i>—Initiate reconfiguration for all DHCPv6 clients on the specified logical system.</p> <p>routing-instance <i>routing-instance-name</i>—Initiate reconfiguration reconfigured for all DHCPv6 clients in the specified routing instance.</p> <p><i>session-id</i>—Initiate reconfiguration for DHCPv6 client with the specified session ID.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • Configuring Dynamic Client Reconfiguration of Extended Local Server Clients Overview on page 693
List of Sample Output	request dhcpv6 server reconfigure on page 1962

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

`request dhcpv6 server reconfigure`

```
user@host> request dhcpv6 server reconfigure 2001db8::2/16
```

request dhcpv6 client renew

Syntax	request dhcpv6 client renew [all interface <i>interface-name</i>] routing-instance < <i>routing-instance-name</i> >
Release Information	Statement introduced in Junos OS Release 12.1X45-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Initiate a renew request for the specified DHCPv6 clients if they are in the bound state.
Options	<p>all—Initiate renew requests for all DHCPv6 clients. If you specify a routing instance, renew requests are initiated for all DHCPv6 clients within that routing instance.</p> <p>interface-name <i>interface-name</i>—Initiate renew requests for DHCPv6 clients on the specified interface.</p> <p>routing-instance <i>routing-instance-name</i>—Initiate renew requests for DHCPv6 clients in the specified routing instance. If you do not specify a routing instance, renew requests are initiated on the default routing instance.</p>
Required Privilege Level	view
Output Fields	This command produces no output.

request ipsec switch

Syntax	<code>request ipsec switch (interface <es-fpc/pic/port> security-associations <sa-name>)</code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	(Encryption interface on M Series, PTX Series, and T Series routers and EX Series switches only) Manually switch from the primary to the backup encryption services interface, or switch from the primary to the backup IP Security (IPsec) tunnel.
Options	interface <es-fpc/pic/port> —Switch to the backup encryption interface. security-associations <sa-name> —Switch to the backup tunnel.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• show ipsec redundancy
List of Sample Output	request ipsec switch security-associations on page 1964
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request ipsec switch security-associations

```
user@host> request ipsec switch security-associations sa-private
```


request message

Syntax	<pre>request message all message "text" request message message "text" (terminal <i>terminal-name</i> user <i>user-name</i>)</pre>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>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 a message on the screens of all users who are logged in to the router or switch or on specific screens.
Options	<p>all—Display a message on the terminal of all users who are currently logged in.</p> <p>message "text"—Message to display.</p> <p>terminal <i>terminal-name</i>—Name of the terminal on which to display the message.</p> <p>user <i>user-name</i>—Name of the user to whom to direct the message.</p>
Required Privilege Level	maintenance
List of Sample Output	request message message on page 1965
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request message message

```
user@host> request message message "Maintenance window in 10 minutes" user maria
Message from user@host on tty0 at 20:27 ...
Maintenance window in 10 minutes
EOF
```

request security certificate enroll (Signed)

Syntax `request security certificate enroll filename filename subject subject
alternative-subject alternative-subject certification-authority certification-authority encoding
(binary | pem) key-file key-file domain-name domain-name`

Release Information Command introduced before Junos OS Release 7.4.
Command introduced in Junos OS Release 9.0 for EX Series switches.

Description (Encryption interface on M Series and T Series routers and EX Series switches only)
Obtain a signed certificate from a certificate authority (CA). The signed certificate validates the CA and the owner of the certificate. The results are saved in a specified file to the `/var/etc/ikecert` directory.



NOTE: For FIPS mode, the digital security certificates must be compliant with the National Institute of Standards and Technology (NIST) SP 800-131A standard. The `request security key-pair` command is deprecated and not available with Junos in FIPS mode because it generates RSA and DSA keys with sizes of 512 and 1024 bits that are not compliant with the NIST SP 800-131A standard.

Options `filename filename`—File that stores the certificate.

`subject subject`—Distinguished name (**dn**), which consists of a set of components—for example, an organization (**o**), an organization unit (**ou**), a country (**c**), and a locality (**l**).

`alternative-subject alternative-subject`—Tunnel source address.

`certification-authority certification-authority`—Name of the certificate authority profile in the configuration.

`encoding (binary | pem)`—File format used for the certificate. The format can be a binary file or privacy-enhanced mail (PEM), an ASCII base64-encoded format. The default format is binary.

`key-file key-file`—File containing a local private key.

`domain-name domain-name`—Fully qualified domain name.

Required Privilege Level maintenance

List of Sample Output `request security certificate enroll filename subject alternative-subject
certification-authority key-file domain-name (Signed) on page 1967`

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

`request security certificate enroll filename subject alternative-subject certification-authority key-file domain-name (Signed)`

```
user@host> request security certificate enroll filename host.crt subject c=uk,o=london
alternative-subject 10.50.1.4 certification-authority verisign key-file host-1.prv domain-name
host.example.com
```

```
CA name: example.com CA file: ca_verisign
local pub/private key pair: host.prv
subject: c=uk,o=london domain name: host.example.com
alternative subject: 10.50.1.4
Encoding: binary
Certificate enrollment has started. To view the status of your enrollment, check
the key management process (kmd) log file at /var/log/kmd. <-----
```

request security certificate enroll (Unsigned)

Syntax	<code>request security certificate enroll filename <i>filename</i> ca-file <i>ca-file</i> ca-name <i>ca-name</i> encoding (binary perm) url <i>url</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	(Encryption interface on M Series and T Series routers and EX Series switches only) Obtain a certificate from a certificate authority (CA). The results are saved in a specified file to the <code>/var/etc/ikecert</code> directory.
Options	<p>filename <i>filename</i>—File that stores the public key certificate.</p> <p>ca-file <i>ca-file</i>—Name of the certificate authority profile in the configuration.</p> <p>ca-name <i>ca-name</i>—Name of the certificate authority.</p> <p>encoding (binary pem)—File format used for the certificate. The format can be a binary file or privacy-enhanced mail (PEM), an ASCII base64-encoded format. The default value is binary.</p> <p>url <i>url</i>—Certificate authority URL.</p>
Required Privilege Level	maintenance
List of Sample Output	request security certificate enroll filename ca-file ca-name url (Unsigned) on page 1968
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request security certificate enroll filename ca-file ca-name url (Unsigned)

```

user@host> request security certificate enroll filename ca_verisign ca-file verisign ca-name
example.com urlxyzcompany URL
http://<verisign ca-name xyzcompany url>/cgi-bin/pkiclient.exe CA name: example.com
CA file: verisign Encoding: binary
Certificate enrollment has started. To view the status of your enrollment, check
the key management process (kmd) log file at /var/log/kmd. <-----

```

request security key-pair

Syntax `request security key-pair filename`
`<size key-size>`
`<type (rsa | dsa)>`

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 for EX Series switches.

Description (Encryption interface on M Series and T Series routers and EX Series switches only)
 Generate a public and private key pair for a digital certificate.



NOTE: The `request security-certificates` command is deprecated and are not available with Junos in FIPS mode because security certificates are not compliant with the NIST SP 800-131A standard.

Options *filename*—Name of a file in which to store the key pair.

size key-size—(Optional) Key size, in bits. The key size can be **512**, **1024**, or **2048**. The default value is **1024**.

type—(Optional) Algorithm used to encrypt the key:

- **rsa**—RSA algorithm. This is the default.
- **dsa**—Digital signature algorithm with Secure Hash Algorithm (SHA).

Required Privilege Level maintenance

List of Sample Output [request security key-pair on page 1969](#)

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

`request security key-pair`

```
user@host> request security key-pair security-key-file
```

request security pki generate-key-pair

Syntax	<code>request security pki generate-key-pair certificate-id <i>certificate-id-name</i></code> <code><size (512 1024 2048)></code> <code><type (dsa rsa)></code>
Release Information	Command introduced in Junos OS Release 11.1 for EX Series switches.
Description	Generate a public key infrastructure (PKI) public/private key pair for a local digital certificate.
Options	<p>certificate-id <i>certificate-id-name</i>—Name of the local digital certificate and the public/private key pair.</p> <p>size—(Optional) Key pair size. The key pair size can be 512, 1024, or 2048 bits. If a key pair size is not specified, the default value, 1024 bits, is applied.</p> <p>type—(Optional) The algorithm to be used for encrypting the public/private key pair. The encryption algorithm can be dsa or rsa. If an encryption algorithm is not specified, the default value, rsa, is applied.</p>
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• Manually Generating Self-Signed Certificates on Switches (CLI Procedure) on page 335
List of Sample Output	request security pki generate-key-pair on page 1970
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request security pki generate-key-pair

```
user@switch> request security pki generate-key-pair certificate-id billy size 2048
Generated key pair billy, key size 2048 bits
```

request security pki local-certificate generate-self-signed


Syntax	<code>request security pki local-certificate generate-self-signed certificate-id <i>certificate-id-name</i> domain-name <i>domain-name</i> ip-address <i>ip-address</i> email <i>email-address</i> subject <i>subject-distinguished-name</i></code>
Release Information	Command introduced in Junos OS Release 11.1 for EX Series switches.
Description	Manually generate a self-signed certificate for the given distinguished name.
Options	<p>certificate-id <i>certificate-id-name</i>—Name of the local digital certificate and the public/private key pair.</p> <p>domain-name <i>domain-name</i>—Fully qualified domain name (FQDN). The FQDN provides the identity of the certificate owner for Internet Key Exchange (IKE) negotiations and provides an alternative to the subject name.</p> <p>email <i>email-address</i>—E-mail address of the certificate holder.</p> <p>ip-address <i>ip-address</i>—IP address of the switch.</p> <p>subject <i>subject-distinguished-name</i>—Distinguished name format that contains the common name, department, company name, state, and country:</p> <ul style="list-style-type: none"> • CN—Common name • OU—Organizational unit name • O—Organization name • ST—State • C—Country
Required Privilege Level	maintenance security
Related Documentation	<ul style="list-style-type: none"> • Manually Generating Self-Signed Certificates on Switches (CLI Procedure) on page 335
List of Sample Output	request security pki local-certificate generate-self-signed on page 1972
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request security pki local-certificate generate-self-signed

```
user@switch> request security pki local-certificate generate-self-signed certificate-id self-cert  
subject cn=abc domain-name abc.net email jdoe@abc.net  
Self-signed certificate generated and loaded successfully
```


request security ssh key-pair-identity generate

Syntax	<code>request security ssh key-pair-identity generate <identity-name> passphrase <i>passphrase</i></code>
Release Information	Command introduced in Junos OS Release 15.1X49-D70.
Description	Generate the SSH private and public key pair for a specified identity. The private and public key files are stored in the <code>/var/db</code> directory, which is accessible through root only. Filenames are based on the identity-name with extensions. The files are similar to the certificate files that are stored in Junos OS.
Options	<ul style="list-style-type: none"> • identity-name—Identity name. • passphrase <i>passphrase</i>— An SSH identity generated with a passphrase. The passphrase is used to protect the private key file stored in the file system. This option does not allow the user to enter a weak passphrase, which ensures stronger security. A private key is used to connect to a remote server and is never displayed or transferred between servers, even if the system is compromised. The private key cannot be used to connect to a remote server if the passphrase is not known.
	<div>  <p>NOTE: By default, the passphrase uses Advanced Encryption Standard (AES) 128 in cipher block chaining (CBC) mode to encrypt a private key. All generated keys are stored in the <code>/var/db/ssh_key</code> directory.</p> </div>
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none"> • show security ssh key-pair-identity on page 2181 • clear security ssh key-pair-identity on page 1951
List of Sample Output	request security ssh key-pair-identity with passphrase on page 1973
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request security ssh key-pair-identity with passphrase

```
user@host> request security ssh key-pair-identity generate myident passphrase 1q2w3e
Created SSH key myident
```

request security tpm master-encryption-password set


Syntax	<code>request security tpm master-encryption-password set plain-text-password</code>
Release Information	Command introduced in Junos OS Release 15.1X49-D80.
Description	Use this command to set or replace the password (in plain text).
Options	plain-text-password —Set or replace the password (in plain text).
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• show security tpm status on page 2179
List of Sample Output	show security tpm status on page 1974
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

show security tpm status

```
user@host> request security tpm master-encryption-password set plain-text-password
Enter new master encryption password:
Repeat new master encryption password:
Binding password with TPM
Master encryption password is bound to TPM
Encoding master password ..
Successfully encoded master password
Encrypted key-pair files
```

request system autorecovery state

Syntax	<code>request system autorecovery state (save recover clear)</code>
Release Information	Command introduced in Junos OS Release 15.1X49-D35 for SRX300, SRX320, SRX345, and SRX550M devices.
Description	Prepare the system for autorecovery of configuration, licenses, and disk information.
Options	<p>save—Save the current state of the disk partitioning, configuration, and licenses for autorecovery.</p> <p>The active Junos OS configuration is saved as the Junos rescue configuration, after which the rescue configuration, licenses, and disk partitioning information is saved for autorecovery. Autorecovery information must be initially saved using this command for the autorecovery feature to verify integrity of data on every bootup.</p> <div>  <p>NOTE:</p> <ul style="list-style-type: none"> Any recovery performed at a later stage will restore the data to the same state as it was when the save command was executed. A fresh rescue configuration is generated when the command is executed. Any existing rescue configuration will be overwritten. </div> <p>recover—Recover the disk partitioning, configuration, and licenses.</p> <p>After autorecovery data has been saved, the integrity of saved items is always checked automatically on every bootup. The recovery command allows you to forcibly re-run the tests at any time if required.</p> <p>clear—Clear all saved autorecovery information.</p> <p>Only the autorecovery information is deleted; the original copies of the data used by the router are not affected. Clearing the autorecovery information also disables all autorecovery integrity checks performed during bootup.</p>
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none"> show system autorecovery state on page 2236
List of Sample Output	request system autorecovery state save on page 1976 request system autorecovery state recover on page 1976

[request system autorecovery state clear on page 1976](#)

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

[request system autorecovery state save](#)

```
user@host> request system autorecovery state save
Saving config recovery information
  Saving license recovery information
  Saving bsdlablel recovery information
```

Sample Output

[request system autorecovery state recover](#)

```
user@host> request system autorecovery state recover

Configuration:
File           Recovery Information  Integrity Check  Action / Status
rescue.conf.gz Saved                    Passed           None
Licenses:
File           Recovery Information  Integrity Check  Action / Status
JUNOS282736.lic Saved                    Passed           None
JUNOS282737.lic Saved                    Failed           Recovered
BSD Labels:
Slice          Recovery Information  Integrity Check  Action / Status
s1             Saved                    Passed           None
s2             Saved                    Passed           None
s3             Saved                    Passed           None
s4             Saved                    Passed           None
```

Sample Output

[request system autorecovery state clear](#)

```
user@host> request system autorecovery state clear
Clearing config recovery information
  Clearing license recovery information
  Clearing bsdlablel recovery information
```

request system decrypt password

Syntax	request system decrypt password
Release Information	Statement introduced in Junos OS Release 15.1X49-D50 for SRX Series devices. Statement introduced in Junos OS Release 16.2 for M, MX, PTX, and T Series devices.
Description	Use to display plain text versions of obfuscated (\$9) or encrypted (\$8) passwords. If the password was encrypted using the new \$8\$ method, you are prompted for the master password.
Options	<ul style="list-style-type: none"> decrypt—Decrypt a \$8\$-encrypted or \$9\$-encrypted password.
Required Privilege Level	system
Related Documentation	<ul style="list-style-type: none"> master-password on page 1516 Hardening Shared Secrets in Junos OS on page 305
Output Fields	When you enter this command, you are provided feedback on the status of your request.


Sample Output

```
// Decrypting a $9 password
user@host> request system decrypt password $9$ABC123
Plaintext password: mysecret
```

Sample Output

```
// Decrypting a $8 password
user@host> request system decrypt password $8$ABC123
Master password:
Plaintext password: mysecret
(Simple passwords like "mysecret" are discouraged. This is an example only.)
```

request system download abort

Syntax	request system download abort <download-id>
Release Information	Command introduced in Junos OS Release 11.2 for SRX300, SRX320, SRX340, SRX345, and SRX550M devices. Command introduced in Junos OS Release 13.2X50-D15 for EX Series switches.
Description	Abort a download. The download instance is stopped and cannot be resumed. Any partially downloaded file is automatically deleted to free disk space. Information regarding the download is retained and can be displayed with the show system download command until a request system download clear operation is performed.
<div> NOTE: Only downloads in the active, paused, and error states can be aborted.</div>	
Options	download-id —(Required) The ID number of the download to be aborted.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• request system download start on page 1982• request system download pause on page 1980• request system download resume on page 1981• request system download clear on page 1979
List of Sample Output	request system download abort on page 1978
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request system download abort

```
user@host> request system download abort 1
Aborted download #1
```

request system download clear


Syntax	request system download clear
Release Information	Command introduced in Junos OS Release 11.2 for SRX300, SRX320, SRX340, SRX345, and SRX550M devices. Command introduced in Junos OS Release 13.2X50-D15 for EX Series switches.
Description	Delete the history of completed and aborted downloads.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none"> • request system download start on page 1982 • request system download pause on page 1980 • request system download resume on page 1981 • request system download abort on page 1978
List of Sample Output	request system download clear on page 1979
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request system download clear

```
user@host> request system download clear
Cleared information on completed and aborted downloads
```

request system download pause


Syntax	<code>request system download pause <download-id></code>
Release Information	Command introduced in Junos OS Release 11.2 for SRX300, SRX320, SRX340, SRX345, and SRX550M devices. Command introduced in Junos OS Release 13.2X50-D15 for EX Series switches.
Description	Suspend a particular download instance.
	<div> NOTE: Only downloads in the active state can be paused.</div>
Options	download-id —(Required) The ID number of the download to be paused.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• request system download start on page 1982• request system download resume on page 1981• request system download abort on page 1978• request system download clear on page 1979
List of Sample Output	request system download pause on page 1980
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request system download pause

```
user@host> request system download pause 1
Paused download #1
```


request system download resume

Syntax	<code>request system download resume <i>download-id</i> <max-rate></code>
Release Information	<p>Command introduced in Junos OS Release 11.2 for SRX300, SRX320, SRX340, SRX345, and SRX550M devices.</p> <p>Command introduced in Junos OS Release 13.2X50-D15 for EX Series switches.</p>
Description	<p>Resume a download that has been paused. Download instances that are not in progress because of an error or that have been explicitly paused by the user can be resumed by the user. The file will continue downloading from the point where it paused. By default, the download resumes with the same bandwidth specified with the request system download start command. The user can optionally specify a new (maximum) bandwidth with the request system download resume command.</p>
	<p> NOTE: Only downloads in the paused and error states can be resumed.</p>
Options	<p>download-id—(Required) The ID number of the download to be resumed.</p> <p>max-rate—(Optional) The maximum bandwidth for the download.</p>
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none"> • request system download start on page 1982 • request system download pause on page 1980 • request system download abort on page 1978 • request system download clear on page 1979
List of Sample Output	request system download resume on page 1981
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request system download resume

```
user@host> request system download resume 1
Resumed download #1
```

request system download start


Syntax	<code>request system download start (<i>sftp-url</i> <i>delay</i> <i>identity-file</i> <i>login</i> <i>max-rate</i> <i>passphrase</i> <i>save as</i>)</code>
Release Information	Command introduced in Junos OS Release 11.2 for SRX300, SRX320, SRX340, SRX345, and SRX550M devices. Command introduced in Junos OS Release 13.2X50-D15 for EX Series switches.
Description	Create a download instance and identify it with a unique integer called the download ID.
Options	<p>sftp-url—(Required) The FTP or HTTP URL location of the file to be downloaded securely.</p> <p>delay—(Optional) The number of hours after which the download should start (range from 1 through 48 hours).</p> <p>identity-file—(Required) The name of the file requesting a Secure FTP (SFTP) download. The SFTP in smart download leverages public key authentication to authenticate a download request. Users need to generate a private or public key pair before starting a download, and then upload a public key to an SFTP server.</p> <p>login—(Optional) The username and password for the server in the format username:password.</p> <p>max-rate—(Optional) The maximum average bandwidth for the download. Numbers with the suffix k or K, m or M, and g or G are interpreted as Kbps, Mbps, or Gbps, respectively.</p> <p>passphrase—(Required) The passphrase to protect the private key file stored on the file system. This option does not allow the user to enter a weak passphrase, which ensures stronger security.</p> <p>save-as—(Optional) The filename to be used for saving the file in the <code>/var/tmp</code> location.</p>
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• request system download pause on page 1980• request system download resume on page 1981• request system download abort on page 1978• request system download clear on page 1979
List of Sample Output	request system download start on page 1983
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request system download start

```
user@host> request system download start identity-file mytestkey  
sftp://mysftpserver/homes/kelly/test.tgz max-rate 200 save as newfile.tgz  
Starting download #8
```

request system firmware upgrade

Syntax	<code>request system firmware upgrade</code>
Release Information	Command introduced in Junos OS Release 10.2.
Description	Upgrade firmware on a system.
Options	<p>fpc—Upgrade FPC ROM monitor.</p> <p>pic—Upgrade PIC firmware.</p> <p>re—Upgrade baseboard BIOS/FPGA. There is an active BIOS image and a backup BIOS image.</p> <ul style="list-style-type: none"> • bios—(Optional) Upgrade BIOS. • fpga—(Optional) Upgrade baseboard FPGA. • ssd—(Optional) Upgrade Routing Engine solid-state drive (SSD) firmware. <p>disk1—Upgrade SSD disk1 firmware.</p> <p>disk2—Upgrade SSD disk2 firmware.</p> <div>  <p>NOTE: Starting in Junos OS Release 17.2R1, you can upgrade the SSD firmware on MX Series routers with the RE-S-X6-64G and RE-MX2K-X8-64G Routing Engines.</p> </div> <p>vcpu—Upgrade VCPU ROM monitor.</p>
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none"> • request system license update on page 1986
List of Sample Output	request system firmware upgrade on page 1984
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request system firmware upgrade

```
user@host> request system firmware upgrade re bios
```

Part	Type	Tag	Current version	Available version	Status
Routing Engine 0	RE BIOS	0	1.5	1.9	OK
Routing Engine 0	RE BIOS Backup	1	1.7	1.9	OK

Perform indicated firmware upgrade ? [yes,no] (no) yes

user@host> request system firmware upgrade re bios backup

Part	Type	Tag	Current version	Available version	Status
Routing Engine 0	RE BIOS	0	1.5	1.9	OK
Routing Engine 0	RE BIOS Backup	1	1.7	1.9	OK

Perform indicated firmware upgrade ? [yes,no] (no) yes


user@host> request system firmware upgrade re ssd disk1

Part	Type	Tag	Current version	Available version	Status
Routing Engine 0	RE SSD1	4	12028	12029	OK

Perform indicated firmware upgrade ? [yes,no] (no) yes

Firmware upgrade initiated, use "show system firmware" to monitor status.

request system license update

Syntax	request system license update
Release Information	Command introduced in Junos OS Release 9.5.
Description	Starts autoupdating license keys from the LMS server. <div><div></div><div>NOTE: The <code>request system license update</code> command always uses the default Juniper license server: https://ae1.juniper.net/.</div></div>
Options	trial —Immediately updates trial license keys from the LMS server.
Required Privilege Level	maintenance
List of Sample Output	request system license update on page 1986 request system license update trial on page 1986
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request system license update

```
user@host> request system license update
```

```
Trying to update license keys from https://ae1.juniper.net has been sent, use  
show system license to check status.
```

request system license update trial

```
user@host> request system license update trial
```

```
Request to automatically update trial license keys from https://ae1.juniper.net  
has been sent, use show system license to check status.
```

request system power-off fpc

Syntax	<code>request system (halt power-off reboot) power-off fpc</code>
Release Information	Command introduced in Junos OS Release 11.4.
Description	Bring Flexible PIC Concentrators (FPCs) offline before Routing Engines are shut down.
Options	<ul style="list-style-type: none"> • halt—Bring FPC offline and then halt the system. • power-off—Bring FPC offline and then power off the system. • reboot—Bring FPC offline and then reboot the system.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none"> • request system reboot (SRX Series) on page 1996
List of Sample Output	request system halt power-off fpc on page 1987 request system power-off power-off fpc on page 1987 request system reboot power-off fpc on page 1987
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request system halt power-off fpc

```
user@host> request system halt power-off fpc
Halt the system ? [yes,no] (no) yes
Offline fpc slot 0
```

request system power-off power-off fpc

```
user@host> request system power-off power-off fpc
Power off the system ? [yes,no] (no) yes
Offline fpc slot 0
```

request system reboot power-off fpc

```
user@host> request system reboot power-off fpc
Reboot the system ? [yes,no] (no) yes
Offline fpc slot 0
```


request system reboot

List of Syntax	Syntax on page 1989 Syntax (EX Series Switches and EX Series Virtual Chassis) on page 1989 Syntax (MX Series Routers and MX Series Virtual Chassis, EX9200 Switches and EX9200 Virtual Chassis) on page 1989 Syntax (QFabric Systems) on page 1989 Syntax (QFX Series Switches and QFX Series Virtual Chassis, Virtual Chassis Fabric) on page 1990 Syntax (TX Matrix Router) on page 1990 Syntax (TX Matrix Plus Router) on page 1990
Syntax	<pre>request system reboot <at <i>time</i>> <both-routing-engines> <in <i>minutes</i>> <media (compact-flash disk removable-compact-flash usb)> <message "<i>text</i>"> <other-routing-engine></pre>
Syntax (EX Series Switches and EX Series Virtual Chassis)	<pre>request system reboot <all-members local member <i>member-id</i>> <at <i>time</i>> <in <i>minutes</i>> <media (external internal)> <media (compact-flash disk removable-compact-flash usb)> <message "<i>text</i>"> <slice <i>slice</i>></pre>
Syntax (MX Series Routers and MX Series Virtual Chassis, EX9200 Switches and EX9200 Virtual Chassis)	<pre>request system reboot <all-members local member <i>member-id</i>> <at <i>time</i>> <both-routing-engines> <in <i>minutes</i>> <media (external internal)> <media (compact-flash disk usb)> <junos network oam usb> <message "<i>text</i>"> <other-routing-engine></pre>
Syntax (QFabric Systems)	<pre>request system reboot <all <graceful>> <at <i>time</i>> <director-device <i>name</i>> <director-group <graceful>> <fabric <graceful>> <in <i>minutes</i>> <in-service> <media></pre>

	<pre><message "text"> <node-group name> <slice slice></pre>
Syntax (QFX Series Switches and QFX Series Virtual Chassis, Virtual Chassis Fabric)	<pre>request system reboot <all-members local member member-id> <at time> <in minutes> <hypervisor> <junos network oam usb> <message "text"> <slice slice></pre>
Syntax (TX Matrix Router)	<pre>request system reboot <all-chassis all-lcc lcc number scc> <at time> <both-routing-engines> <in minutes> <media (compact-flash disk)> <message "text"> <other-routing-engine></pre>
Syntax (TX Matrix Plus Router)	<pre>request system reboot <all-chassis all-lcc lcc number sfc number> <at time> <both-routing-engines> <in minutes> <media (compact-flash disk)> <message "text"> <other-routing-engine> <partition (1 2 alternate)></pre>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Option other-routing-engine introduced in Junos OS Release 8.0.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Option sfc introduced for the TX Matrix Plus router in Junos OS Release 9.6.</p> <p>Option partition changed to slice in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Option both-routing-engines introduced in Junos OS Release 12.1.</p>
Description	<p>Reboot the software.</p> <p>This command can be used on standalone devices and on devices supported in a Virtual Chassis, Virtual Chassis Fabric, or QFabric system.</p>



NOTE: Starting with Junos OS Release 15.1F3, the statement `request system reboot` reboots only the guest operating system on the PTX5000 with RE-PTX-X8-64G and, MX240, MX480, and MX960 with RE-S-X6-64G.

Starting with Junos OS Release 15.1F5, the statement `request system reboot` reboots only the guest operating system on the MX2010, and MX2020 with REMX2K-X8-64G.



NOTE: Starting from Junos OS Release 17.2R1, PTX10008 routers do not support the `request system reboot` command. Starting from Junos OS Release 17.4R1, PTX10016 routers do not support the `request system reboot` command. Use the `request vmhost reboot` command instead of the `request system reboot` command on the PTX10008 and PTX10016 routers to reboot the Junos OS software package or bundle on the router. See *request vmhost reboot*.



NOTE: On a QFabric system, to avoid traffic loss on the network Node group, switch mastership of the Routing Engine to the backup Routing Engine, and then reboot.

Options The options described here are not all supported on every platform or release of Junos OS. Refer to the Syntax sections for the options commonly available on each type of platform.

none—Reboot the software immediately.

all-chassis—(Optional) On a TX Matrix router or TX Matrix Plus router, reboot all routers connected to the TX Matrix or TX Matrix Plus router, respectively.

all-lcc—(Optional) On a TX Matrix router or TX Matrix Plus router, reboot all line card chassis connected to the TX Matrix or TX Matrix Plus router, respectively.

all-members | local | member *member-id*—(Optional) Specify which member of the Virtual Chassis to reboot:

- **all-members**—Reboots each switch that is a member of the Virtual Chassis.
- **local**—Reboots only the local switch (switch where you are logged in).
- **member *member-id***—Reboots the specified member switch of the Virtual Chassis

at *time*—(Optional) Time at which to reboot the software, specified in one of the following ways:

- **now**—Stop or reboot the software immediately. This is the default.
- **+minutes**—Number of minutes from now to reboot the software.
- **yymmddhhmm**—Absolute time at which to reboot the software, specified as year, month, day, hour, and minute.
- **hh:mm**—Absolute time on the current day at which to stop the software, specified in 24-hour time.

both-routing-engines—(Optional) Reboot both Routing Engines at the same time.

hypervisor—(Optional) Reboot Junos OS, host OS, and any installed guest VMs.

in minutes—(Optional) Number of minutes from now to reboot the software. This option is an alias for the **at +minutes** option.

junos—(Optional) Reboot from the Junos OS (main) volume.

lcc number—(Optional) Line-card chassis (LLC) number.

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.

media (compact-flash | disk | removable-compact-flash | usb)—(Optional) Use the indicated boot medium for the next boot.

media (external | internal)—(Optional) Use the indicated boot medium for the next boot:

- **external**—Reboot the device using a software package stored on an external boot source, such as a USB flash drive.
- **internal**—Reboot the device using a software package stored in an internal memory source.

message "text"—(Optional) Message to display to all system users before stopping or rebooting the software.

network—(Optional) Reboot using the Preboot Execution Environment (PXE) boot method over the network.

oam—(Optional) Reboot from the maintenance volume (OAM volume, usually the compact flash drive).

other-routing-engine—(Optional) Reboot the other Routing Engine from which the command is issued. For example, if you issue the command from the master Routing Engine, the backup Routing Engine is rebooted. Similarly, if you issue the command from the backup Routing Engine, the master Routing Engine is rebooted.

partition *partition*—(Optional) Reboot using the specified partition on the boot media. This option is equivalent to the **slice** option that is supported on some devices. Specify one of the following *partition* values:

- 1—Reboot from partition 1.
- 2—Reboot from partition 2.
- **alternate**—Reboot from the alternate partition.

scc—(Optional) Reboot the Routing Engine on the TX Matrix switch-card chassis. If you issue the command from re0, re0 is rebooted. If you issue the command from re1, re1 is rebooted.

sfc *number*—(Optional) Reboot the Routing Engine on the TX Matrix Plus switch-fabric chassis. If you issue the command from re0, re0 is rebooted. If you issue the command from re1, re1 is rebooted. Replace *number* with 0.

slice *slice*—(Optional) Reboot using the specified partition on the boot media. This option was originally the **partition** option but was renamed to **slice** on EX Series and QFX Series switches. Specify one of the following *slice* values:

- 1—Reboot from partition 1.
- 2—Reboot from partition 2.
- **alternate**—Reboot from the alternate partition (which did not boot the switch at the last bootup).



NOTE: The slice option is not supported on QFX Series switches that have no alternate slice when Junos OS boots as a Virtual Machine (VM). To switch to the previous version of Junos OS, issue the **request system software rollback** command.

usb—(Optional) Reboot from a USB device.

The following options are available only on QFabric Systems:

all—(Optional) Reboots the software on the Director group, fabric control Routing Engines, fabric manager Routing Engines, Interconnect devices, and network and server Node groups.

director-device *name*—(Optional) Reboots the software on the Director device and the default partition (QFabric CLI).

director-group—(Optional) Reboots the software on the Director group and the default partition (QFabric CLI).

fabric—(Optional) Reboots the fabric control Routing Engines and the Interconnect devices.

node-group *name*—(Optional) Reboots the software on a server Node group or a network Node group.

graceful—(Optional) Enables the QFabric component to reboot with minimal impact to network traffic. This sub-option is only available for the **all**, **fabric**, and **director-group** options.

Additional Information Reboot requests are recorded in the system log files, which you can view with the **show log** command (see *show log*). Also, the names of any running processes that are scheduled to be shut down are changed. You can view the process names with the **show system processes** command (see *show system processes*).

On a TX Matrix or TX Matrix Plus router, if you issue the **request system reboot** command on the master Routing Engine, all the master Routing Engines connected to the routing matrix are rebooted. If you issue this command on the backup Routing Engine, all the backup Routing Engines connected to the routing matrix are rebooted.



NOTE: Before issuing the **request system reboot** command on a TX Matrix Plus router with no options or the **all-chassis**, **all-lcc**, **lcc *number***, or **sfc** options, verify that master Routing Engine for all routers in the routing matrix are in the same slot number. If the master Routing Engine for a line-card chassis is in a different slot number than the master Routing Engine for a TX Matrix Plus router, the line-card chassis might become logically disconnected from the routing matrix after the **request system reboot** command.



NOTE: To reboot a router that has two Routing Engines, reboot the backup Routing Engine (if you have upgraded it) first, and then reboot the master Routing Engine.

Required Privilege Level maintenance

Related Documentation

- *clear system reboot*
- *request system halt*

- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)
- `request vmhost reboot`

List of Sample Output

- [request system reboot on page 1995](#)
- [request system reboot \(at 2300\) on page 1995](#)
- [request system reboot \(in 2 Hours\) on page 1995](#)
- [request system reboot \(Immediately\) on page 1995](#)
- [request system reboot \(at 1:20 AM\) on page 1995](#)

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

`request system reboot`

```
user@host> request system reboot
Reboot the system ? [yes,no] (no)
```

`request system reboot (at 2300)`

```
user@host> request system reboot at 2300 message ?Maintenance time!?
Reboot the system ? [yes,no] (no) yes

shutdown: [pid 186]
*** System shutdown message from root@test.example.net ***
System going down at 23:00
```

`request system reboot (in 2 Hours)`

The following example, which assumes that the time is 5 PM (17:00), illustrates three different ways to request the system to reboot in two hours:

```
user@host> request system reboot at +120
user@host> request system reboot in 120
user@host> request system reboot at 19:00
```

`request system reboot (Immediately)`

```
user@host> request system reboot at now
```

`request system reboot (at 1:20 AM)`

To reboot the system at 1:20 AM, enter the following command. Because 1:20 AM is the next day, you must specify the absolute time.

```
user@host> request system reboot at 06060120

request system reboot at 120
Reboot the system at 120? [yes,no] (no) yes
```

request system reboot (SRX Series)

Syntax `request system reboot <at time> <in minutes> <media> <message "text">`

Release Information Command introduced in Junos OS Release 10.1.
 Command **hypervisor** option introduced in Junos OS Release 15.1X49-D10 for vSRX.
 Command introduced in Junos OS Release 15.1X49-D50 for SRX1500 devices.

Description Reboot the software.

- Options**
- *at time* (Optional)— Specify the time at which to reboot the device. You can specify time in one of the following ways:
 - *now*— Reboot the device immediately. This is the default.
 - *+minutes*— Reboot the device in the number of minutes from now that you specify.
 - *yymmddhhmm*— Reboot the device at the absolute time on the date you specify. Enter the year, month, day, hour (in 24-hour format), and minute.
 - *hh:mm*— Reboot the device at the absolute time you specify, on the current day. Enter the time in 24-hour format, using a colon (:) to separate hours from minutes.
 - *in minutes* (Optional)— Specify the number of minutes from now to reboot the device. This option is a synonym for the *at +minutes* option
 - *media type* (Optional)— Specify the boot device to boot the device from:
 - *disk/internal*— Reboot from the internal media. This is the default.
 - *usb*— Reboot from the USB storage device.
 - *compact flash*— Reboot from the external CompactFlash card.



NOTE: The *media* command option is not available on vSRX.

- *message "text"* (Optional)— Provide a message to display to all system users before the device reboots.

Example: **request system reboot at 5 in 50 media internal message stop**

Required Privilege Level maintenance

Related Documentation

- [request system software rollback \(SRX Series\) on page 2003](#)

request system services dhcp

Syntax	<code>request system services dhcp (release <i>interface-name</i> renew <i>interface-name</i>)</code>
Release Information	Command introduced in Junos OS Release 8.5.
Description	<p>Release or renew the acquired IP address for a specific interface.</p> <p>To view the status of the Dynamic Host Configuration Protocol (DHCP) clients on the specified interfaces, enter the show system services dhcp client <i>interface-name</i> command.</p>
Options	<ul style="list-style-type: none">• release <i>interface-name</i> —Clears other resources received earlier from the server, and reinitializes the client state to INIT for the particular interface.• renew <i>interface-name</i> —Reacquires an IP address from the server for the interface. When you use this option, the command sends a discover message if the client state is INIT and a renew request message if the client state is BOUND. For all other states it performs no action.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• <i>dhcp</i>• show system services dhcp client on page 2247
Output Fields	This command produces no output.

request system snapshot (Maintenance)

Syntax request system snapshot
 <config-partition>
 <media (compact-flash | hard-disk | internal | usb)>
 <partition>
 <root-partition>
 <factory>
 <node (all | local | node-id | primary)>
 <slice (alternate) >

Release Information Command introduced in Junos OS Release 10.2.

Description Back up the currently running and active file system partitions on the device.

- Options**
- **config-partition**— Creates a snapshot of the configuration partition only and stores it onto the default **/altconfig** on the hard disk device or an **/altconfig** on a USB device.
 - **root-partition**— Creates a snapshot of the root partition only and stores it onto the default **/altroot** on the hard disk device or an **/altroot** on a USB device.
 - **factory**— (Optional) Specifies that only the files shipped from the factory are included in the snapshot.
 - **media**—(Optional) Specify the boot device the software is copied to:
 - **compact-flash**—Copy software to the primary compact flash drive.
 - **hard-disk**— Copy software to the hard disk.
 - **usb**— Copy software to the device connected to the USB port.
 - **internal**— Copy software to an internal flash drive. This is the default option.



NOTE: USB option is available on all SRX series devices; hard disk and compact-flash options are available only on SRX5800, SRX5600, and SRX5400 devices; media internal option is available only on SRX300, SRX320, SRX340, SRX345, and SRX550M devices.

- **external**— Copies software to an external storage device. This option is available for the compact flash on the SRX650 Services Gateway.
- **node**—(Optional) Specify the archive data and executable areas of a specific node. If you do not specify the node option, the device considers the current node as default option.
 - **node-id**—Specify for node (0, 1).
 - **all**—Specify for all nodes.

- **local**—Specify for local nodes.
- **primary**— Specify for primary nodes.
- **partition**—(Default) Specify that the target media should be repartitioned before the backup is saved to it.



NOTE: The target media is partitioned whether or not it is specified in the command, because this is a mandatory option.

Example: `request system snapshot media usb partition`

Example: `request system snapshot media usb partition factory`

- **slice**—(Optional) Take a snapshot of the root partition the system has currently booted from to another slice in the same media.
- **alternate**—(Optional) Store the snapshot on the other root partition in the system.



NOTE: The slice option cannot be used along with the other `request system snapshot` options, because the options are mutually exclusive. If you use the `factory`, `media`, or `partition` option, you cannot use the `slice` option; if you use the `slice` option, you cannot use any of the other options.

Required Privilege Level maintenance

List of Sample Output [request system snapshot config-partition on page 1999](#)
[request system snapshot root-partition on page 2000](#)
[request system snapshot media hard-disk on page 2000](#)
[request system snapshot media usb \(when usb device is missing on page 2000](#)
[request system snapshot media compact-flash on page 2000](#)
[request system snapshot partition on page 2000](#)

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

`request system snapshot config-partition`

```
user@host> request system snapshot config-partition
Doing the initial labeling...
Verifying compatibility of destination media partitions...
Running newfs (391MB) on hard-disk media /config partition (ad1s1e)...
Copying '/dev/ad0s1e' to '/dev/ad1s1e' .. (this may take a few minutes)
The following filesystems were archived: /config
```

request system snapshot root-partition

```
user@host> request system snapshot root-partition

Doing the initial labeling...
Verifying compatibility of destination media partitions...
Running newfs (3GB) on hard-disk media / partition (ad1s1a)...
Copying '/dev/ad0s1a' to '/dev/ad1s1a' .. (this may take a few minutes)
The following filesystems were archived: /
```

request system snapshot media hard-disk

```
user@host> request system snapshot media hard-disk

Verifying compatibility of destination media partitions...
Running newfs (880MB) on hard-disk media / partition (ad2s1a)...
Running newfs (98MB) on hard-disk media /config partition (ad2s1e)...
Copying '/dev/ad0s1a' to '/dev/ad2s1a' .. (this may take a few minutes)
...
```

request system snapshot media usb (when usb device is missing)

```
user@host> request system snapshot media usb

Verifying compatibility of destination media partitions...
Running newfs (254MB) on usb media / partition (da1s1a)...
Running newfs (47MB) on usb media /config partition (da1s1e)...
Copying '/dev/da0s2a' to '/dev/da1s1a' .. (this may take a few minutes)
Copying '/dev/da0s2e' to '/dev/da1s1e' .. (this may take a few minutes)
The following filesystems were archived: / /config
```

request system snapshot media compact-flash

```
user@host> request system snapshot media compact-flash


error: cannot snapshot to current boot device
```

request system snapshot partition

```
user@host> request system snapshot partition

Verifying compatibility of destination media partitions...
Running newfs (439MB) on internal media / partition (da0s1a)...
Running newfs (46MB) on internal media /config partition (da0s1e)...
Copying '/dev/da1s1a' to '/dev/da0s1a' .. (this may take a few minutes)
Copying '/dev/da1s1e' to '/dev/da0s1e' .. (this may take a few minutes)
The following filesystems were archived: / /config
```

request system software abort in-service-upgrade (ICU)

Syntax	<code>request system software abort in-service-upgrade</code>
Release Information	Command introduced in Junos OS Release 11.2 for SRX300, SRX320, SRX340, SRX345, and SRX550M devices.
Description	Abort an in-band cluster upgrade (ICU). This command must be issued from a router session other than the one on which you issued the request system in-service-upgrade command that launched the ICU. If an ICU is in progress, this command aborts it. If the node is being upgraded, this command will cancel the upgrade. The command is also helpful in recovering the node in case of a failed ICU.
	<div>  <p>NOTE: We recommend that you use the command only when there is an issue with the ongoing session of ISSU. You may need to manually intervene to bring the system to sane state if after issuing the command the system does not recover from the abort.</p> </div>
Options	This command has no options.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> <i>request system software in-service-upgrade (Maintenance)</i>
List of Sample Output	request system software abort in-service-upgrade on page 2001
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request system software abort in-service-upgrade

```
user@host> request system software abort in-service-upgrade
In-Service-Upgrade aborted
```

request system software add (Maintenance)

Syntax	<code>request system software add <i>package-name</i></code>
Release Information	Partition option introduced in the command in Junos OS Release 10.1.
Description	Install the new software package on the device, for example: request system software add junos-srxsme-10.0R2-domestic.tgz no-copy no-validate partition reboot .
Options	<ul style="list-style-type: none">• delay-restart—Install the software package but does not restart the software process.• best-effort-load—Activate a partial load and treat parsing errors as warnings instead of errors.• no-copy—Install the software package but does not saves the copies of package files.• no-validate—Do not check the compatibility with current configuration before installation starts.• partition—Format and re-partition the media before installation.• reboot—Reboot the device after installation is completed.• unlink—Remove the software package after successful installation.• validate—Check the compatibility with current configuration before installation starts.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• request system reboot (SRX Series) on page 1996

request system software rollback (SRX Series)

Syntax	<code>request system software rollback <node-id></code>
Release Information	Command introduced in Junos OS Release 10.1. Command introduced in Junos OS Release 15.1X49-D50 for SRX1500 devices. Command introduced in Junos OS Release 17.4R1 for SRX4100 and SRX4200 devices.
Description	Revert to the software that was loaded at the last successful request system software add command. The upgraded FreeBSD Junos OS image provides an option to save a recovery image in an Operation, Administration, and Maintenance (OAM) partition, but that option will save only the Junos OS image, not the Linux image. If a user saves the Junos OS image and recovers it later, it might not be compatible with the Linux software loaded on the system.
Options	<i>node-id</i> —Identification number of the chassis cluster node. It can be 0 or 1.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• request system reboot (SRX Series) on page 1996• <i>Upgrading Junos OS with Upgraded FreeBSD</i>

request system zeroize

Syntax `request system zeroize <media>`

Description Erases all configuration information and resets all key values. The command removes all data files, including customized configuration and log files, by unlinking the files from their directories.

The command removes all user-created files from the system including all plain-text passwords, secrets, and private keys for SSH, local encryption, local authentication, IPsec, RADIUS, TACACS+, and SNMP.

This command reboots the device and sets it to the factory default configuration. After the reboot, you cannot access the device through the management Ethernet interface. Log in through the console as root and start the Junos OS CLI by typing `cli` at the prompt.

Options **media**—(Optional) In addition to removing all configuration and log files, the media option causes memory and the media to be scrubbed, removing all traces of any user-created files. Every storage device attached to the system is scrubbed, including disks, flash drives, removable USBs, and the like. The duration of the scrubbing process is dependent on the size of the media being erased. As a result, the request system zeroize media operation can take considerably more time than the request system zeroize operation. However, the critical security parameters are all removed at the beginning of the process.



NOTE: The media option is not supported on SRX5000 line devices.

Required Privilege Level Not applicable.

Related Documentation

- [request system reboot \(SRX Series\) on page 1996](#)
- [request system software rollback \(SRX Series\) on page 2003](#)

List of Sample Output [request system zeroize on page 2004](#)

Sample Output

`request system zeroize`

```
user@host> request system zeroize
```

```
warning: System will be rebooted and may not boot without configuration
Erase all data, including configuration and log files? [yes,no] (no) yes
```



```

warning: zeroizing re0

Loading /boot/loader  Consoles: serial port
BIOS driver C: is disk0
BIOS 607kB/2087552kB available memory

FreeBSD/i386 bootstrap loader, Revision 1.1
(builder@youcompany.com, Mon Mar 28 20:49:26 UTC 2011)
Loading /boot/defaults/loader.conf
/kernel text=0x837a60 data=0x46a78+0x9d44c syms=[0x4+0x8f38+0x4+0xca1ee]

Hit [Enter] to boot immediately, or space bar for command prompt.
Booting [/kernel]...
platform_early_bootinit: MAG Series Early Boot Initilaization
GDB: debug ports: sio
GDB: current port: sio
KDB: debugger backends: ddb gdb
KDB: current backend: ddb
Copyright (c) 1996-2011, Juniper Networks, Inc.
All rights resrvd.
Copyright (c) 1992-2006 The FreeBSD Project.
Copyright (c) 1979, 1980, 1983, 1986, 1988, 18\989, 1991, 1992, 1993,1994
The Regents of the University of California. All rights reserved.
...
output truncated

```

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 1419](#)
 - [show snmp mib](#)
 - [show snmp statistics on page 2192](#)

show captive-portal authentication-failed-users

Syntax	<code>show captive-portal authentication-failed-users</code>
Release Information	Command introduced in Junos OS Release 10.1 for EX Series switches. Command introduced in Junos OS Release 14.2 for MX240, MX480, and MX960 routers in enhanced LAN mode.
Description	Display the users that have failed captive portal authentication.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show captive-portal interface on page 2011 • show captive-portal firewall on page 2009 • clear captive-portal on page 1923 • Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527 • Configuring Captive Portal Authentication (CLI Procedure) on page 532
List of Sample Output	show captive-portal authentication-failed-users on page 2007
Output Fields	Table 64 on page 2007 lists the output fields for the show captive-portal authentication-failed-users command. Output fields are listed in the approximate order in which they appear.

Table 64: show captive-portal authentication-failed-users Output Fields

Field Name	Field Description	Level of Output
Interface	The MAC address configured to bypass captive portal authentication.	all
MAC address	The MAC address configured statically on the interface.	all
User	Name of the user that has failed captive portal authentication.	all
Failure Count	The number of times that 802.1X authentication has failed on the interface.	all

Sample Output

`show captive-portal
authentication-failed-users`

```
user@host> show captive-portal authentication-failed-users
```

Interface	MAC address	User	Failure Count
ge-0/0/17.0	00:37:00:00:00:00	003700000000	28
ge-0/0/20.0	00:04:10:00:00:00	000410000000	32
ge-0/0/18.0	00:00:03:00:0a:00	000003000a00	4
ge-0/0/19.0	00:00:03:00:0b:00	000003000b00	18

show captive-portal firewall

Syntax	<pre>show captive-portal firewall <brief detail> <interface-name> <interface-name detail></pre>
Release Information	<p>Command introduced in Junos OS Release 10.1 for EX Series switches.</p> <p>Command introduced in Junos OS Release 14.2 for MX240, MX480, and MX960 routers in enhanced LAN mode.</p>
Description	Display information about the firewall filters for each user that is authenticated on each captive portal interface.
Options	<p>none—Display all the firewall filters on all captive portal interfaces.</p> <p>brief detail—(Optional) Display the specified level of output.</p> <p>interface-name—(Optional) Display all the terms of the firewall filters for the specified interface.</p> <p>interface-name detail—(Optional) Display all of the terms of the firewall filters for the specified interface.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show captive-portal authentication-failed-users on page 2007 • show captive-portal interface on page 2011 • clear captive-portal on page 1923 • Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527 • Configuring Captive Portal Authentication (CLI Procedure) on page 532
List of Sample Output	<p>show captive-portal firewall brief on page 2010</p> <p>show captive-portal firewall (Specific Interface) on page 2010</p> <p>show captive-portal firewall on page 2010</p>
Output Fields	Output fields for the show captive-portal firewall command include any action modifier specified in firewall filters except policers. Policers are not supported in the terms of the internally generated dynamic firewall filters that are created when multiple supplicants authenticate on 802.1X-enabled interfaces.

Sample Output

show captive-portal firewall brief

```
user@switch> show captive-portal firewall brief
```

Captive Portal Information:

Interface	State	MAC address	User
ge-0/0/1.0	Connecting		
ge-0/0/10.0	Connecting	00:30:48:8c:66:bd	No User

show captive-portal firewall (Specific Interface)

```
user@switch> show captive-portal firewall ge-0/0/10.0
```

Filter name: dot1x_ge-0/0/10

Counters:

Name	Bytes	Packets
dot1x_ge-0/0/10_CP_arp	7616	119
dot1x_ge-0/0/10_CP_dhcp	0	0
dot1x_ge-0/0/10_CP_http	0	0
dot1x_ge-0/0/10_CP_https	0	0
dot1x_ge-0/0/10_CP_t_dns	0	0
dot1x_ge-0/0/10_CP_u_dns	0	0

show captive-portal firewall

```
user@switch> show captive-portal firewall
```

Filter name: dot1x_ge-0/0/0

Counters:

Name	Bytes	Packets
dot1x_ge-0/0/0_CP_arp	0	0
dot1x_ge-0/0/0_CP_dhcp	0	0
dot1x_ge-0/0/0_CP_http	0	0
dot1x_ge-0/0/0_CP_https	0	0
dot1x_ge-0/0/0_CP_t_dns	0	0
dot1x_ge-0/0/0_CP_u_dns	0	0

Filter name: dot1x_ge-0/0/1

Counters:

Name	Bytes	Packets
dot1x_ge-0/0/1_CP_arp	0	0
dot1x_ge-0/0/1_CP_dhcp	0	0
dot1x_ge-0/0/1_CP_http	0	0
dot1x_ge-0/0/1_CP_https	0	0
dot1x_ge-0/0/1_CP_t_dns	0	0
dot1x_ge-0/0/1_CP_u_dns	0	0

Filter name: dot1x_ge-0/0/10

Counters:

Name	Bytes	Packets
dot1x_ge-0/0/10_CP_arp	7616	119
dot1x_ge-0/0/10_CP_dhcp	0	0
dot1x_ge-0/0/10_CP_http	0	0
dot1x_ge-0/0/10_CP_https	0	0
dot1x_ge-0/0/10_CP_t_dns	0	0
dot1x_ge-0/0/10_CP_u_dns	0	0

Filter name: dot1x_ge-0/0/11

show captive-portal interface

Syntax	show captive-portal interface <interface-name> detail
Release Information	Command introduced in Junos OS Release 10.1 for EX Series switches. Command introduced in Junos OS Release 14.2 for MX240, MX480, and MX960 routers in enhanced LAN mode.
Description	Display the current operational state of all captive portal interfaces with the list of connected users and the configured values of captive portal attributes on the interfaces.
Options	<p>none—Display all captive portal interfaces.</p> <p>interface-name—(Optional) Display the state for the specified captive portal interface and lists the MAC address and user names of any clients authenticated on the interface.</p> <p>interface-name detail—(Optional) Display the configured values of captive portal attributes on the specified captive portal interface.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show captive-portal authentication-failed-users on page 2007 • show captive-portal firewall on page 2009 • captive-portal on page 1218 • clear captive-portal on page 1923 • Example: Setting Up Captive Portal Authentication on an EX Series Switch on page 527 • Configuring Captive Portal Authentication (CLI Procedure) on page 532
List of Sample Output	<p>show captive-portal interface (Only Captive Portal Enabled) on page 2013</p> <p>show captive-portal interface (802.1X Authentication and Captive Portal Enabled) on page 2013</p> <p>show captive-portal interface detail (Only Captive Portal Enabled) on page 2013</p> <p>show captive-portal interface detail (802.1X Authentication and Captive Portal Enabled) on page 2014</p>
Output Fields	Table 65 on page 2012 lists the output fields for the show captive-portal interface command. Output fields are listed in the approximate order in which they appear.

Table 65: show captive-portal interface Output Fields

Field Name	Field Description	Level of Output
Interface	Interface on which captive portal has been configured.	All levels
State	<p>The state of the interface:</p> <ul style="list-style-type: none"> • Authenticated—The client has been authenticated through the RADIUS server or has been permitted access through server fail fallback. • Authenticating—The client is authenticating through the RADIUS server. • Connecting—Switch is attempting to contact the RADIUS server. • Initialize—The interface link is down. • Held—An action has been triggered through server fail fallback during a RADIUS server timeout. A supplicant is denied access, permitted access through a specified VLAN, or maintains the authenticated state granted to it before the RADIUS server timeout occurred. 	All levels
MAC address	The MAC address of the connected client on the interface..	brief
User	Users connected to the captive portal interface.	brief
Fallen back	<p>Indicates when 802.1X authentication and captive portal are both enabled on an interface:</p> <ul style="list-style-type: none"> • If 802.1X authentication and captive portal are both enabled, CP fallen back status is Yes. • If 802.1X authentication and captive portal are not both enabled, CP fallen back status is No. 	
Supplicant mode	Mode used to authenticate clients—multiple, single, or single-supplicant.	detail
Number of retries	Number of times the user can attempt to submit authentication information.	detail
Quiet period	Time, in seconds, after a user exceeds the maximum number of retries before they can attempt to authenticate.	detail
Configured CP session timeout	Time, in seconds, that a client can be idle before the session expires.	detail
Server timeout	Time, in seconds, that an interface will wait for a reply when relaying a response from the client to the authentication server before timing out and invoking the server-fail action.	detail
Configured CP User-keepalive timeout	Time, in minutes, that a captive portal authentication session is extended after the MAC aging timer expires.	detail

Table 65: show captive-portal interface Output Fields (continued)

Field Name	Field Description	Level of Output
Number of connected supplicants	<p>Number of users connecting through the captive portal interface. Information for each user includes:</p> <ul style="list-style-type: none"> Supplicant—User name and MAC address. Operational state—See State (above). Dynamic CP session timeout—Timeout value dynamically downloaded from the RADIUS server for this user, if any. CP Session expiration due in—Time remaining in session. Eapol-Block—Shows whether EAPOL block is in effect or not. CP Session User-keepalive Expiration due in—Time, in seconds, remaining in the keep-alive period. 	detail

Sample Output

show captive-portal interface (Only Captive Portal Enabled)

```
user@switch> show captive-portal interface
```

```
Captive Portal Information:
Interface      State          MAC address    User           Fallen back
ge-0/0/1.0     Connecting
ge-0/0/10.0    Connecting     00:30:48:8c:66:bd  No User
ge-6/0/5.0     Authenticated  00:30:48:8d:7a:9b  abcdeX        No
```

show captive-portal interface (802.1X Authentication and Captive Portal Enabled)

```
user@switch> show captive-portal interface
```

```
Captive Portal Information:
Interface      State          MAC address    User           Fallen back
ge-0/0/1.0     Connecting
ge-0/0/10.0    Connecting     00:30:48:8c:66:bd  No User
ge-6/0/5.0     Authenticated  00:30:48:8d:7a:9b  abcdeX        Yes
```

show captive-portal interface detail (Only Captive Portal Enabled)

```
user@switch> show captive-portal interface detail ge-6/0/5.0
```

```
Supplicant mode: Multiple
Number of retries: 3
Quiet period: 60 seconds
Configured CP session timeout: 3600 seconds
Server timeout: 15 seconds
Configured CP User-keepalive timeout: 7 minutes
CP fallen back: No
Number of connected supplicants: 1
  Supplicant: abcdeX, 00:30:48:8d:7a:9b
    Operational state: Authenticated
    Dynamic CP Session Timeout: 3600 seconds
    CP Session Expiration due in: 3583 seconds
    Eapol-Block: In Effect
    CP session User-keepalive Expiration due in: 420 seconds
```

show captive-portal interface detail (802.1X Authentication and Captive Portal Enabled)

```
user@switch> show captive-portal interface detail ge-6/0/5.0
```

```
Supplicant mode: Multiple
Number of retries: 3
Quiet period: 60 seconds
Configured CP session timeout: 3600 seconds
Server timeout: 15 seconds
CP fallen back: Yes
Number of connected supplicants: 1
  Supplicant: abcdeX, 00:30:48:8d:7a:9b
    Operational state: Authenticated
    Dynamic CP Session Timeout: 3600 seconds
    CP Session Expiration due in: 3583 seconds
    Eapol-Block: In Effect
```

show ethernet-switching interfaces

Syntax	<pre>show ethernet-switching interfaces <brief detail summary> <interface <i>interface-name</i>></pre>
Release Information	<p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>In Junos OS Release 9.6 for EX Series switches, the following updates were made:</p> <ul style="list-style-type: none"> • Blocking field output was updated. • The default view was updated to include information about 802.1Q tags. • The detail view was updated to include information on VLAN mapping. <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>In Junos OS Release 11.1 for EX Series switches, the detail view was updated to include reflective relay information.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p>
Description	Display information about switched Ethernet interfaces.
Options	<p>none—(Optional) Display brief information for Ethernet-switching interfaces.</p> <p>brief detail summary—(Optional) Display the specified level of output.</p> <p>interface <i>interface-name</i>—(Optional) Display Ethernet-switching information for a specific interface.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • <i>Troubleshooting Ethernet Switching</i> • <i>Understanding Bridging and VLANs on Switches</i> • <i>Example: Setting Up Basic Bridging and a VLAN on Switches</i> • <i>Example: Setting Up Bridging with Multiple VLANs</i> • <i>Understanding FCoE</i> • <i>Interfaces Overview for Switches</i> • <i>show ethernet-switching mac-learning-log</i> • <i>show ethernet-switching table</i> • <i>Configuring Autorecovery From the Disabled State on Secure or Storm Control Interfaces (CLI Procedure)</i>
List of Sample Output	<p>show ethernet-switching interfaces on page 2018</p> <p>show ethernet-switching interfaces summary on page 2019</p>

[show ethernet-switching interfaces brief on page 2019](#)
[show ethernet-switching interfaces detail on page 2019](#)
[show ethernet-switching interfaces interface-name on page 2020](#)
[show ethernet-switching interfaces on page 2020](#)
[show ethernet-switching interfaces ge-0/0/15 brief on page 2021](#)
[show ethernet-switching interfaces ge-0/0/2 detail \(Blocked by RTG rtggroup\) on page 2021](#)
[show ethernet-switching interfaces ge-0/0/15 detail \(Blocked by STP\) on page 2021](#)
[show ethernet-switching interfaces ge-0/0/17 detail \(Disabled by bpdu-control\) on page 2021](#)
[show ethernet-switching interfaces detail \(C-VLAN to S-VLAN Mapping\) on page 2021](#)
[show ethernet-switching interfaces detail \(Reflective Relay Is Configured\) on page 2021](#)

Output Fields For QFX Series, QFabric, NFX Series, EX4600 and OCX1100:

Table 66 on page 2016 lists the output fields for the **show ethernet-switching interfaces** command on QFX Series, QFabric, NFX Series, EX4600 and OCX1100. Output fields are listed in the approximate order in which they appear.

Table 66: show ethernet-switching interfaces Output Fields

Field Name	Field Description	Level of Output
Interface	Name of a switching interface.	All levels
State	Interface state. Values are up or down .	none, brief, detail, summary
VLAN members	Name of a VLAN.	none, brief, detail, summary
Blocking	Forwarding state of the interface: <ul style="list-style-type: none"> • blocked—Traffic is not being forwarded on the interface. • unblocked—Traffic is forwarded on the interface. • MAC limit exceeded—The interface is temporarily disabled because of a MAC limiting error. The disabled interface is automatically restored to service when the disable timeout expires. • MAC move limit exceeded—The interface is temporarily disabled because of a MAC move limiting error. The disabled interface is automatically restored to service when the disable timeout expires. • Storm control in effect —The interface is temporarily disabled because of a storm control error. The disabled interface is automatically restored to service when the disable timeout expires. • Storm control shutdown in effect —The interface is temporarily disabled because of a storm control shutdown error. The disabled interface is automatically restored to service when the disable timeout expires. 	none, brief, detail, summary
Index	VLAN index internal to Junos OS software.	detail
untagged tagged	Specifies whether the interface forwards IEEE802.1Q-tagged or untagged traffic.	detail

Output fields for EX Series:

Table 67 on page 2017 lists the output fields for the **show ethernet-switching interfaces** command on EX Series switches. Output fields are listed in the approximate order in which they appear.

Table 67: show ethernet-switching interfaces Output Fields

Field Name	Field Description	Level of Output
Interface	Name of a switching interface.	none, brief , detail , summary
Index	VLAN index internal to Junos OS.	detail
State	Interface state. Values are up and down .	none, brief , detail
Port mode	The access mode is the port mode default and works with a single VLAN. Port mode can also be trunk , which accepts tagged packets from multiple VLANs on other switches. The third port mode value is tagged-access , which accepts tagged packets from access devices.	detail
Reflective Relay Status	Reflective relay allows packets to use the same interface for both upstream and downstream traffic. When reflective relay has been configured, the status displayed is always enabled . When reflective relay is not configured, this entry does not appear in the command output.	detail
Ether type for the interface	Ether type is a two-octet field in an Ethernet frame used to indicate which protocol is encapsulated in the payload of an incoming Ethernet packet. Both 802.1Q packets and Q-in-Q packets use this field. The output displayed for this particular field indicates the interface's Ether type, which is used to match the Ether type of incoming 802.1Q packets and Q-in-Q packets. The indicated Ether type field is also added to the interface's outgoing 802.1Q and Q-in-Q packets.	detail
VLAN membership	Names of VLANs that belong to this interface.	none, brief , detail ,
Tag	Number of the 802.1Q tag.	none, brief , detail ,
Tagging	Specifies whether the interface forwards 802.1Q tagged or untagged traffic.	none, brief , detail ,

Table 67: show ethernet-switching interfaces Output Fields (continued)

Field Name	Field Description	Level of Output
Blocking	<p>The forwarding state of the interface:</p> <ul style="list-style-type: none"> • unblocked—Traffic is forwarded on the interface. • blocked—Traffic is not being forwarded on the interface. • Disabled by bpdu control—The interface is disabled due to receiving BPDUs on a protected interface. If the disable-timeout statement has been included in the BPDU configuration, the interface automatically returns to service after the timer expires. • blocked by RTG—The specified redundant trunk group is disabled. • blocked by STP—The interface is disabled due to a spanning-tree protocol error. • MAC limit exceeded—The interface is temporarily disabled due to a MAC limit error. The disabled interface is automatically restored to service when the disable timeout expires. • MAC move limit exceeded—The interface is temporarily disabled due to a MAC move limit error. The disabled interface is automatically restored to service when the disable timeout expires. • Storm control in effect—The interface is temporarily disabled due to a storm control error. The disabled interface is automatically restored to service when the disable timeout expires. 	none, brief , detail ,
Number of MACs learned on IFL	Number of MAC addresses learned by this interface.	detail
mapping	<p>When mapping is configured, the status is one of the following C-VLAN to S-VLAN mapping types:</p> <ul style="list-style-type: none"> • dot1q-tunneled—The interface maps all traffic to the S-VLAN (all-in-one bundling). • native—The interface maps untagged and priority tagged packets to the S-VLAN. • push—The interface maps packets to a firewall filter to an S-VLAN. • policy-mapped—The interface maps packets to a specifically defined S-VLAN. • integer—The interface maps packets to the specified S-VLAN. <p>When mapping is not configured, this entry does not appear in the command output.</p>	detail

Sample Output for QFX Series Switches, QFabric, NFX Series, EX4600 and OCX1100

show ethernet-switching interfaces

```
user@switch> show ethernet-switching interfaces
```

```

Interface  State  VLAN members  Blocking
xe-0/0/0.0  up    T1122         unblocked
xe-0/0/1.0  down  default      - MAC limit exceeded
xe-0/0/2.0  down  default      - MAC move limit exceeded
xe-0/0/3.0  down  default      - Storm control in effect
xe-0/0/4.0  down  default      unblocked
```

```

xe-0/0/5.0 down default unblocked
xe-0/0/6.0 down default unblocked
xe-0/0/7.0 down default unblocked
xe-0/0/8.0 down default unblocked
xe-0/0/9.0 up T111 unblocked
xe-0/0/10.0 down default unblocked
xe-0/0/11.0 down default unblocked
xe-0/0/12.0 down default unblocked
xe-0/0/13.0 down default unblocked
xe-0/0/14.0 down default unblocked
xe-0/0/15.0 down default unblocked
xe-0/0/16.0 down default unblocked
xe-0/0/17.0 down default unblocked
xe-0/0/18.0 down default unblocked
xe-0/0/19.0 up T111 unblocked
xe-0/1/0.0 down default unblocked
xe-0/1/1.0 down default unblocked
xe-0/1/2.0 down default unblocked
xe-0/1/3.0 down default unblocked

```

show ethernet-switching interfaces summary

```
user@switch> show ethernet-switching interfaces summary
```

```

xe-0/0/0.0
xe-0/0/1.0
xe-0/0/2.0
xe-0/0/3.0
xe-0/0/8.0
xe-0/0/10.0
xe-0/0/11.0

```

show ethernet-switching interfaces brief

```
user@switch> show ethernet-switching interfaces brief
```

Interface	State	VLAN members	Blocking
xe-0/0/0.0	down	default	unblocked
xe-0/0/1.0	down	employee-vlan	unblocked
xe-0/0/2.0	down	employee-vlan	unblocked
xe-0/0/3.0	down	employee-vlan	unblocked
xe-0/0/8.0	down	employee-vlan	unblocked
xe-0/0/10.0	down	default	unblocked
xe-0/0/11.0	down	employee-vlan	unblocked

show ethernet-switching interfaces detail

```
user@switch> show ethernet-switching interfaces detail
```

```

Interface: xe-0/0/0.0 Index: 65
  State: down
  VLANs:
    default                untagged    unblocked

Interface: xe-0/0/1.0 Index: 66
  State: down
  VLANs:
    employee-vlan          untagged    unblocked

```

```

Interface: xe-0/0/2.0 Index: 67
State: down
VLANs:
    employee-vlan          untagged    unblocked

Interface: xe-0/0/3.0 Index: 68
State: down
VLANs:
    employee-vlan          untagged    unblocked

Interface: xe-0/0/8.0 Index: 69
State: down
VLANs:
    employee-vlan          untagged    unblocked

Interface: xe-0/0/10.0 Index: 70
State: down
VLANs:
    default                untagged    unblocked

Interface: xe-0/0/11.0 Index: 71
State: down
VLANs:
    employee-vlan          tagged      unblocked

```

show ethernet-switching interfaces interface-name

```
user@switch> show ethernet-switching interfaces xe-0/0/0.0
```

Interface	State	VLAN members	Blocking
xe-0/0/0.0	down	default	unblocked

Sample Output for EX Series Switches

show ethernet-switching interfaces

```
user@switch> show ethernet-switching interfaces
```

Interface	State	VLAN members	Tag	Tagging	Blocking
ae0.0	up	default		untagged	unblocked
ge-0/0/2.0	up	vlan300	300	untagged	blocked by RTG (rtggroup)
ge-0/0/3.0	up	default			blocked by STP
ge-0/0/4.0	down	default			MAC limit exceeded
ge-0/0/5.0	down	default			MAC move limit exceeded
ge-0/0/6.0	down	default			Storm control in effect
ge-0/0/7.0	down	default			unblocked
ge-0/0/13.0	up	default		untagged	unblocked
ge-0/0/14.0	up	vlan100	100	tagged	unblocked
		vlan200	200	tagged	unblocked
ge-0/0/15.0	up	vlan100	100	tagged	blocked by STP
		vlan200	200	tagged	blocked by STP
ge-0/0/16.0	down	default		untagged	unblocked
ge-0/0/17.0	down	vlan100	100	tagged	Disabled by bpdu-control
		vlan200	200	tagged	Disabled by bpdu-control

show ethernet-switching interfaces ge-0/0/15 brief

```
user@switch> show ethernet-switching interfaces ge-0/0/15 brief
```

Interface	State	VLAN members	Tag	Tagging	Blocking
ge-0/0/15.0	up	vlan100	100	tagged	blocked by STP
		vlan200	200	tagged	blocked by STP

show ethernet-switching interfaces ge-0/0/2 detail (Blocked by RTG rtggroup)

```
user@switch> show ethernet-switching interfaces ge-0/0/2 detail
```

```
Interface: ge-0/0/2.0, Index: 65, State: up, Port mode: Access
Ether type for the interface: 0X8100
VLAN membership:
    vlan300, 802.1Q Tag: 300, untagged, msti-id: 0, blocked by RTG(rtggroup)
Number of MACs learned on IFL: 0
```

show ethernet-switching interfaces ge-0/0/15 detail (Blocked by STP)

```
user@switch> show ethernet-switching interfaces ge-0/0/15 detail
```

```
Interface: ge-0/0/15.0, Index: 70, State: up, Port mode: Trunk
Ether type for the interface: 0X8100
VLAN membership:
    vlan100, 802.1Q Tag: 100, tagged, msti-id: 0, blocked by STP
    vlan200, 802.1Q Tag: 200, tagged, msti-id: 0, blocked by STP
Number of MACs learned on IFL: 0
```

show ethernet-switching interfaces ge-0/0/17 detail (Disabled by bpdu-control)

```
user@switch> show ethernet-switching interfaces ge-0/0/17 detail
```

```
Interface: ge-0/0/17.0, Index: 71, State: down, Port mode: Trunk
Ether type for the interface: 0X8100
VLAN membership:
    vlan100, 802.1Q Tag: 100, tagged, msti-id: 1, Disabled by bpdu-control
    vlan200, 802.1Q Tag: 200, tagged, msti-id: 2, Disabled by bpdu-control
Number of MACs learned on IFL: 0
```

show ethernet-switching interfaces detail (C-VLAN to S-VLAN Mapping)

```
user@switch> show ethernet-switching interfaces ge-0/0/6.0 detail
```

```
Interface: ge-0/0/6.0, Index: 73, State: up, Port mode: Access
Ether type for the interface: 0X8100
VLAN membership:
    map, 802.1Q Tag: 134, Mapped Tag: native, push, dot1q-tunneled, unblocked
    map, 802.1Q Tag: 134, Mapped Tag: 20, push, dot1q-tunneled, unblocked
```

show ethernet-switching interfaces detail (Reflective Relay Is Configured)

```
user@switch1> show ethernet-switching interfaces ge-7/0/2 detail
```

```
Interface: ge-7/0/2, Index: 66, State: down, Port mode: Tagged-access
Ether type for the interface: 0x8100
Reflective Relay Status: Enabled
Ether type for the interface: 0x8100
VLAN membership:
    VLAN_Purple VLAN_Orange VLAN_Blue, 802.1Q Tag: 450, tagged, unblocked
Number of MACs learned on IFL: 0
```

show chassis routing-engine (View)

Syntax	show chassis routing-engine
Release Information	Command introduced in Junos OS Release 9.5.
Description	Display the Routing Engine status of the chassis cluster.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • <i>cluster (Chassis)</i> • request system snapshot (Maintenance) on page 1998
List of Sample Output	show chassis routing-engine (Sample 1 - SRX550M) on page 2024 show chassis routing-engine (Sample 2 - vSRX) on page 2024
Output Fields	Table 68 on page 2023 lists the output fields for the show chassis routing-engine command. Output fields are listed in the approximate order in which they appear.

Table 68: show chassis routing-engine Output Fields

Field Name	Field Description
Temperature	Routing Engine temperature. (Not available for vSRX deployments.)
CPU temperature	CPU temperature. (Not available for vSRX deployments.)
Total memory	Total memory available on the system. NOTE: Starting with Junos OS Release 15.1x49-D70 and Junos OS Release 17.3R1, there is a change in the method for calculating the memory utilization by a Routing Engine. The inactive memory is now subtracted from the total available memory. There is thus, a decrease in the reported value for used memory; as the inactive memory is now considered as free.
Control plane memory	Memory available for the control plane.
Data plane memory	Memory reserved for data plane processing.
CPU utilization	Current CPU utilization statistics on the control plane core.
User	Current CPU utilization in user mode on the control plane core.
Background	Current CPU utilization in nice mode on the control plane core.
Kernel	Current CPU utilization in kernel mode on the control plane core.

Table 68: show chassis routing-engine Output Fields (continued)

Field Name	Field Description
Interrupt	Current CPU utilization in interrupt mode on the control plane core.
Idle	Current CPU utilization in idle mode on the control plane core.
Model	Routing Engine model.
Start time	Routing Engine start time.
Uptime	Length of time the Routing Engine has been up (running) since the last start.
Last reboot reason	Reason for the last reboot of the Routing Engine.
Load averages	The average number of threads waiting in the run queue or currently executing over 1-, 5-, and 15-minute periods.

Sample Output

show chassis routing-engine (Sample 1 - SRX550M)

```

user@host> show chassis routing-engine

Routing Engine status:
  Temperature          38 degrees C / 100 degrees F
  CPU temperature      36 degrees C / 96 degrees F
  Total memory         512 MB Max   435 MB used ( 85 percent)
  Control plane memory 344 MB Max   296 MB used ( 86 percent)
  Data plane memory    168 MB Max   138 MB used ( 82 percent)
  CPU utilization:
    User                8 percent
    Background          0 percent
    Kernel              4 percent
    Interrupt           0 percent
    Idle                88 percent
  Model                RE-SRX5500-LOWMEM
  Serial ID            AAP8652
  Start time           2009-09-21 00:04:54 PDT
  Uptime               52 minutes, 47 seconds
  Last reboot reason    0x200:chassis control reset
  Load averages:       1 minute   5 minute   15 minute
                       0.12       0.15       0.10

```

Sample Output

show chassis routing-engine (Sample 2 - vSRX)

```

user@host> show chassis routing-engine

Routing Engine status:
  Total memory         1024 MB Max   358 MB used ( 35 percent)
  Control plane memory 1024 MB Max   358 MB used ( 35 percent)
  5 sec CPU utilization:
    User                2 percent

```

```
Background      0 percent
Kernel         4 percent
Interrupt       6 percent
Idle           88 percent
Model          VSRX RE
Start time      2015-03-03 07:04:18 UTC
Uptime         2 days, 11 hours, 51 minutes, 11 seconds
Last reboot reason Router rebooted after a normal shutdown.
Load averages: 1 minute  5 minute 15 minute
                0.07      0.04    0.06
```

show cli authorization

Syntax `show cli authorization`

Release Information Command introduced before Junos OS Release 7.4.

Description Display the permissions for the current user.

```
user@host> show cli authorization
```

```
Current user: 'root' login: 'boojum' class '(root)'
```

```
Permissions:
```

```
Permissions:
```

```

  admin      -- Can view user accounts
  admin-control-- Can modify user accounts
  clear      -- Can clear learned network info
  configure  -- Can enter configuration mode
  control    -- Can modify any config
  edit       -- Can edit full files
  field      -- Can use field debug commands
  floppy     -- Can read and write the floppy
  interface  -- Can view interface configuration
  interface-control-- Can modify interface configuration
  network    -- Can access the network
  reset      -- Can reset/restart interfaces and daemons
  routing    -- Can view routing configuration
  routing-control-- Can modify routing configuration
  shell      -- Can start a local shell
  snmp       -- Can view SNMP configuration
  snmp-control-- Can modify SNMP configuration
  system     -- Can view system configuration
  system-control-- Can modify system configuration
  trace      -- Can view trace file settings
  trace-control-- Can modify trace file settings
  view       -- Can view current values and statistics
  maintenance -- Can become the super-user
  firewall   -- Can view firewall configuration
  firewall-control-- Can modify firewall configuration
  secret     -- Can view secret statements
  secret-control-- Can modify secret statements
  rollback   -- Can rollback to previous configurations
  security   -- Can view security configuration
  security-control-- Can modify security configuration
  access     -- Can view access configuration
  access-control-- Can modify access configuration
  view-configuration-- Can view all configuration (not including secrets)
  flow-tap   -- Can view flow-tap configuration
  flow-tap-control-- Can modify flow-tap configuration
  idp-profiler-operation-- Can Profiler data
  pgcp-session-mirroring-- Can view pgcp session mirroring configuration
  pgcp-session-mirroring-control-- Can modify pgcp session mirroring
  configuration
  storage    -- Can view fibre channel storage protocol configuration
  storage-control-- Can modify fibre channel storage protocol configuration
  all-control -- Can modify any configuration

```

Required Privilege Level	view
--------------------------	------

show cli directory

Syntax `show cli directory`

Release Information Command introduced before Junos OS Release 7.4.

Description Display the current working directory.

```
user@host> show cli directory
Current directory: /var/tmp
```

**Required Privilege
Level** view

show dhcp client binding

Syntax	<pre>show dhcp client binding [<address> interface <interface-name>] routing-instance <routing-instance name> [brief detail summary] logical-system tenant</pre>
Release Information	<p>Statement introduced in Junos OS Release 12.1X44-D10.</p> <p>The logical-system and tenant options are introduced in Junos OS Release 18.4R1.</p>
Description	Display the address bindings in the Dynamic Host Configuration Protocol (DHCP) client table.
Options	<p>address—(Optional) Display DHCP binding information for a specific client identified by one of the following entries:</p> <ul style="list-style-type: none"> ip-address—The specified IP address. mac-address—The specified MAC address. <p>routing-instance <routing-instance name>—(Optional) Display DHCP binding information for DHCP clients on the specified routing instance.</p> <p>interface <interface-name>—(Optional) Perform this operation on the specified interface.</p> <p>brief—(Optional) Display brief information about the active client bindings.</p> <p>detail—(Optional) Display detailed client binding information.</p> <p>summary—(Optional) Display a summary of DHCP client information.</p> <p>logical-system—(Optional) Displays the DHCP binding information for DHCP clients on the specified logical system.</p> <p>tenant—(Optional) Displays the DHCP binding information for DHCP clients on the specified tenant system.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> clear dhcp client binding on page 1925
List of Sample Output	show dhcp client binding on page 2030

Output Fields Table 69 on page 2030 lists the output fields for the **show dhcp client binding** command. Output fields are listed in the approximate order in which they appear.

Table 69: show dhcp client binding Output Fields

Field Name	Field Description
IP address	IP address of the DHCP client.
Hardware address	Hardware address of the DHCP client.
Server	IP address of the DHCP server.
Expires	Number of seconds in which the lease expires.
State	State of the address binding table on the DHCP local server.
Interface	Interface on which the request was received.
Lease Expires	Date and time at which the client's IP address lease expires.
Lease Expires in	Number of seconds in which the lease expires.
Lease Start	Date and time at which the client's IP address lease started.
Vendor Identifier	Vendor identifier.
Server Identifier	IP address of the DHCP server.
Client IP Address	IP address of the DHCP client.

Sample Output

show dhcp client binding

```
user@host> show dhcp client binding
```

```
2 clients, (2 bound, 0 init, 0 discover, 0 renew, 0 rebind)
```

Interface	IP address	Hardware address	Server	Expires	State
fe-0/0/1.0	10.1.1.89	00:0a:12:00:12:12	10.1.1.1	348	BOUND
fe-0/0/2.0	20.1.1.90	00:0a:12:00:12:34	20.1.1.1	568	BOUND

```
user@host> show dhcp client binding interface fe-0/0/1.0 detail
```

```
Client Interface: fe-0/0/1.0
```

```
Hardware address: 00:0a:12:00:12:12
State: BOUND
Lease Expires: 2010-09-16 14:45:41 UTC
Lease Expires in: 528 seconds
```

```

Lease Start:          2010-09-16 14:35:41 UTC
Vendor Identifier:    ether
Server Identifier:    10.1.1.1
Client IP Address:    10.1.1.89
update server         enabled

DHCP Options :
  Name: name-server, Value: [ 10.209.194.131, 198.51.110.2, 192.0.2.3
]
  Name: server-identifier, Value: 10.1.1.1
  Name: router, Value: [ 10.1.1.80 ]
  Name: domain-name, Value: example-50

```

user@host> show dhcp client binding 10.1.1.89

IP address	Hardware address	Server	Expires	State	Interface
10.1.1.89	00:0a:12:00:12:12	10.1.1.1	348	BOUND	fe-0/0/1.0

user@host> show dhcp client binding tenant TSYs1 routing-instance R1

IP address	Hardware address	Expires	State	Interface
33.33.33.3	00:50:56:b0:b8:21	1628	BOUND	ge-0/0/3.0

user@host> show dhcp client binding detail tenant TSYs1 routing-instance R1

```

Client Interface/Id: ge-0/0/3.0
  Hardware Address:          00:50:56:b0:b8:21
  State:                     BOUND(LOCAL_CLIENT_STATE_BOUND)
  Lease Expires:             2018-04-26 16:24:34 UTC
  Lease Expires in:         1626 seconds
  Lease Start:               2018-04-26 15:51:14 UTC
  Server Identifier:         11.11.11.1
  Client IP Address:         33.33.33.3
  Update Server              No

DHCP options:
  Name: dhcp-lease-time, Value: 33 minutes, 20 seconds
  Name: server-identifier, Value: 11.11.11.1
  Name: router, Value: [ 33.33.33.1 ]
  Name: subnet-mask, Value: 255.255.255.0

```

show dhcp client statistics

Syntax	<pre>show dhcp client statistics <routing-instance <i>routing-instance-name</i> > logical-system tenant</pre>
Release Information	<p>Statement introduced in Junos OS Release 12.1X44-D10.</p> <p>The logical-system and tenant option is introduced in Junos OS Release 18.4R1.</p>
Description	Displays the DHCP client statistics.
Options	<p>routing-instance <i>routing-instance-name</i>—(Optional) Display the statistics for DHCP clients on the specified routing instance.</p> <p>logical-system—(Optional) Displays the DHCP statistics information for DHCP clients on the specified logical system.</p> <p>tenant—(Optional) Displays the DHCP statistics information for DHCP clients on the specified tenant system.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> clear dhcp client statistics on page 1926
List of Sample Output	<p>show dhcp client statistics on page 2033</p> <p>show dhcp client statistics tenant TSYS1 routing-instance R1 on page 2034</p>
Output Fields	<p>Table 70 on page 2032 lists the output fields for the show dhcp client statistics command. Output fields are listed in the approximate order in which they appear.</p>

Table 70: show dhcp client statistics

Field Name	Field Description
Packets dropped	Number of packets discarded by the DHCP local server because of errors. Only nonzero statistics appear in the Packets dropped output. When all of the Packets dropped statistics are 0 (zero), only the Total field appears.

Table 70: show dhcp client statistics (continued)

Field Name	Field Description
Messages received	<p>Number of DHCP messages received.</p> <ul style="list-style-type: none"> • BOOTREPLY—Number of BOOTP protocol data units (PDUs) received • DHCPOFFER—Number of DHCP PDUs of type OFFER received • DHCPACK—Number of DHCP PDUs of type ACK received • DHCPNACK—Number of DHCP PDUs of type NACK received • DHCPFORCERENEW—Number of DHCP PDUs of type FORCERENEW received
Messages sent	<p>Number of DHCP messages sent.</p> <ul style="list-style-type: none"> • BOOTREQUEST—Number of BOOTP protocol data units (PDUs) transmitted • DHCPDECLINE—Number of DHCP PDUs of type DECLINE transmitted • DHCPDISCOVER—Number of DHCP PDUs of type DISCOVER transmitted • DHCPREQUEST—Number of DHCP PDUs of type REQUEST transmitted • DHCPINFORM—Number of DHCP PDUs of type INFORM transmitted • DHCPRELEASE—Number of DHCP PDUs of type RELEASE transmitted • DHCPRENEW—Number of DHCP PDUs of type RENEW transmitted • DHCPREBIND—Number of DHCP PDUs of type REBIND transmitted

Sample Output

show dhcp client statistics

```
user@host> show dhcp client statistics
```

```

Packets dropped:
  Total                0
Messages received:
  BOOTREPLY            0
  DHCPOFFER            0
  DHCPACK              0
  DHCPNACK             0
  DHCPFORCERENEW      0
Messages sent:
  BOOTREQUEST          0
  DHCPDECLINE          0
  DHCPDISCOVER         0
  DHCPREQUEST          0
  DHCPINFORM           0
  DHCPRELEASE          0

```

DHCPRENEW	0
DHCPREBIND	0

show dhcp client statistics tenant TSYS1 routing-instance R1

```
user@host> show dhcp client statistics tenant TSYS1 routing-instance R1
```

Packets dropped:

Total	0
-------	---

Messages received:

BOOTREPLY	14
DHCPOFFER	4
DHCPACK	10
DHCPNAK	0
DHCPFORCERENEW	0

Messages sent:

BOOTREQUEST	17
DHCPDECLINE	0
DHCPDISCOVER	4
DHCPREQUEST	10
DHCPINFORM	0
DHCPRELEASE	3
DHCPRENEW	6
DHCPREBIND	0

show dhcp relay binding

Syntax	Show dhcp relay binding [<address> interface <interface-name>] routing-instance <routing-instance name> [brief detail summary]
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Display the address bindings in the Dynamic Host Configuration Protocol (DHCP) relay client table.
Options	<p>address—(Optional) Display DHCP binding information for a specific client identified by one of the following entries:</p> <ul style="list-style-type: none"> ip-address—The specified IP address. mac-address—The specified MAC address. <p>routing-instance <routing-instance name>—(Optional) Display DHCP binding information on the specified routing instance.</p> <p>interface <interface-name>—(Optional) Perform this operation on the specified interface.</p> <p>brief—(Optional) Display brief information about the active client bindings.</p> <p>detail—(Optional) Display detailed client binding information.</p> <p>summary—(Optional) Display a summary of DHCP client information.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> clear dhcp relay binding on page 1927
List of Sample Output	show dhcp relay binding on page 2036
Output Fields	Table 71 on page 2035 lists the output fields for the show dhcp relay binding command. Output fields are listed in the approximate order in which they appear.

Table 71: show dhcp relay binding Output Fields

Field Name	Field Description
IP address	IP address of the DHCP client.
Hardware address	Hardware address of the DHCP client.

Table 71: show dhcp relay binding Output Fields (continued)

Field Name	Field Description
Request received on	Interface on which the request was received.
Type	Type of DHCP packet processing performed on the device.
Obtained at	Date and time at which the client's IP address lease started.
Expires at	Date and time at which the client's IP address lease expires.
State	State of the address binding table on the DHCP local server.

Sample Output

show dhcp relay binding

```
user@host> show dhcp relay binding detail
```

```
IP address      Hardware address  Type      Lease expires      State
100.20.32.1     90:00:00:01:00:01  active    2007-01-17 11:38:47 PST
rebind
100.20.32.3     90:00:00:02:00:01  active    2007-01-17 11:38:41 PST
rebind
100.20.32.4     90:00:00:03:00:01  active    2007-01-17 11:38:01 PST
rebind
100.20.32.5     90:00:00:04:00:01  active    2007-01-17 11:38:07 PST
rebind
100.20.32.6     90:00:00:05:00:01  active    2007-01-17 11:38:47 PST
rebind
```

```
user@host> show dhcp relay binding 100.20.32.1
```

```
Active binding information:
```

```
IP address      100.20.32.1
Hardware address 90:00:00:01:00:01
```

```
Lease information:
```

```
Type           DHCP
Obtained at     2007-01-17 11:28:47 PST
Expires at     2007-01-17 11:38:47 PST
```

```
> show dhcp relay binding 100.20.32.1 detail
```

```
Active binding information:
```

```
IP address      100.20.32.1
Hardware address 90:00:00:01:00:01
Request received on fe-0/0/2.0, relayed by 100.20.32.2
```

```
Lease information:
```

```
Type           DHCP
Obtained at     2007-01-17 11:28:47 PST
Expires at     2007-01-17 11:38:47 PST
State           rebind
```


show dhcp relay statistics

Syntax	<code>show dhcp relay statistics</code> <code>[<routing-instance>]</code>
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Display Dynamic Host Configuration Protocol (DHCP) relay statistics.
Options	routing-instance —(Optional) Display the DHCP relay statistics on the specified routing instance.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> clear dhcp relay statistics on page 1928
List of Sample Output	show dhcp relay statistics on page 2039
Output Fields	Table 72 on page 2038 lists the output fields for the show dhcp relay statistics command. Output fields are listed in the approximate order in which they appear.

Table 72: show dhcp relay statistics

Field Name	Field Description
Messages received	Number of DHCP messages sent. <ul style="list-style-type: none"> BOOTREQUEST—Number of BOOTP protocol data units (PDUs) received DHCPDECLINE—Number of DHCP PDUs of type DECLINE received DHCPDISCOVER—Number of DHCP PDUs of type DISCOVER received DHCPREQUEST—Number of DHCP PDUs of type REQUEST received DHCPINFORM—Number of DHCP PDUs of type INFORM received DHCPRELEASE—Number of DHCP PDUs of type RELEASE received
Messages sent	Number of DHCP messages received. <ul style="list-style-type: none"> BOOTREPLY—Number of BOOTP PDUs transmitted DHCPOFFER—Number of DHCP PDUs of type OFFER transmitted DHCPACK—Number of DHCP PDUs of type ACK transmitted DHCPNACK—Number of DHCP PDUs of type NACK transmitted DHCPFORCERENEW—Number of DHCP PDUs of type FORCERENEW transmitted

Sample Output

show dhcp relay statistics

```
user@host> show dhcp relay statistics
```

Messages received:

BOOTREQUEST	0
DHCPDECLINE	0
DHCPDISCOVER	0
DHCPINFORM	0
DHCPRELEASE	0
DHCPREQUEST	0

Messages sent:

BOOTREPLY	0
DHCPOFFER	0
DHCPACK	0
DHCPNAK	0
DHCPFORCERENEW	0

show dhcp server binding

Syntax	<pre>show dhcp server binding [interface <interface name>] <brief detail summary verbose> <ip-address MAC address> <routing-instance routing-instance-name></pre>
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Display the address bindings in the client table on the Dynamic Host Configuration Protocol (DHCP) local server.
Options	<p>interface <interface name>—(Optional) Display information about active client bindings on the specified interface.</p> <p>brief detail summary—(Optional) Display the specified level of output about active client bindings. The default is brief, which produces the same output as show dhcp server binding.</p> <p>ip-address—Display DHCP binding information for a specific client identified by the specified IP address.</p> <p>MAC address—Display DHCP binding information for a specific client identified by the specified MAC address.</p> <p>routing-instance routing-instance-name—(Optional) Display information about active client bindings for DHCP clients on the specified routing instance.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> clear dhcp server binding on page 1929
List of Sample Output	show dhcp server binding on page 2041
Output Fields	<p>Table 73 on page 2040 lists the output fields for the show dhcp server binding command. Output fields are listed in the approximate order in which they appear.</p>

Table 73: show dhcp server binding Output Fields

Field Name	Field Description
IP address	IP address of the DHCP client.
Hardware address	Hardware address of the DHCP client.

Table 73: show dhcp server binding Output Fields (continued)

Field Name	Field Description
Request received on	Interface on which the request was received.
Type	Type of DHCP packet processing performed on the device.
Obtained at	Date and time at which the client's IP address lease started.
Expires at	Date and time at which the client's IP address lease expires.
State	State of the address binding table on the DHCP local server.

Sample Output

show dhcp server binding

```
user@host> show dhcp server binding 100.20.32.1 detail
```

```
Active binding information:
```

```

    IP address      100.20.32.1
    Hardware address 90:00:00:01:00:01
    Request received on fe-0/0/2.0, relayed by 100.20.32.2
```

```
Lease information:
```

```

    Type      DHCP
    Obtained at 2007-01-17 11:28:47 PST
    Expires at 2007-01-17 11:38:47 PST
    State      rebind
```

show dhcp server statistics

Syntax	<code>show dhcp server statistics</code> <code><routing-instance></code>
Release Information	Statement introduced in Junos OS Release 12.1X44-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Display Dynamic Host Configuration Protocol (DHCP) local server statistics.
Options	routing-instance —(Optional) Display information about DHCP local server statistics on the specified routing instance. If you do not specify a routing instance, statistics are displayed for the default routing instance.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> clear dhcp server statistics on page 1930
List of Sample Output	show dhcp server statistics on page 2043
Output Fields	Table 74 on page 2042 lists the output fields for the show dhcp server statistics command. Output fields are listed in the approximate order in which they appear.

Table 74: show dhcp server statistics

Field Name	Field Description
Packets dropped	Number of packets discarded by the DHCP local server because of errors. Only nonzero statistics appear in the Packets dropped output. When all of the Packets dropped statistics are 0 (zero), only the Total field appears.
Messages received	Number of DHCP messages sent. <ul style="list-style-type: none"> BOOTREQUEST—Number of BOOTP protocol data units (PDUs) received DHCPDECLINE—Number of DHCP PDUs of type DECLINE received DHCPDISCOVER—Number of DHCP PDUs of type DISCOVER received DHCPREQUEST—Number of DHCP PDUs of type REQUEST received DHCPINFORM—Number of DHCP PDUs of type INFORM received DHCPRELEASE—Number of DHCP PDUs of type RELEASE received

Table 74: *show dhcp server statistics (continued)*

Field Name	Field Description
Messages sent	<p>Number of DHCP messages received.</p> <ul style="list-style-type: none"> BOOTREPLY—Number of BOOTP PDUs transmitted DHCPOFFER—Number of DHCP PDUs of type OFFER transmitted DHCPACK—Number of DHCP PDUs of type ACK transmitted DHCPNACK—Number of DHCP PDUs of type NACK transmitted DHCPFORCERENEW—Number of DHCP PDUs of type FORCERENEW transmitted

Sample Output

show dhcp server statistics

```
user@host> show dhcp server statistics
```

```
Packets dropped:
  Total                0
```

```
Messages received:
  BOOTREQUEST          0
  DHCPDECLINE          0
  DHCPDISCOVER         0
  DHCPINFORM           0
  DHCPRELEASE          0
  DHCPREQUEST          0
```

```
Messages sent:
  BOOTREPLY            0
  DHCPOFFER            0
  DHCPACK              0
  DHCPNAK              0
  DHCPFORCERENEW       0
```

show dhcpv6 client binding

Syntax	<pre>show dhcpv6 client binding interface <i>interface-name</i> routing-instance <<i>routing-instance-name</i>> [brief detail summary]</pre>
Release Information	Statement introduced in Junos OS Release 12.1X45-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Display the address bindings in the Dynamic Host Configuration Protocol version 6 (DHCPv6) client table.
Options	<p>interface <i>interface-name</i>—(Optional) Perform this operation on the specified interface.</p> <p>routing-instance <i>routing-instance-name</i>—(Optional) Display DHCPv6 binding information for DHCPv6 clients on the specified routing instance.</p> <p>brief—(Optional) Display brief information about the active client bindings.</p> <p>detail—(Optional) Display detailed client binding information.</p> <p>summary—(Optional) Display a summary of DHCPv6 client information.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear dhcpv6 client binding on page 1931
List of Sample Output	show dhcpv6 client binding on page 2045
Output Fields	<p>Table 75 on page 2044 lists the output fields for the show dhcpv6 client binding command. Output fields are listed in the approximate order in which they appear.</p>

Table 75: show dhcpv6 client binding Output Fields

Field Name	Field Description
Hardware Address	Hardware address of the DHCPv6 client.
State	State of the address-binding table on the DHCPv6 local server.
Lease Expires	Date and time at which the client's IP address lease expires.
Lease Expires in	Number of seconds until the lease expires.
Lease Start	Date and time at which the client's IP address lease started.

Table 75: show dhcpv6 client binding Output Fields (continued)

Field Name	Field Description
Client DUID	The DHCPv6 client's unique identifier.
Bind type	The bind type.
Client Type	The type of DHCPv6 client. The client type can be autoconfig or stateful.
Rapid Commit	Two-message exchange option for address assignment.
Server IP Address	IP address of the DHCPv6 server.
Client IP Address	IP address of the DHCPv6 client.

Sample Output

show dhcpv6 client binding

```
user@host> show dhcpv6 client binding
```

```
IP prefix      Expires      ClientType  State  Interface  Client DUID
2001:db8::b2b7:8631:d968:8d5e/128  96      STATEFUL   BOUND  ge-0/0/1.0
LL_TIME0x3-0x0-2c:6b:f5:62:39:c1
```

```
user@host> show dhcpv6 client binding detail
```

```
Client Interface: ge-0/0/1.0
  Hardware Address:      2c:6b:f5:62:39:c1
  State:                 BOUND(DHCPV6_CLIENT_STATE_BOUND)
  Lease Expires:        2012-08-07 15:52:19 UTC
  Lease Expires in:     116 seconds
  Lease Start:          2012-08-07 15:50:19 UTC
  Client DUID            VENDOR0x00000583-0x3000103f
  Bind Type:             IA_NA
  ClientType :           STATEFUL
  Rapid Commit           Off
  Server Ip Address:     fe80::230:48ff:fe5d:5bf7
  Client IP Address:     2001:db8::655b:3c80:2deb:1a3/128

DHCP options:
  Name: server-identifier, Value: LL_TIME0x1-0x17acddab-00:30:48:5d:5b:f7
  Name: vendor-opts, Value: 000005830002aaaa
  Name: sip-server-list, Value: 2000::300 2000::302 2000::303 2000::304
  Name: dns-recursive-server, Value: 2000::ff2000::fe
  Name: domain-search-list, Value: 076578616d706c6503636f6d00
```

show dhcpv6 client statistics

Syntax	<code>show dhcpv6 client statistics routing-instance<routing-instance-name></code>
Release Information	Statement introduced in Junos OS Release 12.1X45-D10 for SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.
Description	Display Dynamic Host Configuration Protocol (DHCPv6) client statistics.
Options	<code>routing-instance <routing-instance-name></code> —(Optional) Display the statistics for DHCPv6 clients on the specified routing instance.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• clear dhcpv6 client statistics on page 1932
List of Sample Output	show dhcpv6 client statistics on page 2047
Output Fields	Table 76 on page 2046 lists the output fields for the <code>show dhcpv6 client statistics</code> command. Output fields are listed in the approximate order in which they appear.

Table 76: show dhcpv6 client statistics Output Fields

Field Name	Field Description
Dhcpv6 Packets dropped	Number of packets discarded by the DHCPv6 local server because of errors. Only nonzero statistics appear in the DHCPv6 Packets dropped output. When all of the Packets dropped statistics are 0 (zero), only the Total field appears.

Table 76: show dhcpv6 client statistics Output Fields (continued)

Field Name	Field Description
Messages sent	<p>Number of DHCPv6 messages sent.</p> <ul style="list-style-type: none"> DHCPV6_DECLINE—Number of DHCPv6 PDUs of type DECLINE transmitted DHCPV6_SOLICIT—Number of DHCPv6 PDUs of type SOLICIT transmitted DHCPV6_INFORMATION_REQUEST—Number of DHCPv6 PDUs of type INFORMATION REQUEST transmitted DHCPV6_RELEASE—Number of DHCPv6 PDUs of type RELEASE transmitted DHCPV6_REQUEST—Number of DHCPv6 PDUs of type REQUEST transmitted DHCPV6_CONFIRM—Number of DHCPv6 PDUs of type CONFIRM transmitted DHCPV6_RENEW—Number of DHCPv6 PDUs of type RENEW transmitted DHCPV6_REBIND—Number of DHCPv6 PDUs of type REBIND transmitted
Messages received	<p>Number of DHCPv6 messages received.</p> <ul style="list-style-type: none"> DHCPV6_ADVERTISE—Number of DHCPv6 PDUs of type ADVERTISE received DHCPV6_REPLY—Number of DHCPv6 PDUs of type REPLY received DHCPV6_RECONFIGURE—Number of DHCPv6 PDUs of type RECONFIGURE received

Sample Output

show dhcpv6 client statistics

```
user@host> show dhcpv6 client statistics
```

```
Dhcpv6 Packets dropped:
```

```
Total          0
```

```
Messages sent:
```

```

DHCPV6_DECLINE      0
DHCPV6_SOLICIT      3
DHCPV6_INFORMATION_REQUEST 6
DHCPV6_RELEASE      1
DHCPV6_REQUEST      2
DHCPV6_CONFIRM      0
DHCPV6_RENEW        0
DHCPV6_REBIND       0

```

```
Messages received:
```

```

DHCPV6_ADVERTISE    3
DHCPV6_REPLY        3
DHCPV6_RECONFIGURE  0

```


show dhcpv6 relay binding

Syntax `show dhcpv6 relay binding`
`<address>`
`<brief>`
`<detail>`
`<interface interface-name>`
`<interfaces-vlan>`
`<interfaces-wildcard>`
`<logical-system logical-system-name>`
`<routing-instance routing-instance-name>`
`<summary>`

Release Information Command introduced in Junos OS Release 11.4.
interfaces-vlan and *interfaces-wildcard* options introduced in Junos OS Release 12.1.

Description Display the DHCPv6 address bindings in the Dynamic Host Configuration Protocol (DHCP) client table.

Options **address**—(Optional) One of the following identifiers for the DHCPv6 client whose binding state you want to show:

- *CID*—The specified Client ID (CID).
- *ipv6-prefix*—The specified IPv6 prefix.
- *session-id*—The specified session ID.

brief—(Optional) Display brief information about the active client bindings. This is the default, and produces the same output as **show dhcpv6 relay binding**.

detail—(Optional) Display detailed client binding information.

interface interface-name—(Optional) Perform this operation on the specified interface. You can optionally filter on VLAN ID and S-VLAN ID.

interfaces-vlan—(Optional) Interface VLAN ID or S-VLAN ID interface on which to show binding state information.

interfaces-wildcard—(Optional) Set of interfaces on which to show binding state information. This option supports the use of the wildcard character (*).

logical-system logical-system-name—(Optional) Perform this operation on the specified logical system.

routing-instance routing-instance-name—(Optional) Perform this operation on the specified routing instance.

summary—(Optional) Display a summary of DHCPv6 client information.

Required Privilege Level view

Related Documentation

- [Viewing and Clearing DHCP Bindings](#)
- [clear dhcpv6 relay binding on page 1933](#)

List of Sample Output

- [show dhcpv6 relay binding on page 2052](#)
- [show dhcpv6 relay binding \(Address\) on page 2052](#)
- [show dhcpv6 relay binding detail \(Client ID\) on page 2053](#)
- [show dhcpv6 relay binding detail on page 2053](#)
- [show dhcpv6 relay binding detail \(Dual-Stack\) on page 2054](#)
- [show dhcpv6 relay binding detail \(Multi-Relay Topology\) on page 2054](#)
- [show dhcpv6 relay binding \(Session ID\) on page 2054](#)
- [show dhcpv6 relay binding \(Subscriber with Multiple Addresses\) on page 2054](#)
- [show dhcpv6 relay binding detail \(Subscriber with Multiple Addresses\) on page 2055](#)
- [show dhcpv6 relay binding \(Interfaces VLAN\) on page 2056](#)
- [show dhcpv6 relay binding \(Interfaces Wildcard\) on page 2056](#)
- [show dhcpv6 relay binding \(Interfaces Wildcard\) on page 2057](#)
- [show dhcpv6 relay binding summary on page 2057](#)

Output Fields [Table 77 on page 2050](#) lists the output fields for the **show dhcpv6 relay binding** command. Output fields are listed in the approximate order in which they appear.

Table 77: show dhcpv6 relay binding Output Fields

Field Name	Field Description	Level of Output
<i>number clients, (number init, number bound, number selecting, number requesting, number renewing, number rebinding, number releasing)</i>	Summary counts of the total number of DHCPv6 clients and the number of DHCPv6 clients in each state.	summary
Client IPv6 Prefix	Prefix of the DHCPv6 client.	brief detail
Client IPv6 Excluded Prefix	IPv6 Prefix of the DHCP client excluded.	detail
Client DUID	DHCP for IPv6 Unique Identifier (DUID) of the client.	brief detail
Client IPv6 Address	IPv6 address assigned to the subscriber.	detail
Session Id	Session ID of the subscriber session.	brief detail
Expires	Number of seconds in which the lease expires.	brief detail

Table 77: show dhcpv6 relay binding Output Fields (continued)

Field Name	Field Description	Level of Output
State	<p>State of the DHCPv6 relay address binding table on the DHCPv6 client:</p> <ul style="list-style-type: none"> • BOUND—Client has an active IP address lease. • INIT—Initial state. • REBINDING—Client is broadcasting a request to renew the IP address lease. • RECONFIGURE—Client is broadcasting a request to reconfigure the IP address lease. • RELEASE—Client is releasing the IP address lease. • RENEWING—Client is sending a request to renew the IP address lease. • REQUESTING—Client is requesting a DHCPv6 server. • SELECTING—Client is receiving offers from DHCPv6 servers. 	brief detail
Interface	Incoming client interface.	brief
Lease Expires	Date and time at which the client's IP address lease expires.	detail
Lease Expires in	Number of seconds in which the lease expires.	detail
Preferred Lease Expires	Date and UTC time at which the client's IPv6 prefix expires.	detail
Preferred Lease Expires in	Number of seconds at which the client's IPv6 prefix expires.	detail
Lease Start	Date and time at which the client's IP address lease started.	detail
Lease time violated	Lease time violation has occurred.	detail
Incoming Client Interface	Client's incoming interface.	detail
Server Address	<p>IP address of the DHCPv6 server.</p> <p>Displays unknown for a DHCPv6 relay agent in a multi-relay topology that is not directly adjacent to the DHCPv6 server and does not detect the IP address of the server. In that case, the output instead displays the Next Hop Server Facing Relay field.</p>	detail
Next Hop Server Facing Relay	Next-hop address in the direction of the DHCPv6 server.	detail
Server Interface	Interface of the DHCPv6 server.	detail
Relay Address	IP address of the relay.	detail
Client Pool Name	Address pool that granted the client lease.	detail
Client ID Length	Length of client ID.	All levels

Table 77: show dhcpv6 relay binding Output Fields (continued)

Field Name	Field Description	Level of Output
Client Id	Client ID.	All levels
Generated Circuit ID	Circuit ID generated by the DHCPv6 Interface-ID option (option 18)	detail
Generated Remote ID Enterprise Number	The Juniper Networks IANA private enterprise number	detail
Generated Remote ID	Remote ID generated by the DHCPv6 Remote-ID option (option 37)	detail
Dual Stack Group	Name of the dual-stack group for the DHCPv6 binding.	detail
Dual Stack Peer Address	Address of the dual-stack DHCPv4 peer.	detail

Sample Output

show dhcpv6 relay binding

```
user@host> show dhcpv6 relay binding
```

```

Prefix                Session Id  Expires  State  Interface  Client DUID
2001:db8:3c4d:15::/64  1          83720    BOUND  ge-1/0/0.0
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:01
2001:db8:3c4d:16::/64  2          83720    BOUND  ge-1/0/0.0
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:02
2001:db8:3c4d:17::/64  3          83720    BOUND  ge-1/0/0.0
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:03
2001:db8:3c4d:18::/64  4          83720    BOUND  ge-1/0/0.0
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:04
2001:db8:3c4d:19::/64  5          83720    BOUND  ge-1/0/0.0
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:05
2001:db8:3c4d:20::/64  6          83720    BOUND  ge-1/0/0.0
LL_TIME0x1-0x4bfa26af-00:10:94:00:00:06

```

show dhcpv6 relay binding (Address)

```
user@host> show dhcpv6 relay binding 2001:db8:1111:2222::/64 detail
```

```

Session Id: 1
  Client IPv6 Prefix:      2001:db8:3c4d:15::/64
  Client DUID:             LL_TIME0x1-0x4bfa26af-00:10:94:00:00:01

  State:                   BOUND(RELAY_STATE_BOUND)
  Lease Expires:           2011-05-25 07:12:09 PDT
  Lease Expires in:        77115 seconds
  Preferred Lease Expires: 2012-07-24 00:18:14 UTC
  Preferred Lease Expires in: 600 seconds
  Lease Start:             2011-05-24 07:12:09 PDT
  Incoming Client Interface: ge-1/0/0.0
  Server Address:          2001:db8:aaaa:bbbb::1
  Server Interface:        none

```



```

Relay Address:          2001:db8:1111:2222::
Client Pool Name:       pool-25
Client Id Length:       14
Client Id:
/0x00010001/0x4bfa26af/0x00109400/0x0001

```

show dhcpv6 relay binding detail (Client ID)

```
user@host> show dhcpv6 relay binding 14/0x00010001/0x4bfa26af/0x00109400/0x0001
detail
```

```

Session Id: 1
  Client IPv6 Prefix:      2001:db8:3c4d:15::/64
  Client DUID:             LL_TIME0x1-0x4bfa26af-00:10:94:00:00:01

  State:                   BOUND(RELAY_STATE_BOUND)
  Lease Expires:           2011-05-25 07:12:09 PDT
  Lease Expires in:        77115 seconds
  Preferred Lease Expires: 2012-07-24 00:18:14 UTC
  Preferred Lease Expires in: 600 seconds
  Lease Start:             2011-05-24 07:12:09 PDT
  Lease time violated:     yes
  Incoming Client Interface: ge-1/0/0.0
  Server Address:          2001:db8:aaaa:bbbb::1
  Server Interface:        none
  Relay Address:           2001:db8:1111:2222::
  Client Pool Name:        pool-25
  Client Id Length:        14
  Client Id:
/0x00010001/0x4bfa26af/0x00109400/0x0001

```

show dhcpv6 relay binding detail

```
user@host> show dhcpv6 relay binding detail
```

```

Session Id: 1
  Client IPv6 Prefix:      2001:db8:3c4d:15::/64
  Client DUID:             LL_TIME0x1-0x4bfa26af-00:10:94:00:00:01

  State:                   BOUND(RELAY_STATE_BOUND)
  Lease Expires:           2011-05-25 07:12:09 PDT
  Lease Expires in:        77115 seconds
  Preferred Lease Expires: 2012-07-24 00:18:14 UTC
  Preferred Lease Expires in: 600 seconds
  Lease Start:             2011-05-24 07:12:09 PDT
  Lease time violated:     yes
  Incoming Client Interface: ge-1/0/0.0
  Server Address:          2001:db8:aaaa:bbbb::1
  Server Interface:        none
  Relay Address:           2001:db8:1111:2222::
  Client Pool Name:        pool-25
  Client Id Length:        14
  Client Id:
/0x00010001/0x4bfa26af/0x00109400/0x0001
  Generated Remote ID Enterprise Number: 1411
  Generated Remote ID:         host:ge-1/0/0:100

```

show dhcpv6 relay binding detail (Dual-Stack)

```
user@host> show dhcpv6 relay binding detail
```

```
Session Id: 2
  Client IPv6 Prefix:      2001:db8:ffff:0:4::/64
  Client IPv6 Address:    2001:db8:3000:8003::1/128
  Client DUID:            LL0x1-00:00:64:01:01:02
  State:                  BOUND(DHCPV6_RELAY_STATE_BOUND)
  Lease Expires:          2016-10-17 07:39:25 PDT
  Lease Expires in:       3450 seconds
  Lease Start:            2016-10-17 06:39:25 PDT
  Last Packet Received:   2016-10-17 06:39:25 PDT
  Incoming Client Interface: ae0.3221225472
  Client Interface Svlan Id: 2000
  Client Interface Vlan Id: 1
  Server Ip Address:      2001:db8:3000::2
  Server Interface:       none
  Client Profile Name:    my-dual-stack
  Client Id Length:       10
  Client Id:              /0x00030001/0x00006401/0x0102
  Dual Stack Group:       group1
  Dual Stack Peer Address: 192.0.2.4
```

show dhcpv6 relay binding detail (Multi-Relay Topology)

```
user@host > show dhcpv6 relay binding detail
```

```
Session Id: 13
  Client IPv6 Prefix:      2001:db8:3000:0:8001::5/128
  Client DUID:            LL0x1-00:00:65:03:01:02
  State:                  BOUND(DHCPV6_RELAY_STATE_BOUND)
  Lease Expires:          2011-11-21 06:14:50 PST
  Lease Expires in:       293 seconds
  Preferred Lease Expires: 2012-07-24 00:18:14 UTC
  Preferred Lease Expires in: 600 seconds
  Lease Start:            2011-11-21 06:09:50 PST
  Incoming Client Interface: ge-1/0/0.0
  Server Address:         unknown
  Next Hop Server Facing Relay: 2001:db8:4000::2
  Server Interface:       none
  Client Id Length:       10
  Client Id:              /0x00030001/0x00006503/0x0102
```

show dhcpv6 relay binding (Session ID)

```
user@host> show dhcpv6 relay binding 41
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:db8:3c4d:15::/64	41	78837	BOUND	ge-1/0/0.0	LL_TIME0x1-0x4bfa26af-00:10:94:00:00:01

show dhcpv6 relay binding (Subscriber with Multiple Addresses)

```
user@host> show dhcpv6 relay binding
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:db8:1001::1:24/128	23	593	BOUND	ge-9/0/9.0	LL_TIME0x1-0x55306754-00:10:94:00:00:02
2001:db8:1001::1:1c/128	23	393	BOUND	ge-9/0/9.0	

```

LL_TIME0x1-0x55306754-00:10:94:00:00:02
2001:db8:1001::1:14/128      23      193      BOUND      ge-9/0/9.0
LL_TIME0x1-0x55306754-00:10:94:00:00:02
2001:db8:3001::300/120      23      293      BOUND      ge-9/0/9.0
LL_TIME0x1-0x55306754-00:10:94:00:00:02
2001:db8:3001::200/120      23      193      BOUND      ge-9/0/9.0
LL_TIME0x1-0x55306754-00:10:94:00:00:02
2001:db8:3001::100/120      23      93       BOUND      ge-9/0/9.0
LL_TIME0x1-0x55306754-00:10:94:00:00:02

```

When DHCPv6 relay binding is configured with prefix exclude option, we get the following output:

```
user@host> show dhcpv6 relay binding detail
```

```

Session Id: 6
  Hardware Address:          00:10:94:00:00:01
  Client IPv6 Address:       7001:2:3::d/128
  Lease Expires:             2017-12-11 07:45:27 IST
  Lease Expires in:          9999952 seconds
  Preferred Lease Expires:   2017-12-11 07:45:27 IST
  Preferred Lease Expires in: 9999952 seconds
  Client IPv6 Prefix:        7001::1000:0:0:0/68
  Client IPv6 Excluded Prefix: 7001::1fff:ffff:ffff:ff00/120
  Lease Expires:             2017-12-11 07:45:27 IST
  Lease Expires in:          9999952 seconds
  Preferred Lease Expires:   2017-12-11 07:45:27 IST
  Preferred Lease Expires in: 9999952 seconds
  Client DUID:                LL_TIME0x1-0x599553b0-00:10:94:00:00:01

  State:                      BOUND(DHCPV6_RELAY_STATE_BOUND)
  Lease Start:                2017-08-17 13:58:33 IST
  Last Packet Received:       2017-08-17 13:58:48 IST
  Incoming Client Interface:  ge-0/0/0.100
  Client Interface Vlan Id:   100
  Server Ip Address:          7002::1
  Server Interface:           none
  Client Id Length:           14
  Client Id:                  /0x00010001/0x599553b0/0x00109400/0x0001
  Generated Circuit ID:       ge-0/0/0:100

```

show dhcpv6 relay binding detail (Subscriber with Multiple Addresses)

```
user@host> show dhcpv6 relay binding detail
```

```

Session Id: 3
  Client IPv6 Address:       2001:db8:1001::1:2/128
  Lease Expires:             2015-05-15 02:34:51 PDT
  Lease Expires in:          24 seconds
  Preferred Lease Expires:   2015-05-15 02:34:51 PDT
  Preferred Lease Expires in: 24 seconds
  Client IPv6 Address:       2001:db8:1001::1:12/128
  Lease Expires:             2015-05-15 02:41:31 PDT
  Lease Expires in:          424 seconds
  Preferred Lease Expires:   2015-05-15 02:41:31 PDT
  Preferred Lease Expires in: 424 seconds
  Client IPv6 Address:       2001:db8:1001::1:a/128
  Lease Expires:             2015-05-15 02:38:11 PDT
  Lease Expires in:          224 seconds

```

```

Preferred Lease Expires:      2015-05-15 02:38:11 PDT
Preferred Lease Expires in:   224 seconds
Client IPv6 Prefix:          2001:db8:3001::/120
Lease Expires:               2015-05-15 02:34:51 PDT
Lease Expires in:            24 seconds
Preferred Lease Expires:      2015-05-15 02:34:51 PDT
Preferred Lease Expires in:   24 seconds
Client IPv6 Prefix:          2001:db8:3001::200/120
Lease Expires:               2015-05-15 02:38:11 PDT
Lease Expires in:            224 seconds
Preferred Lease Expires:      2015-05-15 02:38:11 PDT
Preferred Lease Expires in:   224 seconds
Client IPv6 Prefix:          2001:db8:3001::100/120
Lease Expires:               2015-05-15 02:36:31 PDT
Lease Expires in:            124 seconds
Preferred Lease Expires:      2015-05-15 02:36:31 PDT
Preferred Lease Expires in:   124 seconds
Client DUID:                  LL_TIME0x1-0x55554c6e-00:10:94:00:00:02

State:                        BOUND(DHCPV6_RELAY_STATE_BOUND)
Lease Start:                  2015-05-15 02:34:21 PDT
Last Packet Received:         2015-05-15 02:34:22 PDT
Incoming Client Interface:    ge-9/0/9.0
Client Interface Vlan Id:     111
Demux Interface:              demux0.3221225475
Server Ip Address:            2001:db8:5001::1
Server Interface:             none
Client Profile Name:          DHCP-IPDEMUX-PROF
Client Id Length:             14
Client Id:                    /0x00010001/0x55554c6e/0x00109400/0x0002
Generated Circuit ID:         ge-9/0/9:111
Generated Remote ID Enterprise Number: 1411
Generated Remote ID:          ge-9/0/9:111

```

show dhcpv6 relay binding (Interfaces VLAN)

```
user@host> show dhcpv6 relay binding ge-1/0/0:100-200
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:DB8::/32	11	87583	BOUND	ge-1/0/0.1073741827	LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01
2001:DB8:19::/32	12	87583	BOUND	ge-1/0/0.1073741827	LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01

show dhcpv6 relay binding (Interfaces Wildcard)

```
user@host> show dhcpv6 relay binding demux0
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:DB8::/32	30	79681	BOUND	demux0.1073741824	LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01
2001:DB8:19::/32	31	79681	BOUND	demux0.1073741825	LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01
2001:DB8:C9::/32	32	79681	BOUND	demux0.1073741826	LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01

show dhcpv6 relay binding (Interfaces Wildcard)

```
user@host> show dhcpv6 relay binding ge-1/3/*
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:DB8::/32	22	79681	BOUND	ge-1/3/0.110	LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01
2001:DB8:19::/32	33	79681	BOUND	ge-1/3/0.110	LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01
2001:DB8:C9::/32	24	79681	BOUND	ge-1/3/0.110	LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01

show dhcpv6 relay binding summary

```
user@host> show dhcpv6 relay binding summary
```

```
5 clients, (0 init, 5 bound, 0 selecting, 0 requesting, 0 renewing, 0 releasing)
```

show dhcpv6 relay statistics

Syntax	<pre>show dhcpv6 relay statistics <bulk-leasequery-connections> <logical-system <i>logical-system-name</i>> <routing-instance <i>routing-instance-name</i>></pre>
Release Information	<p>Command introduced in Junos OS Release 11.4.</p> <p>Command introduced in Junos OS Release 12.1X48R3 for PTX Series Packet Transport Switches.</p> <p>Command introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>bulk-leasequery-connections option introduced in Junos OS Release 16.1.</p>
Description	Display Dynamic Host Configuration Protocol for IPv6 (DHCPv6) relay statistics.
Options	<p>bulk-leasequery-connections—(Optional) Display bulk leasequery statistics.</p> <p>logical-system <i>logical-system-name</i>—(Optional) Perform this operation on the specified logical system. If you do not specify a logical system name, statistics are displayed for the default logical system.</p> <p>routing-instance <i>routing-instance-name</i>—(Optional) Perform this operation on the specified routing instance. If you do not specify a routing instance name, statistics are displayed for the default routing instance.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• clear dhcpv6 relay statistics on page 1936• <i>DHCPv6 Client MAC Address Validation to Prevent Session Hijacking</i>
List of Sample Output	<p>show dhcpv6 relay statistics on page 2060</p> <p>show dhcpv6 relay statistics bulk-leasequery-connections on page 2061</p>
Output Fields	<p>Table 78 on page 2059 lists the output fields for the show dhcpv6 relay statistics command. Output fields are listed in the approximate order in which they appear.</p>

Table 78: show dhcpv6 relay statistics Output Fields

Field Name	Field Description
DHCPv6 Packets dropped	<p>Number of packets discarded by the extended DHCPv6 relay agent application due to errors. Only nonzero statistics appear in the Packets dropped output. When all of the Packets dropped statistics are 0 (zero), only the Total field appears.</p> <ul style="list-style-type: none"> • Total—Total number of packets discarded by the DHCPV6 relay agent application. • Bad options—Number of packets discarded because invalid options were specified. • Bad send—Number of packets that the extended DHCP relay application could not send. • Bad src address—Number of packets discarded because the family type was not AF_INET6. • Client MAC validation—Number of packets discarded because validation of the client MAC address failed. • No client id—Number of packets discarded because they could not be matched to a client. • Lease Time Violation—Number of packets discarded because of a lease time violation • No safd—Number of packets discarded because they arrived on an unconfigured interface. • Short packet—Number of packets discarded because they were too short. • Relay hop count—Number of packets discarded because the hop count in the packet exceeded 32.
Messages received	<p>Number of DHCPv6 messages received.</p> <ul style="list-style-type: none"> • DHCPv6_DECLINE—Number of DHCPv6 PDUs of type DECLINE received • DHCPv6_SOLICIT—Number of DHCPv6 PDUs of type SOLICIT received • DHCPv6_INFORMATION_REQUEST—Number of DHCPv6 PDUs of type INFORMATION-REQUEST received • DHCPv6_RELEASE—Number of DHCPv6 PDUs of type RELEASE received • DHCPv6_REQUEST—Number of DHCPv6 PDUs of type REQUEST received • DHCPv6_CONFIRM—Number of DHCPv6 PDUs of type CONFIRM received • DHCPv6_RENEW—Number of DHCPv6 PDUs of type RENEW received • DHCPv6_REBIND—Number of DHCPv6 PDUs of type REBIND received • DHCPv6_RELAY_REPL—Number of DHCPv6 PDUs of type RELAY-REPL received • DHCPv6_RELAY_FORW—Number of DHCPv6 RELAY-FORW PDUs received. • DHCPv6_LEASEQUERY_REPLY—Number of DHCPv6 replies received from the DHCPv6 sever • DHCPv6_LEASEQUERY_DATA—xxxx • DHCPv6_LEASEQUERY_DONE—The leasequery is complete
Messages sent	<p>Number of DHCPv6 messages sent.</p> <ul style="list-style-type: none"> • DHCPv6_ADVERTISE—Number of DHCPv6 ADVERTISE PDUs transmitted • DHCP_REPLY—Number of DHCPv6 REPLY PDUs transmitted • DHCP_RECONFIGURE—Number of DHCPv6 RECONFIGURE PDUs transmitted • DHCP_RELAY_FORW—Number of DHCPv6 RELAY-FORW PDUs transmitted • DHCPv6_RELAY_REPL—Number of DHCPv6 RELAY-REPL PDUs transmitted. • DHCPv6_LEASEQUERY—Number of DHCP leasequery messages transmitted
Packets forwarded	<p>Number of packets forwarded by the extended DHCPv6 relay agent application.</p> <ul style="list-style-type: none"> • FWD REQUEST—Number of DHCPv6 REQUEST packets forwarded • FWD REPLY—Number of DHCPv6 REPLY packets forwarded

Table 78: show dhcpv6 relay statistics Output Fields (continued)

Field Name	Field Description
External Server Response	State of the external DHCP server responsiveness.
Total Requested Servers	Total number of servers with which the DHCP relay agent has requested a bulk leasequery connection.
Total Attempted Servers	Total number of servers with which the DHCP relay agent has attempted to create a bulk leasequery connection.
Total Connected	Total number of servers that have formed a bulk leasequery connection with the DHCP relay agent.
Total Terminated by Server	Total number of servers that have terminated a bulk leasequery connection with the DHCP relay agent.
Total Max Attempted	Total number of servers where the DHCP relay agent reached the maximum retry limit when it attempted to create a bulk leasequery connection.
Total Closed due to Errors	Total number of bulk leasequery connections that closed due to an internal error on the DHCP relay agent.
In-Flight Connected	Number of current bulk leasequery connections on the DHCP relay agent.
Bulk Leasequery Reply Packet Retries	Number of bulk leasequery reply packets that the DHCP relay agent has retried.

Sample Output

show dhcpv6 relay statistics

```
user@host> show dhcpv6 relay statistics
```

```
DHCPv6 Packets dropped:
```

```
  Total                2
  Lease Time Violation  1
  Client MAC validation  1
```

```
Messages received:
```

```
  DHCPV6_DECLINE        0
  DHCPV6_SOLICIT        10
  DHCPV6_INFORMATION_REQUEST  0
  DHCPV6_RELEASE        0
  DHCPV6_REQUEST        10
  DHCPV6_CONFIRM        0
  DHCPV6_RENEW          0
  DHCPV6_REBIND         0
  DHCPV6_RELAY_FORW     0
  DHCPV6_LEASEQUERY_REPLY  0
  DHCPV6_LEASEQUERY_DATA  0
  DHCPV6_LEASEQUERY_DONE  0
```

```
Messages sent:
```



```
DHCPV6_ADVERTISE      0
DHCPV6_REPLY          0
DHCPV6_RECONFIGURE    0
DHCPV6_RELAY_REPL     0
DHCPV6_LEASEQUERY     0

Packets forwarded:
  Total                4
  FWD REQUEST          2
  FWD REPLY            2

External Server Response:
  State                Responding
```

show dhcpv6 relay statistics bulk-leasequery-connections

```
user@host> show dhcpv6 relay statistics bulk-leasequery-connections
```

```
Total Requested Servers: 0
Total Attempted Servers: 0
Total Connected: 0
Total Terminated by Server: 0
Total Max Attempted: 0
Total Closed due to Errors: 0
In-Flight Connected: 0
Bulk Leasequery Reply Packet Retries: 0
```

show dhcpv6 server binding

Syntax	<pre>show dhcpv6 server binding <address> <brief detail summary> <interface interface-name> <interfaces-vlan> <interfaces-wildcard> <logical-system logical-system-name> <routing-instance routing-instance-name></pre>
Release Information	Command introduced in Junos OS Release 9.6. Options <i>interfaces-vlan</i> and <i>interfaces-wildcard</i> added in Junos OS Release 12.1.
Description	Display the address bindings in the client table on the extended Dynamic Host Configuration Protocol for IPv6 (DHCPv6) local server.
Options	<p>address—(Optional) One of the following identifiers for the DHCPv6 client whose binding state you want to show:</p> <ul style="list-style-type: none">• <i>CID</i>—The specified Client ID (CID).• <i>ipv6-prefix</i>—The specified IPv6 prefix.• <i>session-id</i>—The specified session ID. <p>brief detail summary—(Optional) Display the specified level of output about active client bindings. The default is brief, which produces the same output as show dhcpv6 server binding.</p> <p>interface interface-name—(Optional) Display information about active client bindings on the specified interface. You can optionally filter on VLAN ID and SVLAN ID.</p> <p>interfaces-vlan—(Optional) Interface VLAN ID or S-VLAN ID interface on which to show binding state information.</p> <p>interfaces-wildcard—(Optional) Set of interfaces on which to show binding state information. This option supports the use of the wildcard character (*).</p> <p>logical-system logical-system-name—(Optional) Display information about active client bindings for DHCPv6 clients on the specified logical system.</p> <p>routing-instance routing-instance-name—(Optional) Display information about active client bindings for DHCPv6 clients on the specified routing instance.</p>
Required Privilege Level	view

- Related Documentation**
- [Viewing and Clearing DHCP Bindings](#)
 - [clear dhcpv6 server binding on page 1938](#)

- List of Sample Output**
- [show dhcpv6 server binding on page 2065](#)
 - [show dhcpv6 server binding detail on page 2065](#)
 - [show dhcpv6 server binding interface on page 2066](#)
 - [show dhcpv6 server binding interface detail on page 2066](#)
 - [show dhcpv6 server binding \(IPv6 Prefix\) on page 2066](#)
 - [show dhcpv6 server binding \(Session ID\) on page 2067](#)
 - [show dhcpv6 server binding \(Interfaces VLAN\) on page 2067](#)
 - [show dhcpv6 server binding \(Interfaces Wildcard\) on page 2067](#)
 - [show dhcpv6 server binding \(Interfaces Wildcard\) on page 2067](#)
 - [show dhcpv6 server binding summary on page 2068](#)

Output Fields [Table 79 on page 2063](#) lists the output fields for the **show dhcpv6 server binding** command. Output fields are listed in the approximate order in which they appear.

Table 79: show dhcpv6 server binding Output Fields

Field Name	Field Description	Level of Output
<i>number clients, (number init, number bound, number selecting, number requesting, number renewing, number releasing)</i>	Summary counts of the total number of DHCPv6 clients and the number of DHCPv6 clients in each state.	summary
Prefix	Client's DHCPv6 prefix, or prefix used to support multiple address assignment.	brief detail
Session Id	Session ID of the subscriber session.	brief detail
Expires	Number of seconds in which lease expires.	brief detail
State	State of the address binding table on the extended DHCPv6 local server: <ul style="list-style-type: none"> • BOUND—Client has active IP address lease. • INIT—Initial state. • RECONFIGURE—Server has sent reconfigure message to client. • RELEASE—Client is releasing IP address lease. • RENEWING—Client sending request to renew IP address lease. • REQUESTING—Client requesting a DHCPv6 server. • SELECTING—Client receiving offers from DHCPv6 servers. 	brief detail
Interface	Interface on which the DHCPv6 request was received.	brief
Client IPv6 Address	Client's IPv6 address.	detail
Client IPv6 Prefix	Client's IPv6 prefix.	detail

Table 79: show dhcpv6 server binding Output Fields (continued)

Field Name	Field Description	Level of Output
Client IPv6 Excluded Prefix	IPv6 Prefix of the DHCP client excluded.	detail
Client DUID	Client's DHCP Unique Identifier (DUID).	brief detail
Lease expires	Date and time at which the client's IP address lease expires.	detail
Lease expires in	Number of seconds in which lease expires.	detail
Preferred Lease Expires	Date and UTC time at which the client's IPv6 prefix expires.	detail
Preferred Lease Expires in	Number of seconds at which client's IPv6 prefix expires.	detail
Lease Start	Date and time at which the client's address lease was obtained.	detail
Lease time violated	Lease time violation has occurred.	detail
Incoming Client Interface	Client's incoming interface.	detail
Server IP Address	IP address of DHCPv6 server.	detail
Server Interface	Interface of DHCPv6 server.	detail
Client Pool Name	Address pool used to assign IPv6 address.	detail
Client Prefix Pool Name	Address pool used to assign IPv6 prefix.	detail
Client Id length	Length of the DHCPv6 client ID, in bytes.	detail
Client Id	ID of the DHCPv6 client.	detail
Server Id	DHCP unique identifier (DUID) for the DHCPv6 server.	detail
Client Interface Svlan Id	S-VLAN ID of the client's incoming interface.	detail
Client Interface Vlan Id	VLAN ID of the client's incoming interface.	detail
Dual Stack Group	DHCPv6 server profile name.	detail
Dual Stack Peer Address	DHCPv6 Peer IP address.	detail

Sample Output

show dhcpv6 server binding

```
user@host> show dhcpv6 server binding
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:db8:1111:2222::/64	6	86321	BOUND	ge-1/0/0.0	
LL_TIME0x1-0x2e159c0-00:10:94:00:00:01					
2001:db8:1111:2222::/64	7	86321	BOUND	ge-1/0/0.0	
LL_TIME0x1-0x2e159c0-00:10:94:00:00:02					
2001:db8:1111:2222::/64	8	86321	BOUND	ge-1/0/0.0	
LL_TIME0x1-0x2e159c0-00:10:94:00:00:03					
2001:db8:1111:2222::/64	9	86321	BOUND	ge-1/0/0.0	
LL_TIME0x1-0x2e159c1-00:10:94:00:00:04					
2001:db8:1111:2222::/64	10	86321	BOUND	ge-1/0/0.0	
LL_TIME0x1-0x2e159c1-00:10:94:00:00:05					
2001:db8:2002::1/74	11	86321	BOUND	ge-1/0/0.0	
LL_TIME0x1-0x2e159c1-00:10:94:00:00:06					

show dhcpv6 server binding detail

```
user@host> show dhcpv6 server binding detail
```

```
Session Id: 2
  Client IPv6 Prefix:      2001:db8:ffff:0:4::/64
  Client IPv6 Address:     2001:db8:0:8003::1/128
  Client DUID:             LL0x1-00:00:64:01:01:02
  State:                   BOUND(DHCPV6_LOCAL_SERVER_STATE_BOUND)

  Lease Expires:          2016-11-07 08:30:39 PST
  Lease Expires in:       43706 seconds
  Preferred Lease Expires: 2016-11-07 08:30:39 PST
  Preferred Lease Expires in: 43706 seconds
  Lease Start:            2016-11-04 11:00:37 PDT
  Last Packet Received:   2016-11-06 09:00:39 PST
  Incoming Client Interface: ae0.3221225472
  Client Interface Svlan Id: 2000
  Client Interface Vlan Id: 1
  Server Ip Address:      2001:db8::2
  Server Interface:       none
  Client Profile Name:    my-dual-stack
  Client Id Length:       10
  Client Id:              /0x00030001/0x00006401/0x0102
  Dual Stack Group:       my-dual-stack
  Dual Stack Peer Address: 192.0.2.10
```

When DHCPv6 binding is configured with prefix exclude option, we get the following output:

```
user@host> show dhcpv6 server binding detail
```

```
Session Id: 5
  Client IPv6 Address:      2001:db8:2:3::d/128
  Lease Expires:           2017-12-11 07:45:15 IST
  Lease Expires in:       9999995 seconds
  Preferred Lease Expires: 2017-12-11 07:45:15 IST
  Preferred Lease Expires in: 9999995 seconds
  Client IPv6 Prefix:      2001:db8::1000:0:0/68
```

```

Client IPv6 Excluded Prefix:      2001:db8::1fff:ffff:ff00/120
Lease Expires:                   2017-12-11 07:45:15 IST
Lease Expires in:                9999995 seconds
Preferred Lease Expires:         2017-12-11 07:45:15 IST
Preferred Lease Expires in:      9999995 seconds
Client DUID:                     LL_TIME0x1-0x599553b0-00:10:94:00:00:01

State:                           BOUND(DHCPV6_LOCAL_SERVER_STATE_BOUND)

Lease Start:                     2017-08-17 13:58:32 IST
Last Packet Received:            2017-08-17 13:58:36 IST
Incoming Client Interface:       ge-0/0/0.0
Client Interface Vlan Id:        100
Client Pool Name:                ia_na_pool
Client Prefix Pool Name:         prefix_delegate_pool
Client Id Length:                14
Client Id:                       /0x00010001/0x599553b0/0x00109400/0x0001
Relay Id Length:                31
Relay Id:                       /0x00020000/0x05830130/0x303a3035/0x3a38363a
Relay Id:                       /0x34343a65/0x323a6330/0x00000000/0x000000

```

show dhcpv6 server binding interface

```

user@host> show dhcpv6 server binding interface ge-1/0/0:10-101

Prefix          Session Id Expires State Interface Client DUID
2001:db8:1111:2222::/64 1      86055  BOUND  ge-1/0/0.100
LL_TIME0x1-0x4b0a53b9-00:10:94:00:00:01

```

show dhcpv6 server binding interface detail

```

user@host> show dhcpv6 server binding interface ge-1/0/0:10-101 detail

Session Id: 7
Client IPv6 Prefix:      2001:db8:1111:2222::/64
Client DUID:             LL_TIME0x1-0x2e159c0-00:10:94:00:00:02

State:                   BOUND(bound)
Lease Expires:           2009-07-21 10:41:15 PDT
Lease Expires in:        86136 seconds
Preferred Lease Expires: 2012-07-24 00:18:14 UTC
Preferred Lease Expires in: 600 seconds
Lease Start:             2009-07-20 10:41:15 PDT
Incoming Client Interface: ge-1/0/0.0
Server Ip Address:       0.0.0.0
Server Interface:        none
Client Id Length:        14
Client Id:               /0x00010001/0x02e159c0/0x00109400/0x0002

```

show dhcpv6 server binding (IPv6 Prefix)

```

user@host> show dhcpv6 server binding 14/0x00010001/0x02b3be8f/0x00109400/0x0005
detail

```

```

Session Id: 7
  Client IPv6 Prefix:      2001:db8:1111:2222::/64
  Client DUID:             LL_TIME0x1-0x2e159c0-00:10:94:00:00:02

  State:                   BOUND(bound)
  Lease Expires:           2009-07-21 10:41:15 PDT
  Lease Expires in:       86136 seconds
  Preferred Lease Expires: 2012-07-24 00:18:14 UTC
  Preferred Lease Expires in: 600 seconds
  Lease Start:            2009-07-20 10:41:15 PDT
  Incoming Client Interface: ge-1/0/0.0
  Server Ip Address:      0.0.0.0
  Server Interface:       none
  Client Id Length:       14
  Client Id:
/0x00010001/0x02e159c0/0x00109400/0x0002

```

show dhcpv6 server binding (Session ID)

```
user@host> show dhcpv6 server binding 8
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:db8::/32	8	86235	BOUND	ge-1/0/0.0	
LL_TIME0x1-0x2e159c0-00:10:94:00:00:03					

show dhcpv6 server binding (Interfaces VLAN)

```
user@host> show dhcpv6 server binding ge-1/0/0:100-200
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:db8::/32	11	87583	BOUND	ge-1/0/0.1073741827	
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01					
2001:db8:19::/32	12	87583	BOUND	ge-1/0/0.1073741827	
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01					

show dhcpv6 server binding (Interfaces Wildcard)

```
user@host> show dhcpv6 server binding demux0
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:db8::/32	30	79681	BOUND	demux0.1073741824	
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01					
2001:db8:19::/32	31	79681	BOUND	demux0.1073741825	
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01					
2001:db8:C9::/32	32	79681	BOUND	demux0.1073741826	
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01					

show dhcpv6 server binding (Interfaces Wildcard)

```
user@host> show dhcpv6 server binding ge-1/3/*
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:db8::/32	22	79681	BOUND	ge-1/3/0.110	
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01					
2001:db8:19::/32	33	79681	BOUND	ge-1/3/0.110	
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01					
2001:db8:C9::/32	24	79681	BOUND	ge-1/3/0.110	
LL_TIME0x1-0x4d5d009f-00:10:94:00:00:01					

show dhcpv6 server binding summary

```
user@host> show dhcpv6 server binding summary
```

```
5 clients, (0 init, 5 bound, 0 selecting, 0 requesting, 0 renewing, 0 releasing)
```


show dhcpv6 server binding (View)

Syntax	<pre>show dhcpv6 server binding <brief detail summary> <interface <i>interface-name</i>> <routing-instance <i>routing-instance-name</i>></pre>
Release Information	Command introduced in Junos OS Release 10.4.
Description	Display the address bindings in the client table for DHCPv6 local server.
Options	<ul style="list-style-type: none"> • brief detail summary—(Optional) Display the specified level of output about active client bindings. The default is brief, which produces the same output as show dhcpv6 server binding. • interface <i>interface-name</i>—(Optional) Display information about active client bindings on the specified interface. • routing-instance <i>routing-instance-name</i>—(Optional) Display information about active client bindings for DHCPv6 clients on the specified routing instance.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear dhcpv6 server binding (Local Server) on page 1941
List of Sample Output	show dhcpv6 server binding on page 2070 show dhcpv6 server binding detail on page 2071 show dhcpv6 server binding interface on page 2071 show dhcpv6 server binding interface detail on page 2072 show dhcpv6 server binding prefix on page 2072 show dhcpv6 server binding session-id on page 2072 show dhcpv6 server binding summary on page 2072
Output Fields	<p>Table 79 on page 2063 lists the output fields for the show dhcpv6 server binding command. Output fields are listed in the approximate order in which they appear.</p>

Table 80: show dhcv6p server binding Output Fields

Field Name	Field Description	Level of Output
<i>number</i> clients, (<i>number</i> init, <i>number</i> bound, <i>number</i> selecting, <i>number</i> requesting, <i>number</i> renewing, <i>number</i> releasing)	Summary counts of the total number of DHCPv6 clients and the number of DHCPv6 clients in each state.	summary

Table 80: show dhc6p server binding Output Fields (continued)

Field Name	Field Description	Level of Output
Prefix	Client's DHCPv6 prefix.	brief detail
Session Id	Session ID of the subscriber session.	brief detail
Expires	Number of seconds in which lease expires.	brief detail
State	State of the address binding table on the DHCPv6 local server: <ul style="list-style-type: none"> • BOUND—Client has active IP address lease. • INIT—Initial state. • RELEASE—Client is releasing IP address lease. • RECONFIGURE—Client has received reconfigure message from server. • RENEWING—Client sending request to renew IP address lease. • REQUESTING—Client requesting a DHCPv6 server. • SELECTING—Client receiving offers from DHCPv6 servers. 	brief detail
Interface	Interface on which the DHCPv6 request was received.	brief
Client DUID	Client's DHCP Unique Identifier (DUID).	brief
Lease expires	Date and time at which the client's IP address lease expires.	detail
Lease expires in	Number of seconds in which lease expires.	detail
Lease Start	Date and time at which the client's address lease was obtained.	detail
Incoming Client Interface	Client's incoming interface.	detail
Server IP Address	IP address of DHCPv6 server.	detail
Server Interface	Interface of DHCPv6 server.	detail
Client Id length	Length of the DHCPv6 client ID, in bytes.	detail
Client Id	ID of the DHCPv6 client.	detail
Server Id	ID type and ID of the DHCPv6 server.	detail

Sample Output

show dhc6p server binding

```
user@host> show dhc6p server binding
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:bd8:1111:2222::/64 6	LL_TIME0x1-0x2e159c0-00:10:94:00:00:01	86321	BOUND	ge-1/0/0.0	
2001:bd8:1111:2222::/64 7	LL_TIME0x1-0x2e159c0-00:10:94:00:00:02	86321	BOUND	ge-1/0/0.0	
2001:bd8:1111:2222::/64 8	LL_TIME0x1-0x2e159c0-00:10:94:00:00:03	86321	BOUND	ge-1/0/0.0	
2001:bd8:1111:2222::/64 9	LL_TIME0x1-0x2e159c1-00:10:94:00:00:04	86321	BOUND	ge-1/0/0.0	
2001:bd8:1111:2222::/64 10	LL_TIME0x1-0x2e159c1-00:10:94:00:00:05	86321	BOUND	ge-1/0/0.0	

show dhcpv6 server binding detail

```
user@host> show dhcpv6 server binding detail
```

```
Session Id: 6
  Client IPv6 Prefix:      2001:bd8:1111:2222::/64
  Client DUID:             LL_TIME0x1-0x2e159c0-00:10:94:00:00:01

  State:                   BOUND(bound)
  Lease Expires:           2009-07-21 10:41:15 PDT
  Lease Expires in:        86308 seconds
  Lease Start:             2009-07-20 10:41:15 PDT
  Incoming Client Interface: ge-1/0/0.0
  Server Ip Address:       0.0.0.0
  Server Interface:        none
  Client Id Length:        14
  Client Id:
/0x00010001/0x02e159c0/0x00109400/0x0001      Server Id:
<VENDOR 2198142976/4a4e313132414343374146430000000000000000>

Session Id: 7
  Client IPv6 Prefix:      2001:bd8:1111:2222::/64
  Client DUID:             LL_TIME0x1-0x2e159c0-00:10:94:00:00:02

  State:                   BOUND(bound)
  Lease Expires:           2009-07-21 10:41:15 PDT
  Lease Expires in:        86308 seconds
  Lease Start:             2009-07-20 10:41:15 PDT
  Incoming Client Interface: ge-1/0/0.0
  Server Ip Address:       0.0.0.0
  Server Interface:        none
  Client Id Length:        14
  Client Id:
/0x00010001/0x02e159c0/0x00109400/0x0002      Server Id:
<VENDOR 2198142976/4a4e313132414343374146430000000000000000>
```

show dhcpv6 server binding interface

```
user@host> show dhcpv6 server binding interface ge-1/0/0:10-101
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:bd8:1111:2222::/64 1	LL_TIME0x1-0x4b0a53b9-00:10:94:00:00:01	86055	BOUND	ge-1/0/0.100	

show dhcpv6 server binding interface detail

```
user@host> show dhcpv6 server binding interface ge-1/0/0:10-101 detail
```

```

Session Id: 7
  Client IPv6 Prefix:          2001:bd8:1111:2222::/64
  Client DUID:                 LL_TIME0x1-0x2e159c0-00:10:94:00:00:02

  State:                       BOUND(bound)
  Lease Expires:               2009-07-21 10:41:15 PDT
  Lease Expires in:           86136 seconds
  Lease Start:                 2009-07-20 10:41:15 PDT
  Incoming Client Interface:   ge-1/0/0.0
  Server Ip Address:           0.0.0.0
  Server Interface:            none
  Client Id Length:            14
  Client Id:
/0x00010001/0x02e159c0/0x00109400/0x0002      Server Id:
<VENDOR 2198142976/4a4e313132414343374146430000000000000000>

```

show dhcpv6 server binding prefix

```
user@host> show dhcpv6 server binding 14/0x00010001/0x02b3be8f/0x00109400/0x0005 detail
```

```

Session Id: 7
  Client IPv6 Prefix:          2001:bd8:1111:2222::/64
  Client DUID:                 LL_TIME0x1-0x2e159c0-00:10:94:00:00:02

  State:                       BOUND(bound)
  Lease Expires:               2009-07-21 10:41:15 PDT
  Lease Expires in:           86136 seconds
  Lease Start:                 2009-07-20 10:41:15 PDT
  Incoming Client Interface:   ge-1/0/0.0
  Server Ip Address:           0.0.0.0
  Server Interface:            none
  Client Id Length:            14
  Client Id:
/0x00010001/0x02e159c0/0x00109400/0x0002

```

show dhcpv6 server binding session-id

```
user@host> show dhcpv6 server binding 8
```

Prefix	Session Id	Expires	State	Interface	Client DUID
2001:bd8:1111:2222::/64	8	86235	BOUND	ge-1/0/0.0	LL_TIME0x1-0x2e159c0-00:10:94:00:00:03

show dhcpv6 server binding summary

```
user@host> show dhcpv6 server binding summary
```

```
5 clients, (0 init, 5 bound, 0 selecting, 0 requesting, 0 renewing, 0 releasing)
```

show dhcpv6 server statistics

Syntax	<pre>show dhcpv6 server statistics <bulk-leasequery-connections> <logical-system <i>logical-system-name</i>> <routing-instance <i>routing-instance-name</i>></pre>
Release Information	<p>Command introduced in Junos OS Release 9.6.</p> <p>bulk-leasequery-connections option introduced in Junos OS Release 16.1.</p>
Description	Display extended Dynamic Host Configuration Protocol for IPv6 (DHCPv6) local server statistics.
Options	<p>bulk-leasequery-connections—(Optional) Display bulk leasequery statistics.</p> <p>logical-system <i>logical-system-name</i>—(Optional) Display information about extended DHCPv6 local server statistics on the specified logical system. If you do not specify a logical system, statistics are displayed for the default logical system.</p> <p>routing-instance <i>routing-instance-name</i>—(Optional) Display information about extended DHCPv6 local server statistics on the specified routing instance. If you do not specify a routing instance, statistics are displayed for the default routing instance.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear dhcpv6 server statistics on page 1942 • <i>DHCPv6 Client MAC Address Validation to Prevent Session Hijacking</i>
List of Sample Output	<p>show dhcpv6 server statistics on page 2075</p> <p>show dhcpv6 server statistics bulk-leasequery-connections on page 2076</p>
Output Fields	<p>Table 81 on page 2074 lists the output fields for the show dhcpv6 server statistics command. Output fields are listed in the approximate order in which they appear.</p>

Table 81: show dhcpv6 server statistics Output Fields

Field Name	Field Description
Packets dropped	<p>Number of packets discarded by the extended DHCPv6 local server because of errors. Only nonzero statistics appear in the Packets dropped output. When all of the Packets dropped statistics are 0 (zero), only the Total field appears.</p> <ul style="list-style-type: none"> • Total—Total number of packets discarded by the extended DHCPv6 local server • Strict Reconfigure—Number of solicit messages discarded because the client does not support reconfiguration • Bad hardware address—Number of packets discarded because an invalid hardware address was specified • Bad opcode—Number of packets discarded because an invalid operation code was specified • Bad options—Number of packets discarded because invalid options were specified • Client MAC validation—Number of packets discarded because validation of the client MAC address failed. • Invalid server address—Number of packets discarded because an invalid server address was specified • Lease Time Violation—Number of packets discarded because of a lease time violation • No available addresses—Number of packets discarded because there were no addresses available for assignment • No interface match—Number of packets discarded because they did not belong to a configured interface • No routing instance match—Number of packets discarded because they did not belong to a configured routing instance • No valid local address—Number of packets discarded because there was no valid local address • Packet too short—Number of packets discarded because they were too short • Read error—Number of packets discarded because of a system read error • Send error—Number of packets that the extended DHCPv6 local server could not send
Advertise Delay	<p>Number of DHCP advertise messages delayed.</p> <ul style="list-style-type: none"> • DELAYED—Number of DHCPv6 advertise packets that have been sent after being delayed. • INPROGRESS—Number of DHCPv6 advertise packets that are in the delay queue. • TOTAL—Total number of delayed DHCPv6 advertise messages; sum of DELAYED and INPROGRESS.
Messages received	<p>Number of DHCPv6 messages received.</p> <ul style="list-style-type: none"> • DHCPV6_CONFIRM—Number of DHCPv6 CONFIRM PDUs received. • DHCPV6_DECLINE—Number of DHCPv6 DECLINE PDUs received. • DHCPV6_INFORMATION_REQUEST—Number of DHCPv6 INFORMATION-REQUEST PDUs received. • DHCPV6_REBIND—Number of DHCPv6 REBIND PDUs received. • DHCPV6_RELAY_FORW—Number of DHCPv6 RELAY-FORW PDUs received. • DHCPV6_RELAY_REPL—Number of DHCPv6 RELAY-REPL PDUs received. • DHCPV6_RELEASE—Number of DHCPv6 RELEASE PDUs received. • DHCPV6_RENEW—Number of DHCPv6 RENEW PDUs received. • DHCPV6_REQUEST—Number of DHCPv6 REQUEST PDUs received. • DHCPV6_SOLICIT—Number of DHCPv6 SOLICIT PDUs received. • DHCPV6_LEASEQUERY—Number of DHCPv6 leasequery messages received.

Table 81: show dhcpv6 server statistics Output Fields (continued)

Field Name	Field Description
Messages sent	<p>Number of DHCPv6 messages sent.</p> <ul style="list-style-type: none"> DHCPV6_ADVERTISE—Number of DHCPv6 ADVERTISE PDUs transmitted. DHCPV6_REPLY—Number of DHCPv6 ADVERTISE PDUs transmitted. DHCPV6_LOGICAL_NAK—Number of logical NAK messages sent, signifying T1 and T2 timers with values of zero; subset of DHCPV6_REPLY counter. (Displays only at verbose level. DHC6_RECONFIGURE—Number of DHCPv6 RECONFIGURE PDUs transmitted. DHCPV6_RELAY_REPL—Number of DHCPv6 RELAY-REPL PDUs transmitted. DHCPV6_RELAY_FORW—Number of DHCPv6 RELAY-FORW PDUs transmitted. DHCPV6_LEASEQUERY_REPLY—Number of DHCPv6 leasequery replies transmitted to the DHCPv6 relay agent. DHCPV6_LEASEQUERY_DATA—Number of DHCPv6 LEASEQUERY-DATA packets transmitted. DHCPV6_LEASEQUERY_DONE—Number of DHCPv6 LEASEQUERY-DONE packets sent.

Sample Output

show dhcpv6 server statistics

```
user@host> show dhcpv6 server statistics
```

```
Dhcpv6 Packets dropped:
```

```
  Total                2
  Lease Time Violation  1
  Client MAC validation  1
```

```
Advertise Delay:
```

```
  DELAYED                3
  INPROGRESS              9
  TOTAL                   12
```

```
Messages received:
```

```
  DHCPV6_DECLINE          0
  DHCPV6_SOLICIT          9
  DHCPV6_INFORMATION_REQUEST 0
  DHCPV6_RELEASE          0
  DHCPV6_REQUEST          5
  DHCPV6_CONFIRM          0
  DHCPV6_RENEW            0
  DHCPV6_REBIND           0
  DHCPV6_RELAY_FORW       0
  DHCPV6_LEASEQUERY       0
```

```
Messages sent:
```

```
  DHCPV6_ADVERTISE        9
  DHCPV6_REPLY            5
  DHCPV6_RECONFIGURE       0
  DHCPV6_RELAY_REPL        0
  DHCPV6_LEASEQUERY_REPLY  0
  DHCPV6_LEASEQUERY_DATA   0
  DHCPV6_LEASEQUERY_DONE   0
```

show dhcpv6 server statistics bulk-leasequery-connections

```
user@host> show dhcpv6 server statistics bulk-leasequery-connections
```

```
Total Accepted Connections:          0
Total Not-Accepted Connections:      0
Connections Closed due to Errors:     0
Connections Closed due to max-empty-replies: 0
In-flight Connections:                0
```


show dhcpv6 server statistics (View)

Syntax	<pre>show dhcpv6 server statistics <logical-system <i>logical-system-name</i>> <routing-instance <i>routing-instance-name</i>></pre>
Release Information	Command introduced in Junos OS Release 10.4.
Description	Display DHCPv6 local server statistics.
Options	<p>logical-system <i>logical-system-name</i>—(Optional) Display information about extended DHCPv6 local server statistics on the specified logical system. If you do not specify a logical system, statistics are displayed for the default logical system.</p> <p>routing-instance <i>routing-instance-name</i>—(Optional) Display information about DHCPv6 local server statistics on the specified routing instance. If you do not specify a routing instance, statistics are displayed for the default routing instance.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear dhcpv6 server statistics (Local Server) on page 1943
List of Sample Output	show dhcpv6 server statistics on page 2079
Output Fields	<p>Table 82 on page 2078 lists the output fields for the show dhcpv6 server statistics command. Output fields are listed in the approximate order in which they appear.</p>

Table 82: show dhcpv6 server statistics Output Fields

Field Name	Field Description
Dhcpv6 Packets dropped	<p>Number of packets discarded by the DHCPv6 local server because of errors. Only nonzero statistics appear in the Packets dropped output. When all of the Packets dropped statistics are 0 (zero), only the Total field appears.</p> <ul style="list-style-type: none"> • Total—Total number of packets discarded by the DHCPv6 local server • Authentication—Number of packets discarded because they could not be authenticated • Strict Reconfigure—Number of solicit messages discarded because the client does not support reconfiguration • Bad hardware address—Number of packets discarded because an invalid hardware address was specified • Bad opcode—Number of packets discarded because an invalid operation code was specified • Bad options—Number of packets discarded because invalid options were specified • Invalid server address—Number of packets discarded because an invalid server address was specified • No available addresses—Number of packets discarded because there were no addresses available for assignment • No interface match—Number of packets discarded because they did not belong to a configured interface • No routing instance match—Number of packets discarded because they did not belong to a configured routing instance • No valid local address—Number of packets discarded because there was no valid local address • Packet too short—Number of packets discarded because they were too short • Read error—Number of packets discarded because of a system read error • Send error—Number of packets that the DHCPv6 local server could not send
Messages received	<p>Number of DHCPv6 messages received.</p> <ul style="list-style-type: none"> • DHCPV6_CONFIRM—Number of DHCPv6 CONFIRM PDUs received. • DHCPV6_DECLINE—Number of DHCPv6 DECLINE PDUs received. • DHCPV6_INFORMATION_REQUEST—Number of DHCPv6 INFORMATION-REQUEST PDUs received. • DHCPV6_REBIND—Number of DHCPv6 REBIND PDUs received. • DHCPV6_RELAY_FORW—Number of DHCPv6 RELAY-FORW PDUs received from a relay by the DHCPv6 server. • DHCPV6_RELEASE—Number of DHCPv6 RELEASE PDUs received. • DHCPV6_RENEW—Number of DHCPv6 RENEW PDUs received. • DHCPV6_REQUEST—Number of DHCPv6 REQUEST PDUs received. • DHCPV6_SOLICIT—Number of DHCPv6 SOLICIT PDUs received.
Messages sent	<p>Number of DHCPv6 messages sent.</p> <ul style="list-style-type: none"> • DHCPV6_ADVERTISE—Number of DHCPv6 ADVERTISE PDUs transmitted. • DHCPV6_REPLY—Number of DHCPv6 ADVERTISE PDUs transmitted. • DHC6_RECONFIGURE—Number of DHCPv6 RECONFIGURE PDUs transmitted. • DHCPV6_RELAY_REPL—Number of DHCPv6 RELAY-REPL PDUs sent from DHCPv6 server to DHCPv6 relay.

Sample Output

show dhcpv6 server statistics

```
user@host> show dhcpv6 server statistics
```

```
Dhcpv6 Packets dropped:
```

```
  Total                0
```

```
Messages received:
```

```
  DHCPV6_DECLINE        0
```

```
  DHCPV6_SOLICIT        9
```

```
  DHCPV6_INFORMATION_REQUEST 0
```

```
  DHCPV6_RELEASE        0
```

```
  DHCPV6_REQUEST        5
```

```
  DHCPV6_CONFIRM        0
```

```
  DHCPV6_RENEW          0
```

```
  DHCPV6_REBIND         0
```

```
  DHCPV6_RELAY_FORW     0
```

```
Messages sent:
```

```
  DHCPV6_ADVERTISE      9
```

```
  DHCPV6_REPLY          5
```

```
  DHCPV6_RECONFIGURE    0
```

```
  DHCPV6_RELAY_REPL     0
```

show firewall (View)

Syntax `show firewall`
`<filter filter-name>`
`<counter counter-name>`
`<log>`
`<prefix-action-stats>`
`<terse>`

Release Information Command introduced before Junos OS Release 10.0 .

Description Display statistics about configured firewall filters.

Options **none**—Display statistics about configured firewall filters.

filter *filter-name*—Name of a configured filter.

counter *counter-name*—Name of a filter counter.

log—Display log entries for firewall filters.

prefix-action-stats—Display prefix action statistics for firewall filters.

terse—Display firewall filter names only.

Required Privilege Level view

Related Documentation

- [firewall on page 924](#)

List of Sample Output [show firewall on page 2081](#)

Output Fields [Table 83 on page 2080](#) lists the output fields for the **show firewall** command. Output fields are listed in the approximate order in which they appear.

Table 83: show firewall Output Fields

Field Name	Field Description
Filter	<p>Name of a filter that has been configured with the filter at the [edit firewall] hierarchy level.</p> <p>When an interface-specific filter is displayed, the name of the filter is followed by the full interface name and by either -in for an input filter or -out for an output filter.</p> <p>When dynamic filters are displayed, the name of the filter is followed by the full interface name and by either -in for an input filter or -out for an output filter. When a logical system-specific filter is displayed, the name of the filter is prefixed with two underscore (__) characters and the name of the logical system (for example, __ls1/filter1).</p>

Table 83: show firewall Output Fields (continued)

Field Name	Field Description
Counters	<p>Display filter counter information:</p> <ul style="list-style-type: none"> • Name—Name of a filter counter that has been configured with the counter firewall filter action. • Bytes—Number of bytes that match the filter term under which the counter action is specified. • Packets—Number of packets that matched the filter term under which the counter action is specified.
Policers	<p>Display policer information:</p> <ul style="list-style-type: none"> • Name—Name of policer. • Bytes—Number of bytes that match the filter term under which the policer action is specified. This is only the number out-of-specification (out-of-spec) byte counts, not all the bytes in all packets policed by the policer. • Packets—Number of packets that matched the filter term under which the policer action is specified. This is only the number of out-of-specification (out-of-spec) packet counts, not all packets policed by the policer.

Sample Output

show firewall

```
user@host> show firewall
```

```
Filter: ef_path
```

```
Counters:
```

Name	Bytes	Packets
def-count	0	0
video-count	0	0
voice-count	0	0

```
Filter: __default_bpdu_filter__
```

```
Filter: deep
```

```
Counters:
```

Name	Bytes	Packets
deep2	302076	5031

```
Filter: deep-flood
```

```
Counters:
```

Name	Bytes	Packets
deep_flood_def	302136	5032
deep1	0	0

```
Policers:
```

Name	Packets
deep-pol-op-first	0

show dot1x

Syntax	show dot1x <brief detail> <interface <i>interface-name</i>>
Release Information	Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 14.1X53-D30 for the QFX Series. Command introduced in Junos OS Release 14.2 for MX240, MX480, and MX960 routers in enhanced LAN mode.
Description	Display the current operational state of all ports with the list of connected users. This command displays the list of connected supplicants received from the RADIUS authentication server regardless of the session state—that is, for both authenticated supplicants and for supplicants that attempted authentication.
Options	none —Display information for all authenticator ports. brief detail —(Optional) Display the specified level of output. interface <i>interface-name</i> —(Optional) Display information for the specified port with a list of connected supplicants.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• clear dot1x on page 1944• Example: Setting Up 802.1X for Single-Supplicant or Multiple-Supplicant Configurations on an EX Series Switch on page 367• Example: Configuring 802.1X Authentication Options When the RADIUS Server Is Unavailable to an EX Series Switch on page 430• Example: Configuring Fallback Options on EX Series Switches for EAP-TTLS Authentication and Odyssey Access Clients on page 410• Filtering 802.1X Supplicants by Using RADIUS Server Attributes on page 388• Verifying 802.1X Authentication on page 440
List of Sample Output	show dot1x interface brief on page 2086 show dot1x interface detail on page 2086
Output Fields	Table 84 on page 2083 lists the output fields for the show dot1x command. Output fields are listed in the approximate order in which they appear.

Table 84: show dot1x Output Fields

Field Name	Field Description	Level of Output
Interface	Name of a port.	All levels
MAC address	The MAC address of the connected supplicant on the port.	All levels
Role	The 802.1X authentication role of the interface. When 802.1X is enabled on an interface, the role is Authenticator . As Authenticator , the interface blocks LAN access until a supplicant is authenticated through 802.1X or MAC RADIUS authentication.	brief, detail
State	<p>The state of the port:</p> <ul style="list-style-type: none"> • Authenticated—The supplicant has been authenticated through the RADIUS server or has been permitted access through server fail fallback. • Authenticating—The supplicant is authenticating through the RADIUS server. • Held—An action has been triggered through server fail fallback during a RADIUS server timeout. A supplicant is denied access, permitted access through a specified VLAN, or maintains the authenticated state granted to it before the RADIUS server timeout occurred. 	brief
User	The username of the connected supplicant.	brief
Administrative state	<p>The administrative state of the port:</p> <ul style="list-style-type: none"> • auto—Traffic is allowed through the port based on the authentication result (by default). • force-authorize—All traffic flows through the port irrespective of the authentication result. This state is not allowed on an interface whose VLAN membership has been set to dynamic. • force-unauthorize—All traffic drops on the port irrespective of the authentication result. This state is not allowed on an interface whose VLAN membership has been set to dynamic. 	detail
Supplicant	<p>The mode for the supplicant:</p> <ul style="list-style-type: none"> • single—Only the first supplicant is authenticated. All other supplicants who connect later to the port are allowed full access without any further authentication. They effectively “piggyback” on the first supplicant’s authentication. • single-secure—Only one supplicant is allowed to connect to the port. No other supplicant is allowed to connect until the first supplicant logs out. • multiple—Multiple supplicants are allowed to connect to the port. Each supplicant is authenticated individually. 	detail
Quiet period	The number of seconds the port waits following a failed authentication exchange with the supplicant before reattempting the authentication. The default value is 60 seconds. The range is 0 through 65,535 seconds.	detail
Transmit period	The number of seconds the port waits before retransmitting the initial EAPOL PDUs to the supplicant. The default value is 30 seconds. The range is 1 through 65,535 seconds.	detail

Table 84: show dot1x Output Fields (continued)

Field Name	Field Description	Level of Output
MAC radius	MAC RADIUS authentication: <ul style="list-style-type: none"> enabled—The switch sends an EAPOL request to the connecting host to attempt 802.1X authentication and if the connecting host is unresponsive, the switch tries to authenticate the host by using the MAC address. disabled—The default. The switch does not attempt to authenticate the MAC address of the connecting host. 	detail
MAC radius authentication protocol	MAC RADIUS authentication protocol: <ul style="list-style-type: none"> EAP-MD5—The EAP-MD5 protocol is used for MAC RADIUS authentication. EAP-MD5 is an authentication method belonging to the Extensible Authentication Protocol (EAP) authentication framework. EAP-MD5 is the default authentication protocol. PAP—The Password Authentication Protocol (PAP) authentication protocol is used for MAC RADIUS authentication. 	detail
MAC radius restrict	The authentication method is restricted to MAC RADIUS only. 802.1X authentication is not enabled.	detail
Reauthentication	The reauthentication state: <ul style="list-style-type: none"> disable—Periodic reauthentication of the client is disabled. interval—Sets the periodic reauthentication time interval. The default value is 3600 seconds. The range is 1 through 65,535 seconds. 	detail
Supplicant timeout	The number of seconds the port waits for a response when relaying a request from the authentication server to the supplicant before resending the request. The default value is 30 seconds. The range is 1 through 60 seconds.	detail
Server timeout	The number of seconds the port waits for a reply when relaying a response from the supplicant to the authentication server before timing out. The default value is 30 seconds. The range is 1 through 60 seconds.	detail
Maximum EAPOL requests	The maximum number of times an EAPOL request packet is retransmitted to the supplicant before the authentication session times out. The default value is 2. The range is 1 through 10.	detail
Number of clients bypassed because of authentication	The number of non-802.1X clients granted access to the LAN by means of static MAC bypass. The following fields are displayed: <ul style="list-style-type: none"> Client—MAC address of the client. vlan—The name of the VLAN to which the client is connected. 	detail
Guest VLAN member	The VLAN to which a supplicant is connected when the supplicant is authenticated using a guest VLAN. If a guest VLAN is not configured on the interface, this field displays <not configured> .	detail
Multi domain data session count	The number of data sessions that have been authenticated on a multi-domain authentication interface.	detail

Table 84: show dot1x Output Fields (continued)

Field Name	Field Description	Level of Output
Number of connected supplicants	The number of supplicants connected to a port.	detail
Supplicant	The username and MAC address of the connected supplicant.	detail
Authentication method	<p>The authentication method used for a supplicant:</p> <ul style="list-style-type: none"> • CWA Authentication—A supplicant is authenticated by the central Web authentication (CWA) server. • Fail—Authentication failed and supplicant is in Held state. • Guest VLAN—A supplicant is connected to the LAN through the guest VLAN. • MAC RADIUS—A nonresponsive host is authenticated based on its MAC address. The MAC address is configured as permitted on the RADIUS server, the RADIUS server lets the switch know that the MAC address is a permitted address, and the switch opens LAN access to the nonresponsive host on the interface to which it is connected. • RADIUS—A supplicant is configured on the RADIUS server, the RADIUS server communicates this to the switch, and the switch opens LAN access on the interface to which the supplicant is connected. • Server-fail—One of the following fallback actions is in effect because the RADIUS server is unreachable. Indicates whether EAPOL block is in effect, and the amount of time remaining for EAPOL block (in seconds). <ul style="list-style-type: none"> • deny—The supplicant is denied access to the LAN, preventing traffic from flowing from the supplicant through the interface. This is the default server fail fallback action. • permit—The supplicant is permitted access to the LAN as if the supplicant had been successfully authenticated by the RADIUS server. • use-cache—In the event that the RADIUS server times out when the supplicant is attempting reauthentication, the supplicant is reauthenticated only if it was previously authenticated; otherwise, the supplicant is denied LAN access. • VLAN—The supplicant is configured to be moved to a specified VLAN if the RADIUS server is unavailable to reauthenticate the supplicant. (The VLAN must already exist on the switch.) • Server-reject VLAN—The supplicant received a RADIUS access-reject message from the authentication server and was moved to a server-reject VLAN, a specified VLAN already configured on the switch. 	detail
Authenticated VLAN	The VLAN to which the supplicant is connected.	detail
Dynamic filter	User policy filter sent by the RADIUS server.	detail
Session Reauth interval	The configured reauthentication interval.	detail
Reauthentication due in	The number of seconds in which reauthentication will occur again for the connected supplicant.	detail
Session Accounting Interim Interval	The number of seconds between interim RADIUS accounting messages.	detail

Table 84: show dot1x Output Fields (continued)

Field Name	Field Description	Level of Output
Accounting Update due in	The number of seconds until the next interim RADIUS accounting update is due.	detail
CWA Redirect URL	The URL used to redirect the supplicant to a central Web server for authentication.	detail
Eapol Block	Shows whether EAPOL block is in effect or not in effect.	detail

Sample Output

show dot1x interface brief

```
user@switch> show dot1x interface brief
```

```
802.1X Information:
```

Interface	Role	State	MAC address	User
ge-0/0/1	Authenticator	Authenticated	00:a0:d2:18:1a:c8	user1
ge-0/0/2	Authenticator	Connecting		
ge-0/0/3	Authenticator	Held	00:a6:55:f2:94:ae	user3

show dot1x interface detail

```
user@switch> show dot1x interface ge-0/0/16.0 detail
```

```
ge-0/0/16.0
Role: Authenticator
Administrative state: Auto
Supplicant mode: Single
Number of retries: 3
Quiet period: 60 seconds
Transmit period: 30 seconds
Mac Radius: Enabled
Mac Radius Restrict: Disabled
Mac Radius Authentication Protocol: PAP
Reauthentication: Enabled
Configured Reauthentication interval: 3600 seconds
Supplicant timeout: 30 seconds
Server timeout: 30 seconds
Maximum EAPOL requests: 2
Guest VLAN member: <not configured>
Number of connected supplicants: 2
  Supplicant: abc, 00:30:48:8C:66:BD
    Operational state: Authenticated
    Authentication method: Radius
    Authenticated VLAN: v200
    Session Reauth interval: 3600 seconds
    Reauthentication due in 3587 seconds
    Eapol-Block: Not In Effect
  Supplicant: 000303030303, 00:03:03:03:03:03
    Operational state: Authenticated
    Backend Authentication state: Idle
    Authentication method: Mac Radius
    Authenticated VLAN: dyn_vlan2
```

```
Session Reauth interval: 3600 seconds  
Reauthentication due in 3587 seconds  
Eapol-Block: In Effect
```

show dot1x accounting attribute

Syntax	show dot1x accounting attribute
Release Information	Command introduced in JUNOS Release 16.1 for EX Series switches.
Description	<p>Display the RADIUS accounting attributes sent by the switch, operating as the network access server (NAS), to the RADIUS accounting server. RADIUS accounting attributes convey information that is used to account for a service provided to an authenticated user. The user session statistics are recorded by the accounting server in an accounting log file.</p> <p>RADIUS accounting attributes are included in Accounting-Request messages sent from the switch to the accounting server. Attribute information is created only if the data for the attribute is available.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• show dot1x on page 2082• clear dot1x on page 1944• Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch on page 509• Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch on page 367• Filtering 802.1X Suplicants by Using RADIUS Server Attributes on page 388
List of Sample Output	show dot1x accounting-attributes on page 2089
Output Fields	Table 85 on page 2089 lists the output fields for the show dot1x accounting-attributes command. Output fields are listed in the approximate order in which they appear.

Table 85: show dot1x accounting attribute Output Fields

Field Name	Field Description
Accounting attributes	<p>Shows the value for the RADIUS accounting attributes sent from the NAS to the server. An attribute is displayed only if data is available for that attribute value. The following RADIUS accounting attributes are supported:</p> <ul style="list-style-type: none"> • User-Name—The name of the authenticated user. • NAS-Port—The physical port number of the NAS which is authenticating the user. • Framed-IP-Address—The IP address of the authenticated user. • Filter-ID—The name of the filter list for the authenticated user. • Framed-MTU—The maximum transmission unit that can be configured for user. • Client-System-Name—This is a vendor-specific attribute (VSA) used to indicate the client host name. Supported for LLDP-capable devices only. • Session-Timeout—The maximum number of seconds that a session will stay active before termination of the session or prompt. • Called-Station-ID—Allows the NAS to send the phone number that the user called, using Dialed Number Identification (DNIS) or similar technology. • Calling-Station-ID—Allows the NAS to send the phone number that the call came from, using Dialed Number Identification (DNIS) or similar technology. • NAS-Identifier—Contains a string identifying the NAS originating the Accounting-Request. • Acct-Status-Type—Indicates whether this Accounting-Request marks the beginning of the user session (Start) or the end (Stop). Can also be used for an interim update (Interim-Update). • Acct-Authentic—Indicates whether the user was authenticated locally (Local), by the RADIUS server (RADIUS), or by another remote authentication protocol (Remote). • Acct-Session-ID—A unique ID for a specific accounting session that can be used to match start and stop records for a session in the log file. • Event-Timestamp—Records the time an event occurred. • NAS-Port-ID—The port of the NAS that is authenticating the user. • Framed-IPv6-Address—The IPv6 address of the authenticated user.

Sample Output

show dot1x accounting-attributes

```
user@switch> show dot1x accounting-attributes
```

```
Accounting Attribute:
  Calling Station Id:      88-e0-f3-1f-c5-e0
  Called station Id:      00-10-94-00-00-02
  Framed Ipv6 Address     :2001:db8:0:1:2a0:a514:0:24d
  Accounting Session ID:  802.1x812f00250002dcc6
  Client System Name:     AVX149485
  Session-Timeout:        120s
  Framed-MTU:             492
  Acct-Authentic:         RADIUS
  Nas-Port-ID             ge-0/0/5.0
```

show dot1x authentication-failed-users

Syntax	show dot1x authentication-failed-users
Release Information	Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 14.1X53-D30 for the QFX Series.
Description	Display the supplicants (users) that have failed 802.1X authentication.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear dot1x on page 1944 • Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch on page 509 • Configuring 802.1X Interface Settings (CLI Procedure) on page 357
List of Sample Output	show dot1x authentication-failed-users on page 2090
Output Fields	Table 86 on page 2090 lists the output fields for the show dot1x authentication-failed-users command. Output fields are listed in the approximate order in which they appear.

Table 86: show dot1x authentication-failed-users Output Fields

Field Name	Field Description	Level of Output
Interface	The MAC address configured to bypass 802.1X authentication.	all
MAC address	The MAC address configured statically on the interface.	all
User	The user that is configured on the RADIUS server and that has failed 802.1X authentication.	all
Failure Count	The number of times that 802.1X authentication has failed on the interface.	all

Sample Output

show dot1x authentication-failed-users

```
user@switch> show dot1x authentication-failed-users
```

Interface	MAC address	User	Failure Count
ge-0/0/17.0	00:37:00:00:00:00	003700000000	28
ge-0/0/20.0	00:04:10:00:00:00	000410000000	32

ge-0/0/18.0	00:00:03:00:0a:00	000003000a00	4
ge-0/0/19.0	00:00:03:00:0b:00	000003000b00	18

show dot1x firewall

Syntax	<code>show dot1x firewall <interface <i>interface-name</i>></code>
Release Information	Command introduced in Junos OS Release 9.5 for EX Series switches. Command introduced in Junos OS Release 14.2 for MX240, MX480, and MX960 routers in enhanced LAN mode.
Description	Display information about the firewall filters for each user or nonresponsive host that is authenticated on each 802.1X-enabled interface that is configured for multiple supplicants. For example, if the firewall filter is configured with a term for counters, the command shows the count for each user.
Options	none —Display information for all interfaces. interface <i>interface-names</i> —(Optional) Display information for the specified interface.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• clear dot1x on page 1944
List of Sample Output	show dot1x firewall on page 2092 show dot1x firewall on page 2092
Output Fields	Output fields include any action modifier that is specified in firewall filters.

Sample Output

show dot1x firewall

(Showing counter action)

```
user@switch> show dot1x firewall
Filter: dot1x-filter-ge-0/0/3
Counters
  counter1_dot1x_ge-0/0/3_user1    342
  counter1_dot1x_ge-0/0/3_user2    857
```

show dot1x firewall

(Showing policer action)

```
user@switch> show dot1x firewall
Filter: dot1x_ge-0/0/0
Counters
```



```
p1-t1 494946
```

show dot1x static-mac-address

Syntax	<code>show dot1x static-mac-address <(interface [<i>interface-name</i>])></code>
Release Information	<p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 14.1X53-D30 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.2 for MX240, MX480, and MX960 routers in enhanced LAN mode.</p>
Description	Display all the static MAC addresses that are configured to bypass 802.1X authentication on the switch.
Options	<p>none—Display static MAC addresses for all interfaces.</p> <p>interface <i>interface-name</i>—(Optional) Display static MAC addresses for a specific interface.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear dot1x on page 1944 • Example: Configuring Static MAC Bypass of 802.1X and MAC RADIUS Authentication on an EX Series Switch on page 509 • Adding a Static MAC Address Entry to the Ethernet Switching Table on a Switch with ELS Support • Configuring 802.1X Interface Settings (CLI Procedure) on page 357 • Understanding Authentication on Switches on page 348
List of Sample Output	<p>show dot1x static-mac-address on page 2095</p> <p>show dot1x static-mac-address interface (Specific Interface) on page 2095</p>
Output Fields	Table 87 on page 2094 lists the output fields for the show dot1x static-mac-address command. Output fields are listed in the approximate order in which they appear.

Table 87: show dot1x static-mac-address Output Fields

Field Name	Field Description	Level of Output
MAC address	The MAC address of the device that is configured to bypass 802.1X authentication.	all
VLAN-Assignment	The name of the VLAN to which the device is assigned.	all
Interface	The name of the interface on which authentication is bypassed for a given MAC address.	all

Sample Output

show dot1x static-mac-address

```
user@switch> show dot1x static-mac-address
```

MAC address	VLAN-Assignment	Interface
00:00:00:11:22:33		
00:00:00:00:12:12		ge-0/0/3.0
00:00:00:02:34:56	facilities	ge-0/0/1.0

show dot1x static-mac-address interface (Specific Interface)

```
user@switch> show dot1x static-mac-address interface ge-0/0/0.1
```

MAC address	VLAN-Assignment	Interface
00:00:00:12:24:12	support	ge-0/0/1.0
00:00:00:72:30:58	support	ge-0/0/1.0

show dot1x statistics

Syntax `show dot1x statistics
<interface interface>`

Release Information Command introduced in Junos OS Release 9.0 for EX Series switches.

Description Display the number of EAPOL messages transmitted or received on all interfaces or specific interfaces.

Options **none**—Displays statistical information for all interfaces.

interface *interface-name*—(Optional) Displays statistical information for the specified interface.

Required Privilege Level view

Related Documentation

- [show dot1x on page 2082](#)
- [clear dot1x on page 1944](#)
- [Example: Setting Up 802.1X for Single-Suppliant or Multiple-Suppliant Configurations on an EX Series Switch on page 367](#)
- [Filtering 802.1X Suplicants by Using RADIUS Server Attributes on page 388](#)

List of Sample Output [show dot1x statistics interface on page 2097](#)

Output Fields [Table 85 on page 2089](#) lists the output fields for the **show dot1x statistics** command. Output fields are listed in the approximate order in which they appear.

Table 88: show dot1x statistics Output Fields

Field Name	Field Description
TxReqId	The number of EAP-Request/Identity messages transmitted on the interface.
TxReq	The number of transmitted EAP-Request frames that were not EAP-Request/Identity.
TxTotal	The total number of EAPOL messages transmitted on the interface.
RxStart	The number of EAPOL-Start messages received on the interface.
RxLogoff	The number of EAP-Logoff messages received on the interface.
RxRespId	The number of EAP-Response/Identity frames received on the interface.

Table 88: show dot1x statistics Output Fields (continued)

Field Name	Field Description
RxResp	The number of EAP-Response messages received that were not EAP-Response/Identity.
CoA-Request	The number of Change of Authorization (CoA) Request messages received on the interface.
CoA-Ack	The number of CoA-Ack messages transmitted on the interface.
CoA-Nak	The number of CoA-Nak messages transmitted on the interface.
RxInvalid	The number of invalid EAPOL messages received on the interface.
RxLenErr	The number of EAPOL messages with incorrect length received on the interface.
RxTotal	The total number of EAPOL messages creceived on the interface.
LastRxVersion	The version number of the last EAPOL message received on the interface.
LastRxCsrcMac	The source MAC address in the last EAPOL message received on the interface.
PortBounceReqRx	The number of port bounce requests received on the port.

Sample Output

show dot1x statistics interface

```
user@host> show dot1x statistics interface ge-0/0/0
```

```
Interface: ge-0/0/0.0
TxReqId = 4 TxReq = 0 TxTotal = 4
RxStart = 0 RxLogoff = 0 RxRespId = 0 RxResp = 0
CoA-Request = 0 CoA-Ack = 0 CoA-Nak = 0
RxInvalid = 0 RxLenErr = 0 RxTotal = 0
LastRxVersion = 0 LastRxCsrcMac = 00:50:56:85:66:0f
PortBounceReqRx = 0
```

show ethernet-switching interfaces

Syntax	<pre>show ethernet-switching interfaces <brief detail summary> <interface <i>interface-name</i>></pre>
Release Information	<p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>In Junos OS Release 9.6 for EX Series switches, the following updates were made:</p> <ul style="list-style-type: none">• Blocking field output was updated.• The default view was updated to include information about 802.1Q tags.• The detail view was updated to include information on VLAN mapping. <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>In Junos OS Release 11.1 for EX Series switches, the detail view was updated to include reflective relay information.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p>
Description	Display information about switched Ethernet interfaces.
Options	<p>none—(Optional) Display brief information for Ethernet-switching interfaces.</p> <p>brief detail summary—(Optional) Display the specified level of output.</p> <p>interface <i>interface-name</i>—(Optional) Display Ethernet-switching information for a specific interface.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• <i>Troubleshooting Ethernet Switching</i><i>Understanding Bridging and VLANs on Switches</i>• <i>Example: Setting Up Basic Bridging and a VLAN on Switches</i>• <i>Example: Setting Up Bridging with Multiple VLANs</i>• <i>Understanding FCoE</i>• <i>Interfaces Overview for Switches</i>• <i>show ethernet-switching mac-learning-log</i>• <i>show ethernet-switching table</i>• <i>Configuring Autorecovery From the Disabled State on Secure or Storm Control Interfaces (CLI Procedure)</i>
List of Sample Output	<p>show ethernet-switching interfaces on page 2101</p> <p>show ethernet-switching interfaces summary on page 2102</p>

[show ethernet-switching interfaces brief on page 2102](#)
[show ethernet-switching interfaces detail on page 2102](#)
[show ethernet-switching interfaces interface-name on page 2103](#)
[show ethernet-switching interfaces on page 2103](#)
[show ethernet-switching interfaces ge-0/0/15 brief on page 2104](#)
[show ethernet-switching interfaces ge-0/0/2 detail \(Blocked by RTG rtggroup\) on page 2104](#)
[show ethernet-switching interfaces ge-0/0/15 detail \(Blocked by STP\) on page 2104](#)
[show ethernet-switching interfaces ge-0/0/17 detail \(Disabled by bpdu-control\) on page 2104](#)
[show ethernet-switching interfaces detail \(C-VLAN to S-VLAN Mapping\) on page 2104](#)
[show ethernet-switching interfaces detail \(Reflective Relay Is Configured\) on page 2104](#)

Output Fields For QFX Series, QFabric, NFX Series, EX4600 and OCX1100:

Table 66 on page 2016 lists the output fields for the **show ethernet-switching interfaces** command on QFX Series, QFabric, NFX Series, EX4600 and OCX1100. Output fields are listed in the approximate order in which they appear.

Table 89: show ethernet-switching interfaces Output Fields

Field Name	Field Description	Level of Output
Interface	Name of a switching interface.	All levels
State	Interface state. Values are up or down .	none, brief , detail , summary
VLAN members	Name of a VLAN.	none, brief , detail , summary
Blocking	Forwarding state of the interface: <ul style="list-style-type: none"> • blocked—Traffic is not being forwarded on the interface. • unblocked—Traffic is forwarded on the interface. • MAC limit exceeded—The interface is temporarily disabled because of a MAC limiting error. The disabled interface is automatically restored to service when the disable timeout expires. • MAC move limit exceeded—The interface is temporarily disabled because of a MAC move limiting error. The disabled interface is automatically restored to service when the disable timeout expires. • Storm control in effect —The interface is temporarily disabled because of a storm control error. The disabled interface is automatically restored to service when the disable timeout expires. • Storm control shutdown in effect —The interface is temporarily disabled because of a storm control shutdown error. The disabled interface is automatically restored to service when the disable timeout expires. 	none, brief , detail , summary
Index	VLAN index internal to Junos OS software.	detail
untagged tagged	Specifies whether the interface forwards IEEE802.1Q-tagged or untagged traffic.	detail

Output fields for EX Series:

Table 67 on page 2017 lists the output fields for the **show ethernet-switching interfaces** command on EX Series switches. Output fields are listed in the approximate order in which they appear.

Table 90: show ethernet-switching interfaces Output Fields

Field Name	Field Description	Level of Output
Interface	Name of a switching interface.	none, brief , detail , summary
Index	VLAN index internal to Junos OS.	detail
State	Interface state. Values are up and down .	none, brief , detail
Port mode	The access mode is the port mode default and works with a single VLAN. Port mode can also be trunk , which accepts tagged packets from multiple VLANs on other switches. The third port mode value is tagged-access , which accepts tagged packets from access devices.	detail
Reflective Relay Status	Reflective relay allows packets to use the same interface for both upstream and downstream traffic. When reflective relay has been configured, the status displayed is always enabled . When reflective relay is not configured, this entry does not appear in the command output.	detail
Ether type for the interface	Ether type is a two-octet field in an Ethernet frame used to indicate which protocol is encapsulated in the payload of an incoming Ethernet packet. Both 802.1Q packets and Q-in-Q packets use this field. The output displayed for this particular field indicates the interface's Ether type, which is used to match the Ether type of incoming 802.1Q packets and Q-in-Q packets. The indicated Ether type field is also added to the interface's outgoing 802.1Q and Q-in-Q packets.	detail
VLAN membership	Names of VLANs that belong to this interface.	none, brief , detail ,
Tag	Number of the 802.1Q tag.	none, brief , detail ,
Tagging	Specifies whether the interface forwards 802.1Q tagged or untagged traffic.	none, brief , detail ,

Table 90: show ethernet-switching interfaces Output Fields (continued)

Field Name	Field Description	Level of Output
Blocking	<p>The forwarding state of the interface:</p> <ul style="list-style-type: none"> • unblocked—Traffic is forwarded on the interface. • blocked—Traffic is not being forwarded on the interface. • Disabled by bpdu control—The interface is disabled due to receiving BPDUs on a protected interface. If the disable-timeout statement has been included in the BPDU configuration, the interface automatically returns to service after the timer expires. • blocked by RTG—The specified redundant trunk group is disabled. • blocked by STP—The interface is disabled due to a spanning-tree protocol error. • MAC limit exceeded—The interface is temporarily disabled due to a MAC limit error. The disabled interface is automatically restored to service when the disable timeout expires. • MAC move limit exceeded—The interface is temporarily disabled due to a MAC move limit error. The disabled interface is automatically restored to service when the disable timeout expires. • Storm control in effect—The interface is temporarily disabled due to a storm control error. The disabled interface is automatically restored to service when the disable timeout expires. 	none, brief , detail ,
Number of MACs learned on IFL	Number of MAC addresses learned by this interface.	detail
mapping	<p>When mapping is configured, the status is one of the following C-VLAN to S-VLAN mapping types:</p> <ul style="list-style-type: none"> • dot1q-tunneled—The interface maps all traffic to the S-VLAN (all-in-one bundling). • native—The interface maps untagged and priority tagged packets to the S-VLAN. • push—The interface maps packets to a firewall filter to an S-VLAN. • policy-mapped—The interface maps packets to a specifically defined S-VLAN. • integer—The interface maps packets to the specified S-VLAN. <p>When mapping is not configured, this entry does not appear in the command output.</p>	detail

Sample Output for QFX Series Switches, QFabric, NFX Series, EX4600 and OCX1100

show ethernet-switching interfaces

```
user@switch> show ethernet-switching interfaces
```

```

Interface  State  VLAN members  Blocking
xe-0/0/0.0  up    T1122         unblocked
xe-0/0/1.0  down  default      - MAC limit exceeded
xe-0/0/2.0  down  default      - MAC move limit exceeded
xe-0/0/3.0  down  default      - Storm control in effect
xe-0/0/4.0  down  default      unblocked

```

```

xe-0/0/5.0 down default unblocked
xe-0/0/6.0 down default unblocked
xe-0/0/7.0 down default unblocked
xe-0/0/8.0 down default unblocked
xe-0/0/9.0 up T111 unblocked
xe-0/0/10.0 down default unblocked
xe-0/0/11.0 down default unblocked
xe-0/0/12.0 down default unblocked
xe-0/0/13.0 down default unblocked
xe-0/0/14.0 down default unblocked
xe-0/0/15.0 down default unblocked
xe-0/0/16.0 down default unblocked
xe-0/0/17.0 down default unblocked
xe-0/0/18.0 down default unblocked
xe-0/0/19.0 up T111 unblocked
xe-0/1/0.0 down default unblocked
xe-0/1/1.0 down default unblocked
xe-0/1/2.0 down default unblocked
xe-0/1/3.0 down default unblocked

```

show ethernet-switching interfaces summary

```
user@switch> show ethernet-switching interfaces summary
```

```

xe-0/0/0.0
xe-0/0/1.0
xe-0/0/2.0
xe-0/0/3.0
xe-0/0/8.0
xe-0/0/10.0
xe-0/0/11.0

```

show ethernet-switching interfaces brief

```
user@switch> show ethernet-switching interfaces brief
```

Interface	State	VLAN members	Blocking
xe-0/0/0.0	down	default	unblocked
xe-0/0/1.0	down	employee-vlan	unblocked
xe-0/0/2.0	down	employee-vlan	unblocked
xe-0/0/3.0	down	employee-vlan	unblocked
xe-0/0/8.0	down	employee-vlan	unblocked
xe-0/0/10.0	down	default	unblocked
xe-0/0/11.0	down	employee-vlan	unblocked

show ethernet-switching interfaces detail

```
user@switch> show ethernet-switching interfaces detail
```

```

Interface: xe-0/0/0.0 Index: 65
  State: down
  VLANs:
    default          untagged    unblocked

Interface: xe-0/0/1.0 Index: 66
  State: down
  VLANs:
    employee-vlan    untagged    unblocked

```

```

Interface: xe-0/0/2.0 Index: 67
State: down
VLANs:
    employee-vlan          untagged    unblocked

Interface: xe-0/0/3.0 Index: 68
State: down
VLANs:
    employee-vlan          untagged    unblocked

Interface: xe-0/0/8.0 Index: 69
State: down
VLANs:
    employee-vlan          untagged    unblocked

Interface: xe-0/0/10.0 Index: 70
State: down
VLANs:
    default                untagged    unblocked

Interface: xe-0/0/11.0 Index: 71
State: down
VLANs:
    employee-vlan          tagged      unblocked

```

show ethernet-switching interfaces interface-name

```
user@switch> show ethernet-switching interfaces xe-0/0/0.0
```

Interface	State	VLAN members	Blocking
xe-0/0/0.0	down	default	unblocked

Sample Output for EX Series Switches

show ethernet-switching interfaces

```
user@switch> show ethernet-switching interfaces
```

Interface	State	VLAN members	Tag	Tagging	Blocking
ae0.0	up	default		untagged	unblocked
ge-0/0/2.0	up	vlan300	300	untagged	blocked by RTG (rtggroup)
ge-0/0/3.0	up	default			blocked by STP
ge-0/0/4.0	down	default			MAC limit exceeded
ge-0/0/5.0	down	default			MAC move limit exceeded
ge-0/0/6.0	down	default			Storm control in effect
ge-0/0/7.0	down	default			unblocked
ge-0/0/13.0	up	default		untagged	unblocked
ge-0/0/14.0	up	vlan100	100	tagged	unblocked
		vlan200	200	tagged	unblocked
ge-0/0/15.0	up	vlan100	100	tagged	blocked by STP
		vlan200	200	tagged	blocked by STP
ge-0/0/16.0	down	default		untagged	unblocked
ge-0/0/17.0	down	vlan100	100	tagged	Disabled by bpdu-control
		vlan200	200	tagged	Disabled by bpdu-control

show ethernet-switching interfaces ge-0/0/15 brief

```
user@switch> show ethernet-switching interfaces ge-0/0/15 brief
```

Interface	State	VLAN members	Tag	Tagging	Blocking
ge-0/0/15.0	up	vlan100	100	tagged	blocked by STP
		vlan200	200	tagged	blocked by STP

show ethernet-switching interfaces ge-0/0/2 detail (Blocked by RTG rtggroup)

```
user@switch> show ethernet-switching interfaces ge-0/0/2 detail
```

```
Interface: ge-0/0/2.0, Index: 65, State: up, Port mode: Access
Ether type for the interface: 0X8100
VLAN membership:
    vlan300, 802.1Q Tag: 300, untagged, msti-id: 0, blocked by RTG(rtggroup)
Number of MACs learned on IFL: 0
```

show ethernet-switching interfaces ge-0/0/15 detail (Blocked by STP)

```
user@switch> show ethernet-switching interfaces ge-0/0/15 detail
```

```
Interface: ge-0/0/15.0, Index: 70, State: up, Port mode: Trunk
Ether type for the interface: 0X8100
VLAN membership:
    vlan100, 802.1Q Tag: 100, tagged, msti-id: 0, blocked by STP
    vlan200, 802.1Q Tag: 200, tagged, msti-id: 0, blocked by STP
Number of MACs learned on IFL: 0
```

show ethernet-switching interfaces ge-0/0/17 detail (Disabled by bpdu-control)

```
user@switch> show ethernet-switching interfaces ge-0/0/17 detail
```

```
Interface: ge-0/0/17.0, Index: 71, State: down, Port mode: Trunk
Ether type for the interface: 0X8100
VLAN membership:
    vlan100, 802.1Q Tag: 100, tagged, msti-id: 1, Disabled by bpdu-control
    vlan200, 802.1Q Tag: 200, tagged, msti-id: 2, Disabled by bpdu-control
Number of MACs learned on IFL: 0
```

show ethernet-switching interfaces detail (C-VLAN to S-VLAN Mapping)

```
user@switch> show ethernet-switching interfaces ge-0/0/6.0 detail
```

```
Interface: ge-0/0/6.0, Index: 73, State: up, Port mode: Access
Ether type for the interface: 0X8100
VLAN membership:
    map, 802.1Q Tag: 134, Mapped Tag: native, push, dot1q-tunneled, unblocked
    map, 802.1Q Tag: 134, Mapped Tag: 20, push, dot1q-tunneled, unblocked
```

show ethernet-switching interfaces detail (Reflective Relay Is Configured)

```
user@switch1> show ethernet-switching interfaces ge-7/0/2 detail
```

```
Interface: ge-7/0/2, Index: 66, State: down, Port mode: Tagged-access
Ether type for the interface: 0x8100
Reflective Relay Status: Enabled
Ether type for the interface: 0x8100
VLAN membership:
    VLAN_Purple VLAN_Orange VLAN_Blue, 802.1Q Tag: 450, tagged, unblocked
Number of MACs learned on IFL: 0
```

show ethernet-switching interface

Syntax `show ethernet-switching interface`
`<brief | detail | extensive>`
`<interface-name>`

Release Information Command introduced in Junos OS Release 12.3R2.
 Command introduced in Junos OS Release 12.3R2 for EX Series switches.
 Command introduced in Junos OS Release 13.2x51 for QFX Series switches.

Description Display Layer 2 learning information for all the interfaces.

Options **none**—Display Ethernet-switching information for all interfaces.

brief | detail | extensive—(Optional) Display the specified level of output.

interface-name—(Optional) Display Ethernet-switching information for the specified interface.

Required Privilege Level view

Related Documentation

List of Sample Output [show ethernet switching interface \(Specific Interface\) on page 2107](#)
[show ethernet-switching interface detail on page 2108](#)

Output Fields [Table 91 on page 2106](#) describes the output fields for the **show ethernet-switching interface** command. Output fields are listed in the approximate order in which they appear.

Table 91: show ethernet-switching interface Output Fields

Field Name	Field Description
Logical interface	Name of the logical interface.
VLAN members	VLANs associated with this interface.
Tag	VLAN ID.
MAC limit	Number of MAC addresses that can be associated with the interface.
STP state	Spanning Tree protocol (STP) state.

Table 91: show ethernet-switching interface Output Fields (continued)

Field Name	Field Description
Logical interface flags	Status of Layer 2 learning properties for each interface: <ul style="list-style-type: none"> • DL—MAC learning is disabled. • LH—MAC interface limit has been reached. • AD—Packets are dropped after the MAC interface limit is reached. • DN—The MAC interface is down. • MMAS—The MAC interface is disabled after a MAC address move. • SCTL—The MAC interface is disabled after a configured storm-control level is exceeded.
Tagging	Tagging state of the VLAN.

Sample Output

show ethernet switching interface (Specific Interface)

```
user@host> show ethernet-switching interface ae10.0
```

```
Logical Interface flags (DL - disable learning, AD - packet action drop,  
LH - MAC limit hit, DN - interface down)
```

Logical interface	Vlan members	TAG	MAC limit	STP state	Logical interface flags	Tagging
ae10.0			8192			tagged
	VLAN70..	701	1024	Forwarding		
	VLAN70..	702	1024	Forwarding		
	VLAN70..	703	1024	Forwarding		
	VLAN70..	704	1024	Forwarding		
	VLAN70..	705	1024	Forwarding		
	VLAN70..	706	1024	Forwarding		
	VLAN70..	707	1024	Forwarding		
	VLAN70..	708	1024	Forwarding		
	VLAN70..	709	1024	Forwarding		
	VLAN71..	710	1024	Forwarding		
	VLAN71..	711	1024	Forwarding		
	VLAN71..	712	1024	Forwarding		
	VLAN71..	713	1024	Forwarding		
	VLAN71..	714	1024	Forwarding		
	VLAN71..	715				

[...output truncated...]

show ethernet-switching interface detail

```
user@host> show ethernet-switching interface detail
```

Information for interface family:

Name: ge-1/0/3.0

Type: IFF

Index: 331

Handle: 0x8bba280

Generation: 159

Flags: UP,

Routing/Vlan index: 4

Address family: 50

MAC sequence number: 0

MACs learned: 0

Non configured static MACs learned: 0

IFD index: 141

IFL index: 331

Sequence number: 0

MAC limit: 65535

Static MACs learned: 0

Name: ge-1/0/3.0

Type: IFBD (static)

Index:

Trunk id: 0

IFD index:

IFL index:

Sequence number: 1

MAC limit: 65535

Static MACs learned: 0

VSTP index: 11

Handle: 0x8bb6e00

Generation: 129

Flags: UP,

Routing/Vlan index: 2

Address family:

MAC sequence number: 1

MACs learned: 0

Non configured static MACs learned: 0

Rewrite op:

Name: ge-1/0/3.0

Type: IFBD (static)

Index:

Trunk id: 0

IFD index:

IFL index:

Sequence number: 1

MAC limit: 65535

Static MACs learned: 0

VSTP index: 11

Handle: 0x8bb6f00

Generation: 130

Flags: UP,

Routing/Vlan index: 3

Address family:

MAC sequence number: 1

MACs learned: 0

Non configured static MACs learned: 0

Rewrite op:

show lldp

Syntax `show lldp
<detail>`

Release Information Command introduced in Junos OS Release 9.0 for EX Series switches.
Command introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.
Command introduced in Junos OS Release 11.1 for the QFX Series.

Description Display information about Link Layer Discovery Protocol (LLDP) and Link Level Discovery Protocol—Media Endpoint Discovery (LLDP-MED) configuration and capabilities on the switch. LLDP and LLDP-MED are used to learn about and to distribute device information on network links.



NOTE: LLDP-MED is not available on the QFX Series.

Options **none**—Display LLDP information for all interfaces.
detail—(Optional) Display detailed LLDP information for all interfaces.

Required Privilege Level view

Related Documentation

- [Configuring LLDP \(CLI Procedure\) on page 556](#)
- [Configuring LLDP-MED \(CLI Procedure\) on page 566](#)
- [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)
- [Understanding LLDP on page 555](#)

List of Sample Output [show lldp \(EX3200 switches\) on page 2112](#)
[show lldp \(EX4300 switches\) on page 2113](#)
[show lldp detail \(EX4300 switches\) on page 2113](#)
[show lldp detail \(EX3400 switches with VLAN name TLV\) on page 2114](#)

Output Fields [Table 92 on page 2110](#) lists the output fields for the **show lldp** command. Output fields are listed in the approximate order in which they appear.

Table 92: show lldp Output Fields

Field Name	Field Description	Level of Output
LLDP	LLDP operating state. The state can be enabled or disabled . NOTE: If a VLAN that has been configured for untagged packets on an interface also has Layer 2 protocol tunneling (L2PT) enabled for LLDP, the LLDP operating state for that interface is displayed as disabled .	All levels
Advertisement interval	Frequency, in seconds, at which LLDP advertisements are sent. This value is set by the advertisement-interval configuration statement.	All levels
Transmit delay	Seconds of delay before advertisements are sent to neighbors following a change to a TLV (type, length, or value) element in the LLDP protocol or to the state of the local system, such as a change in hostname or management address. You can set this value to reduce the delay in notifying neighbors of a change in the local system. This value is set by the transmit-delay configuration statement.	All levels
Hold timer	On EX4300 switches, the hold timer shows the length of time LLDP information is held before it is discarded. The hold timer value is equal to the advertisement interval multiplied by the hold multiplier. On all other switches, the hold timer shows the value of the hold multiplier. The hold multiplier value is set by the hold-multiplier configuration statement.	All levels
Notification interval	How often LLDP trap notifications are generated as a result of LLDP database changes. If the interval value is 0, LLDP trap notifications on database changes are disabled. This value is set by the lldp-configuration-notification-interval configuration statement.	All levels
Config Trap Interval	How often LLDP trap notifications are generated as a result of changes in topology—for example, when an endpoint connects or disconnects. If the interval value is 0, LLDP trap notifications on topology changes are disabled. This value is set by the ptopo-configuration-trap-interval configuration statement.	All levels
Connection Hold timer	Amount of time the system maintains dynamic topology entries. This value is set by the ptopo-configuration-maximum-hold-time configuration statement.	All levels
LLDP-MED	LLDP-MED operating state. The state can be Enabled or Disabled .	All levels
MED fast start count	Number of advertisements sent from a switch to a device, such as a VoIP telephone, when the device is first detected by the switch. These increased advertisements are temporary. After a device and a switch exchange information and can communicate, advertisements are reduced to one per second. This value is set by using the fast-start configuration statement. NOTE: fast-start is not available on the QFX Series.	All levels

Table 92: show lldp Output Fields (continued)

Field Name	Field Description	Level of Output
Interface	Name of the interface for which LLDP configuration information is being reported.	All levels
Parent Interface	Name of the aggregated Ethernet interface, if any, to which the interface belongs.	All levels
LLDP	LLDP operating state. The state can be Enabled or Disabled .	All levels
Power Negotiation	LLDP power negotiation operating state. The state can be Enabled or Disabled .	All levels
Neighbor count	Total number of new LLDP neighbors detected since the last switch reboot.	detail
Interface	Name of the interface that is advertising VLAN information.	All levels
Vlan-id	VLAN tag associated with the interface sending LLDP frames. If the interface is not a member of a VLAN, the VLAN ID is advertised as 0.	detail
Vlan-name	VLAN name associated with the VLAN ID. For switches running Junos OS releases with Enhanced Layer 2 Software (ELS), this column displays the string vlan-vlan-id by default. Starting in Junos OS Release 15.1X53-D59 and 18.2R1, you can configure the vlan-name-tlv-option name option at the [edit protocols lldp] hierarchy level to transmit the VLAN name in the LLDP VLAN name TLV in place of the VLAN ID, and display the actual VLAN name in this output field instead.	detail
LLDP basic TLVs supported	Basic TLVs supported on the switch: <ul style="list-style-type: none"> • Chassis identifier—TLV that advertises the MAC address associated with the local system. • Port identifier—TLV that advertises the port identification for the specified port in the local system. • Port description—Interface name for the port. • System name—TLV that advertises the user-configured name of the local system. • System description—TLV that advertises the system description containing information about the software and current image running on the system. This information is taken from the software and is not configurable. • System capabilities—TLV that advertises the primary functions performed by the system—for example, bridge or router. • Management address—TLV that advertises the IP management address of the local system. 	detail

Table 92: show lldp Output Fields (continued)

Field Name	Field Description	Level of Output
Supported LLDP 802 TLVs	<p>802.3 TLVs supported on the switch:</p> <ul style="list-style-type: none"> • MAC/PHY configuration status—TLV that advertises information about the physical interface, such as autonegotiation status and support and MAU type. The information is based on the physical interface structure and is not configurable. • Power via MDI—TLV that advertises MDI power support, PSE power pair, and power class information. • Link aggregation—TLV that advertises if the interface is aggregated and its aggregated interface ID. • Maximum frame size—TLV that advertises the maximum transmission unit (MTU) of the interface sending LLDP frames. • Port VLAN tag—TLV that advertises the VLAN tag configured on the interface. • Port VLAN name—TLV that advertises the VLAN name configured on the interface. 	detail
Supported LLDP MED TLVs	<p>LLDP-MED TLVs supported on the switch:</p> <ul style="list-style-type: none"> • LLDP MED capabilities—TLV that advertises the primary function of the port. The capabilities values range from 0 through 15: <ul style="list-style-type: none"> • 0—Capabilities • 1—Network Policy • 2—Location Identification • 3—Extended Power via MDI-PSE • 4—Inventory • 5–15—Reserved • Network policy—TLV that advertises the port VLAN configuration and associated Layer 2 and Layer 3 attributes. Attributes include the policy identifier, application types—such as voice or streaming video—802.1Q VLAN tagging, and 802.1p priority bits and DiffServ code points. • Endpoint location—TLV that advertises the physical location of the endpoint. • Extended power Via MDI—TLV that advertises the power type, power source, power priority, and power value of the port. It is the responsibility of the PSE device (network connectivity device) to advertise the power priority on a port. 	detail

Sample Output

show lldp (EX3200 switches)

```

user@switch> show lldp

LLDP                : Enabled
Advertisement interval : 30 seconds
Transmit delay       : 2 seconds
Hold timer           : 4 seconds
Notification interval : 0 Second(s)
Config Trap Interval : 0 seconds
Connection Hold timer : 300 seconds

LLDP MED             : Disabled

```

```
MED fast start count : 3 Packets
```

Interface	Parent Interface	LLDP	LLDP-MED	Power Negotiation
all	-	Enabled	Enabled	Enabled

show lldp (EX4300 switches)

```
user@switch> show lldp
```

```
LLDP : Enabled
Advertisement interval : 30 seconds
Transmit delay : 2 seconds
Hold timer : 120 seconds
Notification interval : 0 Second(s)
Config Trap Interval : 0 seconds
Connection Hold timer : 300 seconds
```

```
LLDP MED : Disabled
MED fast start count : 3 Packets
```

Interface	Parent Interface	LLDP	LLDP-MED	Power Negotiation
all	-	Enabled	Enabled	Enabled

show lldp detail (EX4300 switches)

```
user@switch> show lldp detail
```

```
LLDP : Enabled
Advertisement interval : 30 seconds
Transmit delay : 2 seconds
Hold timer : 120 seconds
Notification interval : 0 Second(s)
Config Trap Interval : 0 seconds
Connection Hold timer : 300 seconds
```

```
LLDP MED : Disabled
MED fast start count : 3 Packets
```

Interface	Parent Interface	LLDP	LLDP-MED	Power Negotiation	Neighbor count
all	-	Enabled	Enabled	Enabled	8

Interface	Parent Interface	Vlan-id	Vlan-name
xe-3/0/0.0	ae31.0	100	vlan-100
xe-3/0/0.0	ae31.0	101	vlan-101
xe-3/0/0.0	ae31.0	4000	vlan-4000
xe-3/0/1.0	ae31.0	100	vlan-100
xe-3/0/1.0	ae31.0	101	vlan-101
xe-3/0/1.0	ae31.0	4000	vlan-4000
xe-3/0/2.0	ae31.0	100	vlan-100
xe-3/0/2.0	ae31.0	101	vlan-101
xe-3/0/2.0	ae31.0	4000	vlan-4000

LLDP basic TLVs supported:

Chassis identifier, Port identifier, Port description, System name, System description, System capabilities, Management address.

Supported LLDP 802 TLVs:

MAC/PHY configuration/status, Power via MDI, Link aggregation, Maximum frame size, Port VLAN tag, Port VLAN name.

Supported LLDP MED TLVs:

LLDP MED capabilities, Network policy, Endpoint location, Extended power Via MDI.

show lldp detail (EX3400 switches with VLAN name TLV)

```
user@switch> show lldp detail
```

```
LLDP                               : Enabled
Advertisement interval             : 30 seconds
Transmit delay                     : 2 seconds
Hold timer                        : 120 seconds
Notification interval             : 5 Second(s)
Config Trap Interval              : 0 seconds
Connection Hold timer             : 300 seconds
```

```
LLDP MED                           : Enabled
MED fast start count              : 3 Packets
```

```
Port ID TLV subtype               : locally-assigned
Port Description TLV type         : interface-alias (ifAlias)
```

Interface	Parent Interface	LLDP	LLDP-MED	Power Negotiation	Neighbor count
all	-	-	Enabled	-	5

Interface	Parent Interface	Vlan-id	Vlan-name
ge-0/0/0	-	2	dc-vlan
ge-0/0/1	-	2	dc-vlan
ge-0/0/2	-	2	dc-vlan
ge-0/0/3	-	2	dc-vlan
ge-0/0/4	-	2	dc-vlan
ge-0/0/5	-	2	dc-vlan

show lldp local-information

Syntax	show lldp local-information
Release Information	<p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	Display the information that the switch provides in Link Layer Discovery Protocol (LLDP) advertisements to its neighbors.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • Configuring LLDP (CLI Procedure) on page 556 • Understanding LLDP and LLDP-MED on EX Series Switches on page 562 • management-address on page 1515 • Understanding LLDP on page 555
List of Sample Output	show lldp local-information (EX Series Switch) on page 2116
Output Fields	<p>Table 93 on page 2115 lists the output fields for the show lldp local-information command. Output fields are listed in the approximate order in which they appear.</p>

Table 93: show lldp local-information Output Fields

Field Name	Field Description
LLDP Local Information details	<p>Information about the local system (the switch):</p> <ul style="list-style-type: none"> • Chassis ID—MAC address associated with the switch. • System name—User-configured name of the switch. • System descr—System description containing information about the switch model and the current software image running on the switch. This information is taken from the software and is not configurable.
System Capabilities	Capabilities (such as bridge or router) that are supported or enabled on the system.

Table 93: show lldp local-information Output Fields (continued)

Field Name	Field Description
Management Information	<p>Details of the management information: Port Name, Port Address (such as 10.204.34.35), Address Type (such as ipv4 or ipv6), Port ID (SNMP interface index), Port ID Subtype, and Port Subtype.</p> <p>The Port Subtype displays:</p> <ul style="list-style-type: none"> ifindex(2)— IP address of the switch's management Ethernet interface (me0) or virtual management Ethernet (VME) interface address (for a virtual chassis) is used to manage the switch. unknown(1)—IP management address has been configured with set protocols lldp management-address.
Interface name	Name of the local interface which is configured for either LLDP or LLDP-MED.
Parent Interface	Name of the aggregated Ethernet interface, if any, to which the local interface belongs.
SNMP Index	SNMP interface index.
Interface description	User-configured port description.
Status	Administrative status of the interface: either up or down .
Tunneling	Status of tunneling on the interface: either enabled or disabled .

Sample Output

show lldp local-information (EX Series Switch)

```
user@switch> show lldp local-information
```

LLDP Local Information details

```
Chassis ID   : 00:1d:b5:aa:b9:f0
System name  : switch
System descr : Juniper Networks, Inc. ex8208 , version 10.4I0 [builder] Build
               date: 2010-11-17 12:38:30 UTC
```

System Capabilities

```
Supported    : Bridge Router
Enabled      : Bridge Router
```

Management Information

```
Port Name    : -
Port Address  : 10.93.54.6
Address Type  : IPv4
Port ID       : 34
Port ID Subtype : local(7)
Port Subtype  : ifIndex(2)
```

```
Interface name Parent Interface  SNMP Index Interface description Status Tunneling
```


me0.0	-	34	-	Down	Disabled
xe-3/0/0.0	ae31.0	769	xe-3/0/0.0	Up	Disabled
xe-3/0/1.0	ae31.0	770	xe-3/0/1.0	Up	Disabled
xe-3/0/2.0	ae31.0	771	xe-3/0/2.0	Up	Disabled
xe-3/0/3.0	ae31.0	772	xe-3/0/3.0	Up	Disabled
xe-3/0/4.0	ae31.0	577	xe-3/0/4.0	Up	Disabled
xe-3/0/5.0	ae31.0	578	xe-3/0/5.0	Up	Disabled
xe-3/0/6.0	ae31.0	579	xe-3/0/6.0	Up	Disabled
xe-3/0/7.0	ae31.0	581	xe-3/0/7.0	Up	Disabled

show lldp neighbors

Syntax `<show lldp neighbors>`
`<interface interface-ids>`

Release Information Command introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.
 Command introduced in Junos OS Release 11.1 for the QFX Series.

Description Display learned information about Link Layer Discovery Protocol (LLDP) on all neighboring interfaces or on selected interfaces.

Options **none**—Display learned LLDP information on all neighboring interfaces and devices.

interface interface-ids—(Optional) Display learned LLDP information on the selected interfaces or devices.



NOTE: When a port with DCBX enabled begins to exchange type, length, and value (TLV) entries, optional LLDP TLVs on that port are not advertised to neighbors in order to interoperate with a wider variety of converged network adapters (CNAs). As a result, information for those ports will not be listed in the output for this command.

Required Privilege Level view

Related Documentation

- [Understanding LLDP on page 555](#)

List of Sample Output [show lldp neighbors on page 2121](#)
[show lldp neighbors interface on page 2121](#)

Output Fields [Table 94 on page 2118](#) lists the output fields for the **show lldp neighbors** command. Output fields are listed in the approximate order in which they appear.

Table 94: show lldp neighbors Output Fields

Field Name	Field Description
Local Interface	List of local interfaces for which neighbor information is available.
Parent Interface	List of aggregated Ethernet interfaces, if any, to which the local interfaces belong.
Chassis ID	List of chassis identifiers for neighbors.

Table 94: show lldp neighbors Output Fields (continued)

Field Name	Field Description
Port info	List of port information gathered from neighbors. This could be the port identifier or port description.
System name	List of system names gathered from neighbors.
LLDP Neighbor Information	Information about both the local system (the switch) and a neighbor system on the interface (appears when the interface option is used).
Local Information	Information about the local system (appears when the interface option is used).
Index	Local interface index (appears when the interface option is used).
Time to live	Number of seconds for which this information is valid (appears when the interface option is used).
Time mark	Date and timestamp of information (appears when the interface option is used).
Local Interface	Name of the local physical interface (appears when the interface option is used).
Parent Interface	Name of the aggregated Ethernet interface, if any, to which the interface belongs (appears when the interface option is used).
Local Port ID	Local interface SNMP index (appears when the interface option is used).
Ageout Count	Number of times the complete set of information advertised by the neighbor has been deleted from LLDP neighbor information maintained by the local system because the information timeliness interval has expired (appears when the interface option is used).
Neighbor Information	Information about a neighbor system on the interface (appears when the interface option is used).
Chassis type	Type of chassis identifier supplied, such as MAC address (appears when the interface option is used).
Chassis ID	Chassis identifier of the chassis type listed (appears when the interface option is used).
Port type	Type of port identifier supplied, such as locally assigned (appears when the interface option is used).
Port ID	Port identifier of the port type listed (appears when the interface option is used).
Port description	Port description (appears when the interface option is used).

Table 94: *show lldp neighbors* Output Fields (continued)

Field Name	Field Description
System name	Name supplied by the system on the interface (appears when the interface option is used).
System Description	Description supplied by the system on the interface (appears when the interface option is used).
System capabilities	Capabilities (such as Bridge , Router , and Telephone) that are supported or enabled by the system on the interface (appears when the interface option is used).
Management Info	<p>Details of management information: Type (such as ipv4 or ipv6), Address (such as 10.204.34.35), Port ID, Subtype, Interface Subtype, and organization identifier (OID) (appears when the interface option is used).</p> <p>The Interface Subtype displays:</p> <ul style="list-style-type: none"> ifIndex(2)— IP address of the neighbor's management Ethernet interface (me0) or virtual management Ethernet (VME) interface address (for a virtual chassis) is used to manage the switch. unknown(1)—Neighbor's IP management address has been configured with set protocols lldp management-address.
Media Info	Additional details about the endpoint device appear when a device that supports LLDP-MED is attached to the interface. The specific details depend upon the capabilities of the device. Details might include Media endpoint class (such as Class 3 for communication devices such as IP phones), MED Hardware revision , MED Firmware revision , MED Software revision , MED Serial number , MED Manufacturer name , or MED Model name .
Organization Info	One or more entries listing remote information by organizationally unique identifier (OUI), Subtype , Index , and Info (appears when the interface option is used).
Age	How long the neighbor has been identified (appears when the interface option is used and NetBIOS snooping is enabled on the switch).
Local Interface	Name of the local physical interface (appears when the interface option is used and NetBIOS snooping is enabled on the switch).
Parent Interface	Name of the aggregated Ethernet interface, if any, to which the interface belongs (appears when the interface option is used and NetBIOS snooping is enabled on the switch).
Chassis ID	Chassis identifier of the chassis type listed (appears when the interface option is used and NetBIOS snooping is enabled on the switch).
Port description	Port description (appears when the interface option is used and NetBIOS snooping is enabled on the switch).
System name	NetBIOS name of the host (appears when the interface option is used and NetBIOS snooping is enabled on the switch).

Sample Output

show lldp neighbors

```
user@switch> show lldp neighbors
```

Local Interface	Parent Interface	Chassis Id	Port info	System Name
xe-3/0/4.0	ae31.0	b0:c6:9a:63:80:40	xe-0/0/0.0	newyork31
xe-3/0/5.0	ae31.0	b0:c6:9a:63:80:40	xe-0/0/1.0	newyork31
xe-3/0/6.0	ae31.0	b0:c6:9a:63:80:40	xe-0/0/2.0	newyork31
xe-3/0/7.0	ae31.0	b0:c6:9a:63:80:40	xe-0/0/3.0	newyork31
xe-3/0/0.0	ae31.0	b0:c6:9a:63:80:40	xe-0/1/0.0	newyork31
xe-3/0/1.0	ae31.0	b0:c6:9a:63:80:40	xe-0/1/1.0	newyork31
xe-3/0/2.0	ae31.0	b0:c6:9a:63:80:40	xe-0/1/2.0	newyork31
xe-3/0/3.0	ae31.0	b0:c6:9a:63:80:40	xe-0/1/3.0	newyork31

show lldp neighbors interface

```
user@switch> show lldp neighbors interface ge-0/0/2
```

```

LLDP Neighbor Information:
Local Information:
Index: 1 Time to live: 240 Time mark: Wed Dec 1 10:23:24 2010 Age: 29 secs
Local Interface      : ge-0/0/2.0
Parent Interface     : -
Local Port ID        : 507
Ageout Count         : 0

Neighbour Information:
Chassis type         : Mac address
Chassis ID           : 00:1f:12:38:7f:c0
Port type            : Locally assigned
Port ID              : 507
Port description     : ge-0/0/2.0
System name          : bng-148p5-dev

System Description : Juniper Networks, Inc. ex4200-48p , version 10.4I0 Build
date: 2010-11-30 09:32:17 UTC

System capabilities
  Supported : Bridge Router
  Enabled   : Bridge Router

Management Info
  Type      : IPv4
  Address    : 10.204.96.235
  Port ID    : 34
  Subtype    : 1
  Interface Subtype : ifIndex(2)
  OID       : 1.3.6.1.2.1.31.1.1.1.34
Media endpoint class: Network Connectivity

Organization Info
  OUI       : 0.12.f
  Subtype   : 1
  Index     : 1
  Info      : 22A8360000

```

Organization Info

OUI : 0.12.f
Subtype : 2
Index : 2
Info : 030100

show lldp neighbors

Syntax `show lldp neighbors`
`<interface interface>`

Release Information Command introduced in Junos OS Release 9.0 for EX Series switches.

Description Display the information about neighboring devices learned by the switch by using the Link Layer Discovery Protocol (LLDP).



NOTE: The Chassis ID TLV has a subtype for Network Address Family. The supported network address families are IPv4 and IPv6. LLDP frames are validated only if the Network Address subtype of the Chassis ID TLV has a value of 1 (IPv4) or 2 (IPv6). For any other value, the transmitting device is detected by LLDP as a neighbor and displayed in the output of the `show lldp neighbors` command, but is not assigned to the VLAN.

Options `interface interface`—(Optional) Display LLDP neighbor information for a selected interface.

Required Privilege Level view

Related Documentation

- [Configuring LLDP \(CLI Procedure\) on page 556](#)
- [Understanding LLDP and LLDP-MED on EX Series Switches on page 562](#)

List of Sample Output

[show lldp neighbors on page 2126](#)
[show lldp neighbors interface ge-0/0/8 on page 2126](#)
[show lldp neighbors interface ge-0/0/0.0 \(for a VoIP Avaya Telephone with LLDP-MED Support\) on page 2127](#)
[show lldp neighbors interface ge-0/0/5.0 \(with NetBIOS Snooping Enabled on the Switch\) on page 2128](#)

Output Fields [Table 94 on page 2118](#) lists the output fields for the `show lldp neighbors` command. Output fields are listed in the approximate order in which they appear.

Table 95: show lldp neighbors Output Fields

Field Name	Field Description
Local Interface	List of local interfaces for which neighbor information is available.
Parent Interface	List of aggregated Ethernet interfaces, if any, to which the local interfaces belong.

Table 95: show lldp neighbors Output Fields (continued)

Field Name	Field Description
Chassis ID	List of chassis identifiers for neighbors.
Port info	This field displays the port information received from neighbors.
System name	List of system names gathered from neighbors. Includes the host name and the domain name.
LLDP Neighbor Information	Information about both the local system (the switch) and a neighbor system on the interface (appears when the interface option is used).
Local Information	Information about the local system (appears when the interface option is used).
Index	Local interface index (appears when the interface option is used).
Time to live	Number of seconds for which this information is valid (appears when the interface option is used).
Time mark	Date and timestamp of information (appears when the interface option is used).
Local Interface	Name of the local physical interface (appears when the interface option is used).
Parent Interface	Name of the aggregated Ethernet interface, if any, to which the interface belongs (appears when the interface option is used).
Local Port ID	Local interface SNMP index (appears when the interface option is used).
Ageout Count	Number of times the complete set of information advertised by the neighbor has been deleted from LLDP neighbor information maintained by the local system because the information timeliness interval expired (appears when the interface option is used).
Neighbor Information	Information about a neighbor system on the interface (appears when the interface option is used).
Chassis type	Type of chassis identifier supplied, such as Mac address (appears when the interface option is used).
Chassis ID	Chassis identifier of the chassis type listed (appears when the interface option is used).
Port type	Type of port identifier supplied, such as Locally assigned (appears when the interface option is used).
Port ID	Port identifier of the port type listed (appears when the interface option is used).

Table 95: show lldp neighbors Output Fields (continued)

Field Name	Field Description
Port description	The port description field uses the configured port description, the port name or the SNMP ifIndex (appears when the interface option is used).
System name	Name supplied by the system on the interface (appears when the interface option is used).
System Description	Description supplied by the system on the interface (appears when the interface option is used).
System capabilities	Capabilities (such as Bridge , Bridge Router , and Bridge Telephone) that are supported or enabled by the system on the interface (appears when the interface option is used).
Management Info	<p>Details of management information: Type (such as IPv4 or IPv6), Address (such as 10.204.34.35), Port ID, Subtype, Interface Subtype, and organization identifier (OID) (appears when the interface option is used).</p> <p>The Interface Subtype displays:</p> <ul style="list-style-type: none"> • ifindex(2)— IP address of the neighbor's management Ethernet interface (me0) or virtual management Ethernet (VME) interface address (for a Virtual Chassis) is used to manage the switch. • unknown(1)—Neighbor's IP management address has been configured with set protocols lldp management-address.
Media Info	Additional details about the endpoint device appear when a device that supports LLDP-MED is attached to the interface. The specific details depend upon the capabilities of the device. Details might include: Media endpoint class (such as Class 3 for communication devices such as IP phones), MED Hardware revision , MED Firmware revision , MED Software revision , MED Serial number , MED Manufacturer name , MED Model name .
Organization Info	One or more entries (indexed by the Index element) listing more remote interface information by organizationally unique identifier (OUI), Subtype , and Info (appears when the interface option is used).
Age	How long the neighbor has been identified (appears when the interface option is used and NetBIOS snooping is enabled on the switch).
Local Interface	Name of the local physical interface (appears when the interface option is used and NetBIOS snooping is enabled on the switch).
Parent Interface	Name of the aggregated Ethernet interface, if any, to which the interface belongs (appears when the interface option is used and NetBIOS snooping is enabled on the switch).
Chassis ID	Chassis identifier of the chassis type listed (appears when the interface option is used and NetBIOS snooping is enabled on the switch).

Sample Output

show lldp neighbors

```
user@switch> show lldp neighbors
```

Local Interface	Parent Interface	Chassis Id	Port info	System Name
xe-3/0/4.0	ae31.0	b0:c6:9a:63:80:40	xe-0/0/0.0	host.jnpr.net
xe-3/0/5.0	ae31.0	b0:c6:9a:63:80:40	xe-0/0/1.0	host.jnpr.net
xe-3/0/6.0	ae31.0	b0:c6:9a:63:80:40	xe-0/0/2.0	host.jnpr.net
xe-3/0/7.0	ae31.0	b0:c6:9a:63:80:40	xe-0/0/3.0	host.jnpr.net
xe-3/0/0.0	ae31.0	b0:c6:9a:63:80:40	xe-0/1/0.0	host.jnpr.net
xe-3/0/1.0	ae31.0	b0:c6:9a:63:80:40	xe-0/1/1.0	host.jnpr.net
xe-3/0/2.0	ae31.0	b0:c6:9a:63:80:40	xe-0/1/2.0	host.jnpr.net
xe-3/0/3.0	ae31.0	b0:c6:9a:63:80:40	xe-0/1/3.0	host.jnpr.net

show lldp neighbors interface ge-0/0/8

```
user@switch> show lldp neighbors interface ge-0/0/8
```

LLDP Neighbor Information:

Local Information:

Index: 1 Time to live: 120 Time mark: Thu Nov 26 06:41:24 2015 Age: 1 secs

Local Interface : ge-0/0/8

Parent Interface : -

Local Port ID : 518

Ageout Count : 0

Neighbour Information:

Chassis type : Mac address

Chassis ID : 88:e0:f3:1f:14:e0

Port type : Locally assigned

Port ID : 880

Port description : ge-0/0/8

System name : bng-nw6moj.juniper.net

System Description : Juniper Networks, Inc. ex4300-24p Ethernet Switch, kernel JUNOS 14.1I20151125_0548_rajjs, Build date: 2015-11-25 06:06:58 UTC Copyright (c) 1996-2015 Juniper Networks, Inc.

System capabilities

Supported: Bridge Router

Enabled : Bridge Router

Management address

Address Type : IPv4(1)

Address : 10.204.39.232

Interface Number : 33

Interface Subtype : ifIndex(2)

OID : 1.3.6.1.2.1.31.1.1.1.33.

Media endpoint class: Network Connectivity

Organization Info

OUI : IEEE 802.3 Private (0x00120f)

Subtype : MAC/PHY Configuration/Status (1)

Info : Autonegotiation [supported, enabled (0x3)], PMD Autonegotiation

Capability (0x1), MAU Type (0x0)

Index : 1

```

Organization Info
  OUI      : IEEE 802.3 Private (0x00120f)
  Subtype  : MDI Power (2)
  Info     : MDI Power Support [PSE bit set, supported, disabled, CONTROL
bit not set (0x3)], MDI Power Pair [signal], MDI Power Class [Unknown (7)]
  Index    : 2

Organization Info
  OUI      : IEEE 802.3 Private (0x00120f)
  Subtype  : Link Aggregation (3)
  Info     : Aggregation Status [supported, disabled (0x1)], Aggregation
Port ID (0)
  Index    : 3

Organization Info
  OUI      : IEEE 802.3 Private (0x00120f)
  Subtype  : Maximum Frame Size (4)
  Info     : MTU Size (1514)
  Index    : 4

Organization Info
  OUI      : Juniper Specific (0x009069)
  Subtype  : Chassis Serial Type (1)
  Info     : Juniper Slot Serial [MS3112240009]
  Index    : 5

```

show lldp neighbors interface ge-0/0/0.0 (for a VoIP AvayaTelephone with LLDP-MED Support)

```
user@switch>show lldp neighbors interface ge-0/0/0.0
```

```

LLDP Neighbor Information:
Local Information:
Index: 20 Time to live: 120 Time mark: Thu Apr 15 22:26:22 2010 Age: 16 secs
Local Interface   : ge-0/0/0.0
Parent Interface  : -
Local Port ID     : 517
Ageout Count      : 0

Neighbour Information:
Chassis type      : Network address
Chassis ID       : 0.0.0.0
Port type        : Mac address
Port ID          : 00:04:0d:fc:55:48
System name      : AVAFC5548.juniper.net

System capabilities
  Supported : Bridge Telephone
  Enabled   : Bridge

Management Info
  Type      : IPv4
  Address   : 0.0.0.0
  Port ID   : 1
  Subtype   : 1
  Interface Subtype : ifIndex(2)
  OID       : 1.3.6.1.2.1.31.1.1.1.1.1
Media endpoint class: Class III Device

```

```

MED Hardware revision : 4610D01A
MED Firmware revision : b10d01b2_9.bin
MED Software revision : a10d01b2_9.bin
MED Serial number    : 07N510103424
MED Manufacturer name : Avaya
MED Model name       : 4610

Organization Info
  OUI      : IEEE 802.3 Private (0x00120f)
  Subtype  : MAC/PHY Configuration/Status (1)
  Info     : Autonegotiation [supported, enabled (0x3)], PMD Autonegotiation
  Capability (0x1d00), MAU Type (0x0)
  Index    : 1

Organization Info
  OUI      : IEEE 802.3 Private (0x00120f)
  Subtype  : MDI Power (2)
  Info     : MDI Power Support [PSE bit set, supported, disabled, CONTROL
bit not set (0x3)], MDI Power Pair [signal], MDI Power Class [Unknown (7)]
  Index    : 2

Organization Info
  OUI      : IEEE 802.3 Private (0x00120f)
  Subtype  : Link Aggregation (3)
  Info     : Aggregation Status [supported, disabled (0x1)], Aggregation
Port ID (0)
  Index    : 3

Organization Info
  OUI      : IEEE 802.3 Private (0x00120f)
  Subtype  : Maximum Frame Size (4)
  Info     : MTU Size (1514)
  Index    : 4

Organization Info
  OUI      : Ethernet Bridged (0x0080c2)
  Subtype  : Port Vid (1)
  Info     : VLAN ID (10),
  Index    : 5

Organization Info
  OUI      : Juniper Specific (0x009069)
  Subtype  : Chassis Serial Type (1)
  Info     : Juniper Slot Serial [BQ0208211462]
  Index    : 6

Organization Info
  OUI      : Ethernet Bridged (0x0080c2)
  Subtype  : VLAN Name (3)
  Info     : VLAN ID (10), VLAN Name (vtest)
  Index    : 7

```

show lldp neighbors interface ge-0/0/5.0 (with NetBIOS Snooping Enabled on the Switch)

```
user@switch> show lldp neighbors interface ge-0/0/5
```

```

Age: 299999 secs
Local Interface   : ge-0/0/5.0
Parent Interface  : -

```

```
Chassis ID      : 00:10:94:00:00:02
Port description : 192.0.2.1
System name     : host.juniper.net
```

show lldp statistics

Syntax `show lldp statistics`
`<interface interface-ids>`

Release Information 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 Display LLDP statistics on all or selected interfaces.

Options **none**—Display LLDP statistics on all interfaces and devices.
interface *interface-ids*—(Optional) Display LLDP statistics on the selected devices.

Required Privilege Level view

Related Documentation

- [Understanding LLDP on page 555](#)

List of Sample Output [show lldp statistics on page 2131](#)

Output Fields [Table 96 on page 2130](#) lists the output fields for the **show lldp statistics** command. Output fields are listed in the approximate order in which they appear.

Table 96: show lldp statistics Output Fields

Field Name	Field Description	Level of Output
Interface	Name of an interface.	All levels
Received	Total number of LLDP frames received on an interface.	All levels
Unknown-TLVs	Number of unrecognized LLDP TLVs received on an interface.	All levels
With Errors	Number of LLDP frames received that contain errors.	All levels
Discarded TLVs	Number of LLDP TLVs received and then discarded on an interface.	All levels
Transmitted	Total number of LLDP frames transmitted on an interface.	All levels
Untransmitted	Total number of LLDP frames not transmitted on an interface.	All levels

Sample Output

show lldp statistics

```
user@switch> show lldp statistics
```

Interface	Received	Unknown TLVs	With Errors	Discarded TLVs	Transmitted
me0.0	0	0	0	0	8003
ge-0/0/0.0	8002	0	0	0	8003
ge-0/0/1.0	8002	0	0	0	8003

show lldp statistics

Syntax	show lldp statistics <interface <i>interface</i>>
Release Information	Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Display LLDP statistics for all interfaces or for the specified interface.
Options	none —Display LLDP statistics for all interfaces. interface <i>interface</i> —(Optional) Display LLDP statistics for the specified interface.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • Configuring LLDP (CLI Procedure) on page 556 • Understanding LLDP and LLDP-MED on EX Series Switches on page 562
List of Sample Output	show lldp statistics on page 2133 show lldp statistics interface xe-3/0/0.0 on page 2133
Output Fields	Table 96 on page 2130 lists the output fields for the show lldp statistics command. Output fields are listed in the approximate order in which they appear.

Table 97: show lldp statistics Output Fields

Field Name	Field Description
Interface	Name of the interface.
Parent Interface	Name of the aggregated Ethernet interface, if any, to which the interface belongs. NOTE: Because LLDP packets are transmitted and received on member interfaces only, statistics are available only for the member interfaces, not for the aggregated interface.
Received	Total number of LLDP frames received on an interface.
Unknown TLVs	Number of unrecognized LLDP TLVs received on an interface.
With Errors	Number of invalid LLDP TLVs received on an interface.
Discarded	Number of LLDP TLVs received and then discarded on an interface.
Transmitted	Total number of LLDP frames that were transmitted on an interface.

Table 97: show lldp statistics Output Fields (continued)

Field Name	Field Description
Untransmitted	Total number of LLDP frames that were untransmitted on an interface.

Sample Output

show lldp statistics

```
user@switch> show lldp statistics
```

Interface	Parent Interface	Received	Unknown TLVs	With Errors
xe-3/0/0.0	ae31.0	1564	0	0
xe-3/0/1.0	ae31.0	1564	0	0
xe-3/0/2.0	ae31.0	1565	0	0
xe-3/0/3.0	ae31.0	1566	0	0
xe-3/0/4.0	ae31.0	1598	0	0
xe-3/0/5.0	ae31.0	1598	0	0
xe-3/0/6.0	ae31.0	1596	0	0
xe-3/0/7.0	ae31.0	1597	0	0
xe-5/0/6.0	-	0	0	0
xe-5/0/7.0	-	0	0	0

Discarded TLVs	Transmitted	Untransmitted
0	3044	1
0	3044	1
0	3044	1
0	3044	1
0	3075	1
0	3075	1
0	3075	1
0	3075	1
0	17312	0
0	17312	0

show lldp statistics interface xe-3/0/0.0

```
user@switch> show lldp statistics interface xe-3/0/0.0
```

Interface	Parent Interface	Received	Unknown TLVs	With Errors
xe-3/0/0.0	ae31.0	1566	0	0

Discarded TLVs	Transmitted	Untransmitted
0	3046	1

show lldp remote-global-statistics

Syntax	show lldp remote-global-statistics
Release Information	Command introduced in Junos OS Release 10.0 for EX Series switches.
Description	Display remote Link Layer Discovery Protocol (LLDP) global statistics.
Options	This command has no options.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • Configuring LLDP (CLI Procedure) on page 556 • Understanding LLDP and LLDP-MED on EX Series Switches on page 562
List of Sample Output	show lldp remote-global-statistics on page 2135
Output Fields	Table 98 on page 2134 describes the output fields for the show lldp remote-global-statistics command. Output fields are listed in the approximate order in which they appear.

Table 98: show lldp remote-global-statistics Output Fields

Field Name	Field Description
LLDP Remote Database Table Counters	Information about remote database table counters.
LastchangeTime	Time elapsed between LLDP agent startup and the last change to the remote database table information.
Inserts	Number of insertions made in the remote database table.
Deletes	Number of deletions made in the remote database table.
Drops	Number of LLDP frames dropped from the remote database table because of errors.
Ageouts	Number of remote database table entries that have aged out of the table.

Sample Output

show lldp remote-global-statistics

```
user@host> show lldp remote-global-statistics
```

```
user@host> show lldp remote-global-statistics
```

```
LLDP Remote Database Table Counters
```

LastchangeTime	Inserts	Deletes	Drops	Ageouts
00:00:76 (76 sec)	192	0	0	0

show network-access aaa statistics accounting

Syntax	show network-access aaa statistics accounting;
Release Information	Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for QFX Series switches.
Description	Display authentication, authorization, and accounting (AAA) accounting statistics.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • accounting-server on page 1147 • accounting-stop-on-access-deny on page 1149 • Configuring 802.1X RADIUS Accounting (CLI Procedure) on page 386
List of Sample Output	show network-access aaa statistics accounting on page 2136
Output Fields	Table 99 on page 2136 lists the output fields for the show network-access aaa statistics accounting command. Output fields are listed in the approximate order in which they appear.

Table 99: show network-access aaa statistics accounting Output Fields

Field Name	Field Description
Requests received	The number of accounting-request packets sent from a switch to a RADIUS accounting server.
Accounting Response failures	The number of accounting-response failure packets sent from the RADIUS accounting server to the switch.
Accounting Response Success	The number of accounting-response success packets sent from the RADIUS accounting server to the switch.
Requests timedout	The number of requests-timedout packets sent from the RADIUS accounting server to the switch.

Sample Output

show network-access aaa statistics accounting

```

user@switch> show network-access aaa statistics accounting
Accounting module statistics
  Requests received: 1
  Accounting Response failures: 0
  Accounting Response Success: 1
  Requests timedout: 0

```


show network-access aaa statistics authentication

Syntax	show network-access aaa statistics authentication
Release Information	Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for QFX Series switches.
Description	Display authentication, authorization, and accounting (AAA) authentication statistics.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • authentication-server on page 1185 • Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378
List of Sample Output	show network-access aaa statistics authentication on page 2138 show network-access aaa statistics authentication (in QFX Series Switches) on page 2139
Output Fields	Table 100 on page 2138 lists the output fields for the show network-access aaa statistics authentication command. Output fields are listed in the approximate order in which they appear.

Table 100: show network-access aaa statistics authentication Output Fields

Field Name	Field Description
Requests received	The number of authentication requests received by the switch.
Accepts	The number of authentication accepts received by the RADIUS server.
Rejects	The number authentication rejects sent by the RADIUS server.
Challenges	The number of authentication challenges sent by the RADIUS server.

Sample Output

show network-access aaa statistics authentication

```

user@switch> show network-access aaa statistics authentication

Authentication module statistics
Requests received: 2
Accepts: 1
Rejects: 0
Challenges: 1

```

show network-access aaa statistics authentication (in QFX Series Switches)

```
user@switch> show network-access aaa statistics authentication
```

```
Authentication module statistics
```

```
Requests received: 2
```

```
Accepts: 1
```

```
Rejects: 0
```

```
Challenges: 1
```

show network-access aaa statistics dynamic-requests

Syntax	show network-access aaa statistics dynamic-requests;
Release Information	Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for QFX Series switches.
Description	Display authentication, authorization, and accounting (AAA) authentication statistics for disconnects.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • authentication-server on page 1185 • Example: Connecting a RADIUS Server for 802.1X to an EX Series Switch on page 378
List of Sample Output	show network-access aaa statistics authentication on page 2140
Output Fields	Table 101 on page 2140 lists the output fields for the show network-access aaa statistics dynamic-requests command. Output fields are listed in the approximate order in which they appear.

Table 101: show network-access aaa statistics dynamic-requests Output Fields

Field Name	Field Description
Requests received	The number of dynamic requests received by the RADIUS server.
Processed successfully	The number of dynamic requests successfully processed by the RADIUS server.
Errors during processing	The number of errors that occurred while the RADIUS server was processing the dynamic request.
Silently dropped	The number of silently dropped requests.

Sample Output

show network-access aaa statistics authentication

```

user@switch> show network-access aaa statistics dynamic-requests
Dynamic-requests module statistics
Requests received: 0
Processed successfully: 0
Errors during processing: 0
Silently dropped: 0

```


show route extensive

List of Syntax	Syntax on page 2142 Syntax (EX Series Switches) on page 2142
Syntax	<pre>show route extensive <destination-prefix> [logical-system (all logical-system-name)]</pre>
Syntax (EX Series Switches)	<pre>show route extensive <destination-prefix></pre>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Display extensive information about the active entries in the routing tables.
Options	<p>none—Display all active entries in the routing table.</p> <p>destination-prefix—(Optional) Display active entries for the specified address or range of addresses.</p> <p>logical-system (all logical-system-name)—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>
Required Privilege Level	view
List of Sample Output	show route extensive on page 2149 show route extensive (Access Route) on page 2156 show route extensive (BGP PIC Edge) on page 2157 show route extensive (FRR and LFA) on page 2157 show route extensive (IS-IS) on page 2158 show route extensive (Route Reflector) on page 2158 show route label detail (Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs) on page 2159 show route label detail (Multipoint LDP with Multicast-Only Fast Reroute) on page 2159
Output Fields	<p>Table 102 on page 2142 describes the output fields for the show route extensive command. Output fields are listed in the approximate order in which they appear.</p>

Table 102: show route extensive Output Fields

Field Name	Field Description
<i>routing-table-name</i>	Name of the routing table (for example, inet.0).

Table 102: show route extensive Output Fields (continued)

Field Name	Field Description
<i>number destinations</i>	Number of destinations for which there are routes in the routing table.
<i>number routes</i>	<p>Number of routes in the routing table and total number of routes in the following states:</p> <ul style="list-style-type: none"> • active (routes that are active). • holddown (routes that are in the pending state before being declared inactive). • hidden (routes that are not used because of a routing policy).
<i>route-destination</i> (entry, announced)	<p>Route destination (for example: 10.0.0.1/24). The entry value is the number of route for this destination, and the announced value is the number of routes being announced for this destination. Sometimes the route destination is presented in another format, such as:</p> <ul style="list-style-type: none"> • MPLS-label (for example, 80001). • interface-name (for example, ge-1/0/2). • neighbor-address:control-word-status:encapsulation type:vc-id:source (Layer 2 circuit only; for example, 10.1.1.195:NoCtrlWord:1:1:Local/96). <ul style="list-style-type: none"> • neighbor-address—Address of the neighbor. • control-word-status—Whether the use of the control word has been negotiated for this virtual circuit: NoCtrlWord or CtrlWord. • encapsulation type—Type of encapsulation, represented by a number: (1) Frame Relay DLCI, (2) ATM AAL5 VCC transport, (3) ATM transparent cell transport, (4) Ethernet, (5) VLAN Ethernet, (6) HDLC, (7) PPP, (8) ATM VCC cell transport, (10) ATM VPC cell transport. • vc-id—Virtual circuit identifier. • source—Source of the advertisement: Local or Remote.
TSI	Protocol header information.
label stacking	<p>(Next-to-the-last-hop routing device for MPLS only) Depth of the MPLS label stack, where the label-popping operation is needed to remove one or more labels from the top of the stack. A pair of routes is displayed, because the pop operation is performed only when the stack depth is two or more labels.</p> <ul style="list-style-type: none"> • S=0 route indicates that a packet with an incoming label stack depth of two or more exits this router with one fewer label (the label-popping operation is performed). • If there is no S= information, the route is a normal MPLS route, which has a stack depth of 1 (the label-popping operation is not performed).
[protocol, preference]	<p>Protocol from which the route was learned and the preference value for the route.</p> <ul style="list-style-type: none"> • +—A plus sign indicates the active route, which is the route installed from the routing table into the forwarding table. • - —A hyphen indicates the last active route. • *—An asterisk indicates that the route is both the active and the last active route. An asterisk before a to line indicates the best subpath to the route. <p>In every routing metric except for the BGP LocalPref attribute, a lesser value is preferred. In order to use common comparison routines, Junos OS stores the 1's complement of the LocalPref value in the Preference2 field. For example, if the LocalPref value for Route 1 is 100, the Preference2 value is -101. If the LocalPref value for Route 2 is 155, the Preference2 value is -156. Route 2 is preferred because it has a higher LocalPref value and a lower Preference2 value.</p>

Table 102: show route extensive Output Fields (continued)

Field Name	Field Description
Level	(IS-IS only). In IS-IS, a single autonomous system (AS) can be divided into smaller groups called areas. Routing between areas is organized hierarchically, allowing a domain to be administratively divided into smaller areas. This organization is accomplished by configuring Level 1 and Level 2 intermediate systems. Level 1 systems route within an area. When the destination is outside an area, they route toward a Level 2 system. Level 2 intermediate systems route between areas and toward other ASs.
Route Distinguisher	IP subnet augmented with a 64-bit prefix.
PMSI	Provider multicast service interface (MVPN routing table).
Next-hop type	Type of next hop. For a description of possible values for this field, see the Output Field table in the <i>show route detail</i> command.
Next-hop reference count	Number of references made to the next hop.
Flood nexthop branches exceed maximum message	Indicates that the number of flood next-hop branches exceeded the system limit of 32 branches, and only a subset of the flood next-hop branches were installed in the kernel.
Source	IP address of the route source.
Next hop	Network layer address of the directly reachable neighboring system.
via	<p>Interface used to reach the next hop. If there is more than one interface available to the next hop, the name of the interface that is actually used is followed by the word Selected. This field can also contain the following information:</p> <ul style="list-style-type: none"> • Weight—Value used to distinguish primary, secondary, and fast reroute backup routes. Weight information is available when MPLS label-switched path (LSP) link protection, node-link protection, or fast reroute is enabled, or when the standby state is enabled for secondary paths. A lower weight value is preferred. Among routes with the same weight value, load balancing is possible. • Balance—Balance coefficient indicating how traffic of unequal cost is distributed among next hops when a routing device is performing unequal-cost load balancing. This information is available when you enable BGP multipath load balancing.
Label-switched-path lsp-path-name	Name of the LSP used to reach the next hop.
Label operation	MPLS label and operation occurring at this routing device. The operation can be pop (where a label is removed from the top of the stack), push (where another label is added to the label stack), or swap (where a label is replaced by another label).
Offset	Whether the metric has been increased or decreased by an offset value.
Interface	(Local only) Local interface name.
Protocol next hop	Network layer address of the remote routing device that advertised the prefix. This address is used to recursively derive a forwarding next hop.

Table 102: *show route extensive Output Fields (continued)*

Field Name	Field Description
<i>label-operation</i>	MPLS label and operation occurring at this routing device. The operation can be pop (where a label is removed from the top of the stack), push (where another label is added to the label stack), or swap (where a label is replaced by another label).
Indirect next hops	<p>When present, a list of nodes that are used to resolve the path to the next-hop destination, in the order that they are resolved.</p> <p>When BGP PIC Edge is enabled, the output lines that contain Indirect next hop: weight follow next hops that the software can use to repair paths where a link failure occurs. The next-hop weight has one of the following values:</p> <ul style="list-style-type: none"> • 0x1 indicates active next hops. • 0x4000 indicates passive next hops.
State	State of the route (a route can be in more than one state). See the Output Field table in the <i>show route detail</i> command.
Session ID	The BFD session ID number that represents the protection using MPLS fast reroute (FRR) and loop-free alternate (LFA).
Weight	<p>Weight for the backup path. If the weight of an indirect next hop is larger than zero, the weight value is shown.</p> <p>For sample output, see show route table.</p>

Table 102: show route extensive Output Fields (continued)

Field Name	Field Description
Inactive reason	<p>If the route is inactive, the reason for its current state is indicated. Typical reasons include:</p> <ul style="list-style-type: none"> • Active preferred—Currently active route was selected over this route. • Always compare MED—Path with a lower multiple exit discriminator (MED) is available. • AS path—Shorter AS path is available. • Cisco Non-deterministic MED selection—Cisco nondeterministic MED is enabled and a path with a lower MED is available. • Cluster list length—Path with a shorter cluster list length is available. • Forwarding use only—Path is only available for forwarding purposes. • IGP metric—Path through the next hop with a lower IGP metric is available. • IGP metric type—Path with a lower OSPF link-state advertisement type is available. • Interior > Exterior > Exterior via Interior—Direct, static, IGP, or EBGp path is available. • Local preference—Path with a higher local preference value is available. • Next hop address—Path with a lower metric next hop is available. • No difference—Path from a neighbor with a lower IP address is available. • Not Best in its group—Occurs when multiple peers of the same external AS advertise the same prefix and are grouped together in the selection process. When this reason is displayed, an additional reason is provided (typically one of the other reasons listed). • Number of gateways—Path with a higher number of next hops is available. • Origin—Path with a lower origin code is available. • OSPF version—Path does not support the indicated OSPF version. • RIB preference—Route from a higher-numbered routing table is available. • Route distinguisher—64-bit prefix added to IP subnets to make them unique. • Route metric or MED comparison—Route with a lower metric or MED is available. • Route preference—Route with a lower preference value is available. • Router ID—Path through a neighbor with a lower ID is available. • Unusable path—Path is not usable because of one of the following conditions: the route is damped, the route is rejected by an import policy, or the route is unresolved. • Update source—Last tiebreaker is the lowest IP address value.
Local AS	Autonomous system (AS) number of the local routing device.
Age	How long the route has been known.
AIGP	Accumulated interior gateway protocol (AIGP) BGP attribute.
Metric	Cost value of the indicated route. For routes within an AS, the cost is determined by IGP and the individual protocol metrics. For external routes, destinations, or routing domains, the cost is determined by a preference value.
MED-plus-IGP	Metric value for BGP path selection to which the IGP cost to the next-hop destination has been added.
TTL-Action	<p>For MPLS LSPs, state of the TTL propagation attribute. Can be enabled or disabled for all RSVP-signaled and LDP-signaled LSPs or for specific VRF routing instances.</p> <p>For sample output, see show route table.</p>

Table 102: show route extensive Output Fields (continued)

Field Name	Field Description
Task	Name of the protocol that has added the route.
Announcement bits	<p>List of protocols that are consumers of the route. Using the following output as an example, Announcement bits (3): 0-KRT 5-Resolve tree 2 8-BGP RT Background there are (3) announcement bits to reflect the three clients (protocols) that have state for this route: Kernel (0-KRT), 5 (resolution tree process 2), and 8 (BGP).</p> <p>The notation <i>n</i>-Resolve inet indicates that the route is used for route resolution for next hops found in the routing table. <i>n</i> is an index used by Juniper Networks customer support only.</p>
AS path	<p>AS path through which the route was learned. The letters at the end of the AS path indicate the path origin, providing an indication of the state of the route at the point at which the AS path originated:</p> <ul style="list-style-type: none"> • I—IGP. • E—EGP. • Recorded—The AS path is recorded by the sample process (sampled). • ?—Incomplete; typically, the AS path was aggregated. <p>When AS path numbers are included in the route, the format is as follows:</p> <ul style="list-style-type: none"> • []—Brackets enclose the local AS number associated with the AS path if more than one AS number is configured on the routing device, or if AS path prepending is configured. • { }—Braces enclose AS sets, which are groups of AS numbers in which the order does not matter. A set commonly results from route aggregation. The numbers in each AS set are displayed in ascending order. • ()—Parentheses enclose a confederation. • ([])—Parentheses and brackets enclose a confederation set. <p>NOTE: In Junos OS Release 10.3 and later, the AS path field displays an unrecognized attribute and associated hexadecimal value if BGP receives attribute 128 (attribute set) and you have not configured an independent domain in any routing instance.</p>
validation-state	<p>(BGP-learned routes) Validation status of the route:</p> <ul style="list-style-type: none"> • Invalid—Indicates that the prefix is found, but either the corresponding AS received from the EBGp peer is not the AS that appears in the database, or the prefix length in the BGP update message is longer than the maximum length permitted in the database. • Unknown—Indicates that the prefix is not among the prefixes or prefix ranges in the database. • Unverified—Indicates that origin validation is not enabled for the BGP peers. • Valid—Indicates that the prefix and autonomous system pair are found in the database.
FECs bound to route	Point-to-multipoint root address, multicast source address, and multicast group address when multipoint LDP (M-LDP) inband signaling is configured.
AS path: I <Originator>	(For route reflected output only) Originator ID attribute set by the route reflector.

Table 102: show route extensive Output Fields (continued)

Field Name	Field Description
route status	<p>Indicates the status of a BGP route:</p> <ul style="list-style-type: none"> • Accepted—The specified BGP route is imported by the default BGP policy. • Import—The route is imported into a Layer 3 VPN routing instance. • Import-Protect—A remote instance egress that is protected. • Multipath—A BGP multipath active route. • MultipathContrib—The route is not active but contributes to the BGP multipath. • Protect—An egress route that is protected. • Stale—A route that is marked stale due to graceful restart.
Primary Upstream	When multipoint LDP with multicast-only fast reroute (MoFRR) is configured, the primary upstream path. MoFRR transmits a multicast join message from a receiver toward a source on a primary path, while also transmitting a secondary multicast join message from the receiver toward the source on a backup path.
RPF Nexthops	When multipoint LDP with MoFRR is configured, the reverse-path forwarding (RPF) next-hop information. Data packets are received from both the primary path and the secondary paths. The redundant packets are discarded at topology merge points due to the RPF checks.
Label	Multiple MPLS labels are used to control MoFRR stream selection. Each label represents a separate route, but each references the same interface list check. Only the primary label is forwarded while all others are dropped. Multiple interfaces can receive packets using the same label.
weight	Value used to distinguish MoFRR primary and backup routes. A lower weight value is preferred. Among routes with the same weight value, load balancing is possible.
VC Label	MPLS label assigned to the Layer 2 circuit virtual connection.
MTU	Maximum transmission unit (MTU) of the Layer 2 circuit.
VLAN ID	VLAN identifier of the Layer 2 circuit.
Cluster list	(For route reflected output only) Cluster ID sent by the route reflector.
Originator ID	(For route reflected output only) Address of router that originally sent the route to the route reflector.
Prefixes bound to route	Forwarding Equivalent Class (FEC) bound to this route. Applicable only to routes installed by LDP.
Communities	Community path attribute for the route. See the Output Field table in the <i>show route detail</i> command for all possible values for this field.
Layer2-info: encaps	Layer 2 encapsulation (for example, VPLS).
control flags	Control flags: none or Site Down.
mtu	Maximum transmission unit (MTU) information.
Label-Base, range	First label in a block of labels and label block size. A remote PE routing device uses this first label when sending traffic toward the advertising PE routing device.

Table 102: show route extensive Output Fields (continued)

Field Name	Field Description
status vector	Layer 2 VPN and VPLS network layer reachability information (NLRI).
Localpref	Local preference value included in the route.
Router ID	BGP router ID as advertised by the neighbor in the open message.
Primary Routing Table	In a routing table group, the name of the primary routing table in which the route resides.
Secondary Tables	In a routing table group, the name of one or more secondary tables in which the route resides.
Originating RIB	Name of the routing table whose active route was used to determine the forwarding next-hop entry in the resolution database. For example, in the case of inet.0 resolving through inet.0 and inet.3, this field indicates which routing table, inet.0 or inet.3, provided the best path for a particular prefix.
Node path count	Number of nodes in the path.
Forwarding nexthops	Number of forwarding next hops. The forwarding next hop is the network layer address of the directly reachable neighboring system (if applicable) and the interface used to reach it.

Sample Output

show route extensive

```

user@host> show route extensive

inet.0: 22 destinations, 23 routes (21 active, 0 holddown, 1 hidden)
203.0.113.10/16 (1 entry, 1 announced)
TSI:
KRT in-kernel 203.0.113.10/16 -> {192.168.71.254}
  *Static Preference: 5
    Next-hop reference count: 29
    Next hop: 192.168.71.254 via fxp0.0, selected
    State: <Active NoReadvrt Int Ext>
    Local AS: 64496
    Age: 1:34:06
    Task: RT
    Announcement bits (2): 0-KRT 3-Resolve tree 2
    AS path: I

203.0.113.30/30 (2 entries, 1 announced)
  *Direct Preference: 0
    Next hop type: Interface
    Next-hop reference count: 2
    Next hop: via so-0/3/0.0, selected
    State: <Active Int>
    Local AS: 64496
    Age: 1:32:40
    Task: IF
    Announcement bits (1): 3-Resolve tree 2
    AS path: I
  OSPF Preference: 10
    Next-hop reference count: 1

```

```

        Next hop: via so-0/3/0.0, selected
        State: <Int>
        Inactive reason: Route Preference
        Local AS: 64496
        Age: 1:32:40    Metric: 1
        Area: 0.0.0.0
        Task: OSPF
        AS path: I

203.0.113.103/32 (1 entry, 1 announced)
    *Local Preference: 0
        Next hop type: Local
        Next-hop reference count: 7
        Interface: so-0/3/0.0
        State: <Active NoReadvrt Int>
        Local AS: 644969
        Age: 1:32:43
        Task: IF
        Announcement bits (1): 3-Resolve tree 2
        AS path: I

...

203.0.113.203/30 (1 entry, 1 announced)
TSI:
KRT in-kerne 203.0.113.203/30 -> {203.0.113.216}
    *OSPF Preference: 10
        Next-hop reference count: 9
        Next hop: via so-0/3/0.0
        Next hop: 203.0.113.216 via ge-3/1/0.0, selected
        State: <Active Int>
        Local AS: 64496
        Age: 1:32:19    Metric: 2
        Area: 0.0.0.0
        Task: OSPF
        Announcement bits (2): 0-KRT 3-Resolve tree 2
        AS path: I

...

198.51.100.2/32 (1 entry, 1 announced)
TSI:
KRT in-kerne 198.51.100.2/32 -> {}
    *PIM Preference: 0
        Next-hop reference count: 18
        State: <Active NoReadvrt Int>
        Local AS: 64496
        Age: 1:34:08
        Task: PIM Recv
        Announcement bits (2): 0-KRT 3-Resolve tree 2
        AS path: I

...

198.51.100.22/32 (1 entry, 1 announced)
TSI:
KRT in-kerne 198.51.100.22/32 -> {}
    *IGMP Preference: 0
        Next-hop reference count: 18
        State: <Active NoReadvrt Int>

```

```

        Local AS:    64496
        Age: 1:34:06
        Task: IGMP
        Announcement bits (2): 0-KRT 3-Resolve tree 2
        AS path: I

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

203.0.113.103/32 (1 entry, 1 announced)
  State: <FlashAll>
  *RSVP   Preference: 7
          Next-hop reference count: 6
          Next hop: 203.0.113.216 via ge-3/1/0.0 weight 0x1, selected
          Label-switched-path green-r1-r3
          Label operation: Push 100096
          State: <Active Int>
          Local AS:    64496
          Age: 1:28:12   Metric: 2
          Task: RSVP
          Announcement bits (2): 1-Resolve tree 1 2-Resolve tree 2
          AS path: I

203.0.113.238/32 (1 entry, 1 announced)
  State: <FlashAll>
  *RSVP   Preference: 7
          Next-hop reference count: 6
          Next hop: via so-0/3/0.0 weight 0x1, selected
          Label-switched-path green-r1-r2
          State: <Active Int>
          Local AS:    64496
          Age: 1:28:12   Metric: 1
          Task: RSVP
          Announcement bits (2): 1-Resolve tree 1 2-Resolve tree 2
          AS path: I

private1___.inet.0: 2 destinations, 3 routes (2 active, 0 holddown, 0 hidden)

...

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

47.0005.80ff.f800.0000.0108.0001.0102.5507.1052/152 (1 entry, 0 announced)
  *Direct Preference: 0
          Next hop type: Interface
          Next-hop reference count: 1
          Next hop: via lo0.0, selected
          State: <Active Int>
          Local AS:    64496
          Age: 1:34:07
          Task: IF
          AS path: I

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)

0 (1 entry, 1 announced)
TSI:
KRT in-kernel 0      /36 -> {}
  *MPLS   Preference: 0
          Next hop type: Receive
          Next-hop reference count: 6

```

```

        State: <Active Int>
        Local AS: 64496
        Age: 1:34:08      Metric: 1
        Task: MPLS
        Announcement bits (1): 0-KRT
        AS path: I

...

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
299840 (1 entry, 1 announced)
TSI:
KRT in-kernel 299840 /52 -> {indirect(1048575)}
    *RSVP      Preference: 7/2
                Next hop type: Flood
                Address: 0x9174a30
                Next-hop reference count: 4
                Next hop type: Router, Next hop index: 798
                Address: 0x9174c28
                Next-hop reference count: 2
                Next hop: 198.51.100.2 via lt-1/2/0.9 weight 0x1
                Label-switched-path R2-to-R4-2p2mp
                Label operation: Pop
                Next hop type: Router, Next hop index: 1048574
                Address: 0x92544f0
                Next-hop reference count: 2
                Next hop: 198.51.100.2 via lt-1/2/0.7 weight 0x1
                Label-switched-path R2-to-R200-p2mp
                Label operation: Pop
                Next hop: 198.51.100.2 via lt-1/2/0.5 weight 0x8001
                Label operation: Pop
                State: <Active Int>
                Age: 1:29      Metric: 1
                Task: RSVP
                Announcement bits (1): 0-KRT
                AS path: I...

800010 (1 entry, 1 announced)
TSI:
KRT in-kernel 800010 /36 -> {vt-3/2/0.32769}
    *VPLS      Preference: 7
                Next-hop reference count: 2
                Next hop: via vt-3/2/0.32769, selected
                Label operation: Pop
                State: <Active Int>
                Age: 1:31:53
                Task: Common L2 VC
                Announcement bits (1): 0-KRT
                AS path: I

vt-3/2/0.32769 (1 entry, 1 announced)
TSI:
KRT in-kernel vt-3/2/0.32769.0      /16 -> {indirect(1048574)}
    *VPLS      Preference: 7
                Next-hop reference count: 2
                Next hop: 203.0.113.216 via ge-3/1/0.0 weight 0x1, selected
                Label-switched-path green-r1-r3
                Label operation: Push 800012, Push 100096(top)
                Protocol next hop: 203.0.113.103

```

```

Push 800012
Indirect next hop: 87272e4 1048574
State: <Active Int>
Age: 1:31:53    Metric2: 2
Task: Common L2 VC
Announcement bits (2): 0-KRT 1-Common L2 VC
AS path: I
Communities: target:11111:1 Layer2-info: encaps:VPLS,
control flags:, mtu: 0
Indirect next hops: 1
    Protocol next hop: 203.0.113.103 Metric: 2
    Push 800012
    Indirect next hop: 87272e4 1048574
    Indirect path forwarding next hops: 1
        Next hop: 203.0.113.216 via ge-3/1/0.0 weight 0x1

    203.0.113.103/32 Originating RIB: inet.3
        Metric: 2                                Node path count: 1
        Forwarding nexthops: 1
            Nexthop: 203.0.113.216 via ge-3/1/0.0

inet6.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)

2001:db8::10:255:71:52/128 (1 entry, 0 announced)
    *Direct Preference: 0
        Next hop type: Interface
        Next-hop reference count: 1
        Next hop: via lo0.0, selected
        State: <Active Int>
        Local AS:    64496
        Age: 1:34:07
        Task: IF
        AS path: I

fe80::280:42ff:fe10:f179/128 (1 entry, 0 announced)
    *Direct Preference: 0
        Next hop type: Interface
        Next-hop reference count: 1
        Next hop: via lo0.0, selected
        State: <Active NoReadvrt Int>
        Local AS:    64496
        Age: 1:34:07
        Task: IF
        AS path: I

ff02::2/128 (1 entry, 1 announced)
TSI:
KRT in-kernel ff02::2/128 -> {}
    *PIM Preference: 0
        Next-hop reference count: 18
        State: <Active NoReadvrt Int>
        Local AS:    64496
        Age: 1:34:08
        Task: PIM Recv6
        Announcement bits (1): 0-KRT
        AS path: I

ff02::d/128 (1 entry, 1 announced)
TSI:
KRT in-kernel ff02::d/128 -> {}

```

```

    *PIM      Preference: 0
             Next-hop reference count: 18
             State: <Active NoReadvrt Int>
             Local AS:      64496
             Age: 1:34:08
             Task: PIM Recv6
             Announcement bits (1): 0-KRT
             AS path: I

ff02::16/128 (1 entry, 1 announced)
TSI:
KRT in-kernel ff02::16/128 -> {}
    *MLD      Preference: 0
             Next-hop reference count: 18
             State: <Active NoReadvrt Int>
             Local AS:      64496
             Age: 1:34:06
             Task: MLD
             Announcement bits (1): 0-KRT
             AS path: I

private.inet6.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

fe80::280:42ff:fe10:f179/128 (1 entry, 0 announced)
    *Direct Preference: 0
             Next hop type: Interface
             Next-hop reference count: 1
             Next hop: via lo0.16385, selected
             State: <Active NoReadvrt Int>
             Age: 1:34:07
             Task: IF
             AS path: I

green.l2vpn.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)

203.0.113.103:1:3:1/96 (1 entry, 1 announced)
    *BGP      Preference: 170/-101
             Route Distinguisher: 203.0.113.103:1
             Next-hop reference count: 7
             Source: 203.0.113.103
             Protocol next hop: 203.0.113.103
             Indirect next hop: 2 no-forward
             State: <Secondary Active Int Ext>
             Local AS:      64496 Peer AS:      64496
             Age: 1:28:12   Metric2: 1
             Task: BGP_69.203.0.113.103+179
             Announcement bits (1): 0-green-l2vpn
             AS path: I
             Communities: target:11111:1 Layer2-info: encaps:VPLS,
             control flags:, mtu: 0
             Label-base: 800008, range: 8
             Localpref: 100
             Router ID: 203.0.113.103
             Primary Routing Table bgp.l2vpn.0

203.0.113.152:1:1:1/96 (1 entry, 1 announced)
TSI:
Page 0 idx 0 Type 1 val 8699540
    *L2VPN    Preference: 170/-1
             Next-hop reference count: 5

```

```

    Protocol next hop: 203.0.113.152
    Indirect next hop: 0 -
    State: <Active Int Ext>
    Age: 1:34:03    Metric2: 1
    Task: green-l2vpn
    Announcement bits (1): 1-BGP.0.0.0.0+179
    AS path: I
    Communities: Layer2-info: encaps:VPLS, control flags:Site-Down,
    mtu: 0
    Label-base: 800016, range: 8, status-vector: 0x9F

203.0.113.152:1:5:1/96 (1 entry, 1 announced)
TSI:
Page 0 idx 0 Type 1 val 8699528
    *L2VPN Preference: 170/-101
    Next-hop reference count: 5
    Protocol next hop: 203.0.113.152
    Indirect next hop: 0 -
    State: <Active Int Ext>
    Age: 1:34:03    Metric2: 1
    Task: green-l2vpn
    Announcement bits (1): 1-BGP.0.0.0.0+179
    AS path: I
    Communities: Layer2-info: encaps:VPLS, control flags:, mtu: 0
    Label-base: 800008, range: 8, status-vector: 0x9F

...

l2circuit.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
TSI:

203.0.113.163:CtrlWord:4:3:Local/96 (1 entry, 1 announced)
    *L2CKT Preference: 7
    Next hop: via so-1/1/2.0 weight 1, selected
    Label-switched-path my-lsp
    Label operation: Push 100000[0]
    Protocol next hop: 203.0.113.163 Indirect next hop: 86af000 296
    State: <Active Int>
    Local AS: 64499
    Age: 10:21
    Task: l2 circuit
    Announcement bits (1): 0-LDP
    AS path: I
    VC Label 100000, MTU 1500, VLAN ID 512

203.0.113.55/24 (1 entry, 1 announced)
TSI:
KRT queued (pending) add
    198.51.100.0/24 -> {Push 300112}
    *BGP Preference: 170/-101
    Next hop type: Router
    Address: 0x925c208
    Next-hop reference count: 2
    Source: 203.0.113.9
    Next hop: 203.0.113.9 via ge-1/2/0.15, selected
    Label operation: Push 300112
    Label TTL action: prop-ttl
    State: <Active Ext>

```

```

Local AS: 64509 Peer AS: 65539
Age: 1w0d 23:06:56
AIGP: 25
Task: BGP_65539.203.0.113.9+56732
Announcement bits (1): 0-KRT
AS path: 65539 64508 I
Accepted
Route Label: 300112
Localpref: 100
Router ID: 213.0.113.99

```

show route extensive (Access Route)

```
user@host> show route 203.0.113.102 extensive
```

```

inet.0: 39256 destinations, 39258 routes (39255 active, 0 holddown, 1 hidden)
203.0.113.102/32 (1 entry, 1 announced)
TSI:
KRT in-kerne1 203.0.113.102/32 -> {192.0.2.2}
OSPF area : 0.0.0.0, LSA ID : 203.0.113.102, LSA type : Extern
  *Access Preference: 13
    Next-hop reference count: 78472
    Next hop: 192.0.2.2 via fe-0/0/0.0, selected
    State: <Active Int>
  Age: 12
    Task: RPD Unix Domain Server./var/run/rpd_serv.local
    Announcement bits (2): 0-KRT 1-OSPFv2
    AS path: I

```

```
user@host> show route 2001:db8:4641:1::/48 extensive
```

```

inet6.0: 75 destinations, 81 routes (75 active, 0 holddown, 0 hidden)
2001:db8:4641:1::/48 (1 entry, 1 announced)
TSI:
KRT in-kerne1 2001:db8:4641:1::/48 -> {#0 0.13.1.0.0.1}
  *Access Preference: 13
    Next hop type: Router, Next hop index: 74548
    Address: 0x1638c1d8
    Next-hop reference count: 6
    Next hop: #0 0.13.1.0.0.1 via demux0.1073753267, selected
    Session Id: 0x0
    State: <Active Int>
    Age: 4:17
    Validation State: unverified
    Task: RPD Unix Domain Server./var/run/rpd_serv.local
    Announcement bits (2): 0-KRT 4-Resolve tree 2
    AS path: I
2001:db8:4641:1::/128 (1 entry, 1 announced)
TSI:
KRT in-kerne1 2001:db8:4641:1::/128 -> {#0 0.13.1.0.0.1}
  *Access-internal Preference: 12
    Next hop type: Router, Next hop index: 74548
    Address: 0x1638c1d8
    Next-hop reference count: 6
    Next hop: #0 0.13.1.0.0.1 via demux0.1073753267, selected
    Session Id: 0x0
    State: <Active Int>
    Age: 4:17

```



```

Validation State: unverified
Task: RPD Unix Domain Server./var/run/rpd_serv.local
Announcement bits (2): 0-KRT 4-Resolve tree 2
AS path: I

```

show route extensive (BGP PIC Edge)

```

user@host> show route 198.51.100.6 extensive

ed.inet.0: 6 destinations, 9 routes (6 active, 0 holddown, 0 hidden)
 198.51.100.6/32 (3 entries, 2 announced)
    State: <CalcForwarding>
    TSI:
    KRT in-kerne1 198.51.100.6/32 -> {indirect(1048574), indirect(1048577)}
    Page 0 idx 0 Type 1 val 9219e30
    Nexthop: Self
    AS path: [2] 3 I
    Communities: target:2:1
    Path 198.51.100.6 from 198.51.100.4 Vector len 4. Val: 0
..
    #Multipath Preference: 255
    Next hop type: Indirect
    Address: 0x93f4010
    Next-hop reference count: 2
..
    Protocol next hop: 198.51.1001.4
    Push 299824
    Indirect next hop: 944c000 1048574 INH Session ID: 0x3
    Indirect next hop: weight 0x1
    Protocol next hop: 198.51.100.5
    Push 299824
    Indirect next hop: 944c1d8 1048577 INH Session ID: 0x4
    Indirect next hop: weight 0x4000
    State: <ForwardingOnly Int Ext>
    Inactive reason: Forwarding use only
    Age: 25 Metric2: 15
    Validation State: unverified
    Task: RT
    Announcement bits (1): 0-KRT
    AS path: 3 I
    Communities: target:2:1

```

show route extensive (FRR and LFA)

```

user@host> show route 203.0.113.20 extensive

inet.0: 46 destinations, 49 routes (45 active, 0 holddown, 1 hidden)
 203.0.113.20/24 (2 entries, 1 announced)
    State: FlashAll
    TSI:
    KRT in-kerne1 203.0.113.20/24 -> {Push 299776, Push 299792}
    *RSVP Preference: 7/1
    Next hop type: Router, Next hop index: 1048574
    Address: 0xbbbc010
    Next-hop reference count: 5
    Next hop: 203.0.113.112 via ge-2/1/8.0 weight 0x1, selected
    Label-switched-path europa-d-to-europa-e
    Label operation: Push 299776
    Label TTL action: prop-ttl

```

```

Session Id: 0x201
Next hop: 203.0.113.122 via ge-2/1/4.0 weight 0x4001
Label-switched-path europa-d-to-europa-e
Label operation: Push 299792
Label TTL action: prop-ttl
Session Id: 0x202
State: Active Int
Local AS: 64500
Age: 5:31 Metric: 2
Task: RSVP
Announcement bits (1): 0-KRT
AS path: I
OSPF Preference: 10
Next hop type: Router, Next hop index: 615
Address: 0xb9d78c4
Next-hop reference count: 7
Next hop: 203.0.113.112 via ge-2/1/8.0, selected
Session Id: 0x201
State: Int
Inactive reason: Route Preference
Local AS: 64500
Age: 5:35 Metric: 3
Area: 0.0.0.0
Task: OSPF
AS path: I

```

show route extensive (IS-IS)

```
user@host> show route extensive
```

```

IS-IS Preference: 15
Level: 1
Next hop type: Router, Next hop index: 1048577
Address: 0xFFFFFFFF
Next-hop reference count: YY
Next hop: 203.0.113.22 via ae1.0 balance 43%, selected
Session Id: 0x141
Next hop: 203.0.113.22 via ae0.0 balance 57%

```

show route extensive (Route Reflector)

```
user@host> show route extensive
```

```

203.0.113.0/8 (1 entry, 1 announced)

TSI:
KRT in-kernel 203.0.113.0/8 -> {indirect(40)}
  *BGP Preference: 170/-101
    Source: 192.168.4.214
    Protocol next hop: 198.51.100.192 Indirect next hop: 84ac908 40
    State: <Active Int Ext>
    Local AS: 65548 Peer AS: 65548
    Age: 3:09 Metric: 0 Metric2: 0
    Task: BGP_65548.192.168.4.214+1033
    Announcement bits (2): 0-KRT 4-Resolve inet.0
    AS path: 65544 64507 I <Originator>
    Cluster list: 198.51.100.1
    Originator ID: 203.0.113.88
    Communities: 7777:7777

```

```

Localpref: 100
Router ID: 203.0.113.4
Indirect next hops: 1
    Protocol next hop: 203.0.113.192 Metric: 0
    Indirect next hop: 84ac908 40
    Indirect path forwarding next hops: 0
    Next hop type: Discard

```

show route label detail (Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs)

```

user@host> show route label 299872 detail

mpls.0: 13 destinations, 13 routes (13 active, 0 holddown, 0 hidden)
299872 (1 entry, 1 announced)
    *LDP      Preference: 9
              Next hop type: Flood
              Next-hop reference count: 3
              Address: 0x9097d90
              Next hop: via vt-0/1/0.1
              Next-hop index: 661
              Label operation: Pop
              Address: 0x9172130
              Next hop: via so-0/0/3.0
              Next-hop index: 654
              Label operation: Swap 299872
              State: **Active Int>
              Local AS: 64511
              Age: 8:20      Metric: 1
              Task: LDP
              Announcement bits (1): 0-KRT
              AS path: I
              FECs bound to route: P2MP root-addr 203.0.113.166, grp 203.0.113.1,
src 192.168.142.2

```

show route label detail (Multipoint LDP with Multicast-Only Fast Reroute)

```

user@host> show route label 301568 detail

mpls.0: 18 destinations, 18 routes (18 active, 0 holddown, 0 hidden)
301568 (1 entry, 1 announced)
    *LDP      Preference: 9
              Next hop type: Flood
              Address: 0x2735208
              Next-hop reference count: 3
              Next hop type: Router, Next hop index: 1397
              Address: 0x2735d2c
              Next-hop reference count: 3
              Next hop: 203.0.113.82 via ge-1/2/22.0
              Label operation: Pop
              Load balance label: None;
              Next hop type: Router, Next hop index: 1395
              Address: 0x2736290
              Next-hop reference count: 3
              Next hop: 203.0.113.2 via ge-1/2/18.0
              Label operation: Pop
              Load balance label: None;
              State: <Active Int AckRequest MulticastRPF>
              Local AS: 64500

```

```
Age: 54:05      Metric: 1
Validation State: unverified
Task: LDP
Announcement bits (1): 0-KRT
AS path: I
FECs bound to route: P2MP root-addr 198.51.100.1, grp: 203.0.113.1,
src: 192.168.219.11
Primary Upstream : 198.51.100.3:0--198.51.100.2:0
RPF Nexthops :
    ge-1/2/15.0, 10.2.94.1, Label: 301568, weight: 0x1
    ge-1/2/14.0, 10.2.3.1, Label: 301568, weight: 0x1
Backup Upstream : 198.51.100.3:0--198.51.100.6:0
RPF Nexthops :
    ge-1/2/20.0, 198.51.100.96, Label: 301584, weight: 0xffffe
    ge-1/2/19.0, 198.51.100.36, Label: 301584, weight: 0xffffe
```

show route instance

Syntax `show route instance`
`<brief | detail | summary>`
`<instance-name>`
`<operational>`

Release Information Command introduced in Junos OS Release 14.1X53-D20 for OCX Series switches.
 Command introduced in Junos OS Release 11.3 for the QFX Series.

Description (QFabric systems only) Display routing instance information.

Options **none**—(Same as **brief**) Display standard information about all routing instances.

brief | detail | summary—(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to **brief**. (These options are not available with the **operational** keyword.)

instance-name—(Optional) Display information for a specified routing instance.

operational—(Optional) Display operational routing instances.

Required Privilege Level view

List of Sample Output [show route instance on page 2162](#)
[show route instance detail on page 2162](#)
[show route instance operational on page 2163](#)
[show route instance summary on page 2164](#)

Output Fields [Table 103 on page 2161](#) lists the output fields for the **show route instance** command. Output fields are listed in the approximate order in which they appear.

Table 103: show route instance Output Fields

Field Name	Field Description	Level of Output
Instance or <i>instance-name</i>	Name of the routing instance.	All levels
Operational Routing Instances	(operational keyword only) Names of all operational routing instances.	—
Type	Type of routing instance: forwarding or virtual-router .	All levels
State	State of the routing instance: active or inactive .	detail
Interfaces	Name of interfaces belonging to this routing instance.	detail

Table 103: show route instance Output Fields (continued)

Field Name	Field Description	Level of Output
Tables	Tables (and number of routes) associated with this routing instance.	detail
Router ID	Identifier for the router.	detail
Primary RIB	Primary table for this routing instance.	brief none summary
Active/holddown/hidden	Number of active, hold-down, and hidden routes.	All levels

Sample Output

show route instance

```

user@switch> show route instance
Instance           Type
Primary RIB
master             forwarding
inet.0             4/0/1
__juniper_private1__ forwarding
__juniper_private1__.inet.0 1/0/3
__juniper_private2__ forwarding
__juniper_private2__.inet.0 0/0/1
__juniper_private3__ forwarding
__juniper_private3__.inet.0 1/0/2
__juniper_private4__ forwarding
__juniper_private4__.inet.0 4/0/2
__master.anon__    forwarding
r1                  virtual-router
r2                  virtual-router

```

show route instance detail

```

user@switch> show route instance detail
master:
  Router ID: 10.3.3.7
  Type: forwarding      State: Active
  Tables:
    inet.0               : 5 routes (4 active, 0 holddown, 1 hidden)
__juniper_private1__:
  Router ID: 0.0.0.0
  Type: forwarding      State: Active
  Interfaces:
    lo0.16385

```

```

bme0.0
Tables:
  __juniper_private1__.inet.0: 6 routes (1 active, 0 holddown, 3 hidden)

__juniper_private2__:
Router ID: 0.0.0.0
Type: forwarding      State: Active
Interfaces:
  lo0.16384
Tables:
  __juniper_private2__.inet.0: 1 routes (0 active, 0 holddown, 1 hidden)

__juniper_private3__:
Router ID: 0.0.0.0
Type: forwarding      State: Active
Interfaces:
  bme0.1
Tables:
  __juniper_private3__.inet.0: 4 routes (1 active, 0 holddown, 2 hidden)

__juniper_private4__:
Router ID: 0.0.0.0
Type: forwarding      State: Active
Interfaces:
  bme0.2
Tables:
  __juniper_private4__.inet.0: 8 routes (4 active, 0 holddown, 2 hidden)

__master.anon__:
Router ID: 0.0.0.0
Type: forwarding      State: Active

r1:
Router ID: 0.0.0.0
Type: virtual-router  State: Active
Interfaces:
  xe-0/0/0.0

r2:
Router ID: 0.0.0.0
Type: virtual-router  State: Active
Interfaces:
  xe-0/0/3.0

```

show route instance operational

```

user@switch> show route instance operational

Operational Routing Instances:

__juniper_private1__
__juniper_private2__
__juniper_private3__
__juniper_private4__
r1---qfabric
r2---qfabric
master

```

show route instance summary

```
user@switch> show route instance summary
```

Instance	Type	Active/holddown/hidden
Primary RIB		
master	forwarding	
inet.0		4/0/1
__juniper_private1__	forwarding	
__juniper_private1__.inet.0		1/0/3
__juniper_private2__	forwarding	
__juniper_private2__.inet.0		0/0/1
__juniper_private3__	forwarding	
__juniper_private3__.inet.0		1/0/2
__juniper_private4__	forwarding	
__juniper_private4__.inet.0		4/0/2
__master.anon__	forwarding	
r1	virtual-router	
r2	virtual-router	

show route protocol

List of Syntax [Syntax on page 2165](#)
 [Syntax \(EX Series Switches\) on page 2165](#)

Syntax `show route protocol protocol`
 `<brief | detail | extensive | terse>`
 `<logical-system (all | logical-system-name)>`

Syntax (EX Series Switches) `show route protocol protocol`
 `<brief | detail | extensive | terse>`

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 for EX Series switches.
 ospf2 and **ospf3** options introduced in Junos OS Release 9.2.
 ospf2 and **ospf3** options introduced in Junos OS Release 9.2 for EX Series switches.
 flow option introduced in Junos OS Release 10.0.
 flow option introduced in Junos OS Release 10.0 for EX Series switches.

Description Display the route entries in the routing table that were learned from a particular protocol.

Options **brief | detail | extensive | terse**—(Optional) Display the specified level of output. If you do not specify a level of output, the system defaults to **brief**.

logical-system (all | *logical-system-name*)—(Optional) Perform this operation on all logical systems or on a particular logical system.

protocol—Protocol from which the route was learned:

- **access**—Access route for use by DHCP application
- **access-internal**—Access-internal route for use by DHCP application
- **aggregate**—Locally generated aggregate route
- **arp**—Route learned through the Address Resolution Protocol
- **atmvpn**—Asynchronous Transfer Mode virtual private network
- **bgp**—Border Gateway Protocol
- **ccc**—Circuit cross-connect
- **direct**—Directly connected route
- **dvmrp**—Distance Vector Multicast Routing Protocol
- **esis**—End System-to-Intermediate System
- **flow**—Locally defined flow-specification route
- **frr**—Precomputed protection route or backup route used when a link goes down

- **isis**—Intermediate System-to-Intermediate System
- **ldp**—Label Distribution Protocol
- **l2circuit**—Layer 2 circuit
- **l2vpn**—Layer 2 virtual private network
- **local**—Local address
- **mpls**—Multiprotocol Label Switching
- **msdp**—Multicast Source Discovery Protocol
- **ospf**—Open Shortest Path First versions 2 and 3
- **ospf2**—Open Shortest Path First versions 2 only
- **ospf3**—Open Shortest Path First version 3 only
- **pim**—Protocol Independent Multicast
- **rip**—Routing Information Protocol
- **ripng**—Routing Information Protocol next generation
- **rsvp**—Resource Reservation Protocol
- **rtarget**—Local route target virtual private network
- **static**—Statically defined route
- **tunnel**—Dynamic tunnel
- **vpn**—Virtual private network



NOTE: EX Series switches run a subset of these protocols. See the switch CLI for details.

Required Privilege Level

view

List of Sample Output

[show route protocol access on page 2167](#)
[show route protocol access-internal extensive on page 2167](#)
[show route protocol arp on page 2167](#)
[show route protocol bgp on page 2168](#)
[show route protocol bgp detail on page 2168](#)
[show route protocol bgp detail \(Labeled Unicast\) on page 2169](#)
[show route protocol bgp detail \(Aggregate Extended Community Bandwidth\) on page 2169](#)
[show route protocol bgp extensive on page 2170](#)
[show route protocol bgp terse on page 2171](#)
[show route protocol direct on page 2171](#)

[show route protocol frr on page 2172](#)
[show route protocol l2circuit detail on page 2172](#)
[show route protocol l2vpn extensive on page 2173](#)
[show route protocol ldp on page 2174](#)
[show route protocol ldp extensive on page 2174](#)
[show route protocol ospf \(Layer 3 VPN\) on page 2175](#)
[show route protocol ospf detail on page 2176](#)
[show route protocol rip on page 2176](#)
[show route protocol rip detail on page 2176](#)
[show route protocol ripng table inet6 on page 2177](#)
[show route protocol static detail on page 2177](#)

Output Fields For information about output fields, see the output field tables for the *show route* command, the *show route detail* command, the [show route extensive](#) command, or the *show route terse* command.

Sample Output

show route protocol access

```

user@host> show route protocol access

inet.0: 30380 destinations, 30382 routes (30379 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

13.160.0.3/32      *[Access/13] 00:00:09
                  > to 13.160.0.2 via fe-0/0/0.0
13.160.0.4/32      *[Access/13] 00:00:09
                  > to 13.160.0.2 via fe-0/0/0.0
13.160.0.5/32      *[Access/13] 00:00:09
                  > to 13.160.0.2 via fe-0/0/0.0

```

show route protocol access-internal extensive

```

user@host> show route protocol access-internal 13.160.0.19 extensive

inet.0: 100020 destinations, 100022 routes (100019 active, 0 holddown, 1 hidden)
13.160.0.19/32 (1 entry, 1 announced)
TSI:
KRT in-kernel 13.160.0.19/32 -> {13.160.0.2}
    *Access-internal Preference: 12
        Next-hop reference count: 200000
        Next hop: 13.160.0.2 via fe-0/0/0.0, selected
        State: <Active Int>
    Age: 36
        Task: RPD Unix Domain Server./var/run/rpd_serv.local
        Announcement bits (1): 0-KRT
        AS path: I

```

show route protocol arp

```

user@host> show route protocol arp

inet.0: 43 destinations, 43 routes (42 active, 0 holddown, 1 hidden)

inet.3: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

```

```

cust1.inet.0: 1033 destinations, 2043 routes (1033 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

20.20.1.3/32      [ARP/4294967293] 00:04:35, from 20.20.1.1
                  Unusable
20.20.1.4/32      [ARP/4294967293] 00:04:35, from 20.20.1.1
                  Unusable
20.20.1.5/32      [ARP/4294967293] 00:04:32, from 20.20.1.1
                  Unusable
20.20.1.6/32      [ARP/4294967293] 00:04:34, from 20.20.1.1
                  Unusable
20.20.1.7/32      [ARP/4294967293] 00:04:35, from 20.20.1.1
                  Unusable
20.20.1.8/32      [ARP/4294967293] 00:04:35, from 20.20.1.1
                  Unusable
20.20.1.9/32      [ARP/4294967293] 00:04:35, from 20.20.1.1
                  Unusable
20.20.1.10/32     [ARP/4294967293] 00:04:35, from 20.20.1.1
                  Unusable
20.20.1.11/32     [ARP/4294967293] 00:04:33, from 20.20.1.1
                  Unusable
20.20.1.12/32     [ARP/4294967293] 00:04:33, from 20.20.1.1
                  Unusable
20.20.1.13/32     [ARP/4294967293] 00:04:33, from 20.20.1.1
                  Unusable
...

```

show route protocol bgp

```

user@host> show route protocol bgp 192.168.64.0/21

inet.0: 335832 destinations, 335833 routes (335383 active, 0 holddown, 450 hidden)
+ = Active Route, - = Last Active, * = Both

192.168.64.0/21    *[BGP/170] 6d 10:41:16, localpref 100, from 192.168.69.71
                  AS path: 10458 14203 2914 4788 4788 I
                  > to 192.168.167.254 via fxp0.0

```

show route protocol bgp detail

```

user@host> show route protocol bgp 66.117.63.0/24 detail

inet.0: 335805 destinations, 335806 routes (335356 active, 0 holddown, 450 hidden)
66.117.63.0/24    (1 entry, 1 announced)
  *BGP           Preference: 170/-101
                  Next hop type: Indirect
                  Next-hop reference count: 1006436
                  Source: 192.168.69.71
                  Next hop type: Router, Next hop index: 324
                  Next hop: 192.168.167.254 via fxp0.0, selected
                  Protocol next hop: 192.168.69.71
                  Indirect next hop: 8e166c0 342
                  State: <Active Ext>
                  Local AS: 69 Peer AS: 10458
                  Age: 6d 10:42:42 Metric2: 0
                  Task: BGP_10458.192.168.69.71+179
                  Announcement bits (3): 0-KRT 2-BGP RT Background 3-Resolve tree
1

```

```

AS path: 10458 14203 2914 4788 4788 I
Communities: 2914:410 2914:2403 2914:3400
Accepted
Localpref: 100
Router ID: 207.17.136.192

```

show route protocol bgp detail (Labeled Unicast)

```

user@host> show route protocol bgp 1.1.1.8/32 detail

inet.0: 45 destinations, 46 routes (45 active, 0 holddown, 0 hidden)
1.1.1.8/32 (2 entries, 2 announced)
State:
*BGP Preference: 1/-101
Next hop type: Indirect, Next hop index: 0
Address: 0xc007f30
Next-hop reference count: 2
Source: 1.1.1.1
Next hop type: Router, Next hop index: 614
Next hop: 20.1.1.2 via ge-0/0/1.0, selected
Label-switched-path lsp1
Label operation: Push 1000126, Push 1000125, Push 1000124, Push 1000123, Push
299872(top)
Label TTL action: prop-ttl, prop-ttl, prop-ttl, prop-ttl, prop-ttl(top)
Load balance label: Label 1000126: None; Label 1000125: None; Label 1000124: None;
Label 1000123: None; Label 299872: None;
Label element ptr: 0xc007860
Label parent element ptr: 0xc0089a0
Label element references: 1
Label element child references: 0
Label element lsp id: 0
Session Id: 0x140
Protocol next hop: 1.1.1.4
Label operation: Push 1000126, Push 1000125, Push 1000124, Push 1000123(top)
Label TTL action: prop-ttl, prop-ttl, prop-ttl, prop-ttl
Load balance label: Label 1000126: None; Label 1000125: None; Label 1000124: None;
Label 1000123: None;
Indirect next hop: 0xae8d300 1048576 INH Session ID: 0x142
State:
Local AS: 5 Peer AS: 5
Age: 22:43 Metric2: 2
Validation State: unverified
Task: BGP_5.1.1.1.1
Announcement bits (2): 0-KRT 7-Resolve tree 2
AS path: I
Accepted
Route Labels: 1000123(top) 1000124 1000125 1000126
Localpref: 100
Router ID: 1.1.1.1

```

show route protocol bgp detail (Aggregate Extended Community Bandwidth)

```

user@host> show route 10.0.2.0 protocol bgp detail

inet.0: 20 destinations, 26 routes (20 active, 0 holddown, 0 hidden)
10.0.2.0/30 (2 entries, 1 announced)
*BGP Preference: 170/-101
Next hop type: Router, Next hop index: 0
Address: 0xb618990

```

```

Next-hop reference count: 3
Source: 10.0.1.1
Next hop: 10.0.0.2 via ge-0/0/0.0 balance 40%
Session Id: 0x0
Next hop: 10.0.1.1 via ge-0/0/1.0 balance 60%, selected
Session Id: 0x0
State: <Active Ext>
Local AS: 65000 Peer AS: 65001
Age: 20:33
Validation State: unverified
Task: BGP_65001.10.0.1.1
Announcement bits (3): 0-KRT 2-BGP_Listen.0.0.0.0+179
3-BGP_RT_Background
AS path: 65001 I
Communities: bandwidth:65000:60000000
Accepted Multipath
Localpref: 100
Router ID: 128.49.121.137
BGP Preference: 170/-101
Next hop type: Router, Next hop index: 595
Address: 0xb7a1330
Next-hop reference count: 9
Source: 10.0.0.2
Next hop: 10.0.0.2 via ge-0/0/0.0, selected
Session Id: 0x141
State: <NotBest Ext>
Inactive reason: Not Best in its group - Active preferred
Local AS: 65000 Peer AS: 65001
Age: 20:33
Validation State: unverified
Task: BGP_65001.10.0.0.2
AS path: 65001 I
Communities: bandwidth:65000:40000000
Accepted MultipathContrib
Localpref: 100
Router ID: 128.49.121.132

```

show route protocol bgp extensive

```
user@host> show route protocol bgp 192.168.64.0/21 extensive
```

```

inet.0: 335827 destinations, 335828 routes (335378 active, 0 holddown, 450 hidden)
192.168.64.0/21 (1 entry, 1 announced)
TSI:
KRT in-kernel 1.9.0.0/16 -> {indirect(342)}
Page 0 idx 1 Type 1 val db31a80
  Nexthop: Self
  AS path: [69] 10458 14203 2914 4788 4788 I
  Communities: 2914:410 2914:2403 2914:3400
Path 1.9.0.0 from 192.168.69.71 Vector len 4. Val: 1
  *BGP Preference: 170/-101
    Next hop type: Indirect
    Next-hop reference count: 1006502
    Source: 192.168.69.71
    Next hop type: Router, Next hop index: 324
    Next hop: 192.168.167.254 via fxp0.0, selected
    Protocol next hop: 192.168.69.71
    Indirect next hop: 8e166c0 342
    State: <Active Ext>

```

```

Local AS: 69 Peer AS: 10458
Age: 6d 10:44:45 Metric2: 0
Task: BGP_10458.192.168.69.71+179
Announcement bits (3): 0-KRT 2-BGP RT Background 3-Resolve tree
1
AS path: 10458 14203 2914 4788 4788 I
Communities: 2914:410 2914:2403 2914:3400
Accepted
Localpref: 100
Router ID: 207.17.136.192
Indirect next hops: 1
  Protocol next hop: 192.168.69.71
  Indirect next hop: 8e166c0 342
  Indirect path forwarding next hops: 1
    Next hop type: Router
    Next hop: 192.168.167.254 via fxp0.0
  192.168.0.0/16 Originating RIB: inet.0
  Node path count: 1
  Forwarding nexthops: 1
    Nexthop: 192.168.167.254 via fxp0.0

```

show route protocol bgp terse

```
user@host> show route protocol bgp 192.168.64.0/21 terse
```

```

inet.0: 24 destinations, 32 routes (23 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

A Destination      P Prf  Metric 1  Metric 2  Next hop      AS path
192.168.64.0/21    B 170      100          >172.16.100.1 10023 21 I

```

show route protocol direct

```
user@host> show route protocol direct
```

```

inet.0: 335843 destinations, 335844 routes (335394 active, 0 holddown, 450 hidden)
+ = Active Route, - = Last Active, * = Both

172.16.8.0/24      *[Direct/0] 17w0d 10:31:49
> via fe-1/3/1.0
10.255.165.1/32    *[Direct/0] 25w4d 04:13:18
> via lo0.0
172.16.30.0/24     *[Direct/0] 17w0d 23:06:26
> via fe-1/3/2.0
192.168.164.0/22   *[Direct/0] 25w4d 04:13:20
> via fxp0.0

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

47.0005.80ff.f800.0000.0108.0001.0102.5516.5001/152
*[Direct/0] 25w4d 04:13:21
> via lo0.0

inet6.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

```

```

2001:db8::10:255:165:1/128
    *[Direct/0] 25w4d 04:13:21
    > via lo0.0
fe80::2a0:a5ff:fe12:ad7/128
    *[Direct/0] 25w4d 04:13:21
    > via lo0.0

```

show route protocol frr

```

user@host> show route protocol frr

inet.0: 43 destinations, 43 routes (42 active, 0 holddown, 1 hidden)

inet.3: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)

cust1.inet.0: 1033 destinations, 2043 routes (1033 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

20.20.1.3/32      *[FRR/200] 00:05:38, from 20.20.1.1
                  > to 20.20.1.3 via ge-4/1/0.0
                  to 10.10.15.1 via ge-0/2/4.0, Push 16, Push 299792(top)
20.20.1.4/32      *[FRR/200] 00:05:38, from 20.20.1.1
                  > to 20.20.1.4 via ge-4/1/0.0
                  to 10.10.15.1 via ge-0/2/4.0, Push 16, Push 299792(top)
20.20.1.5/32      *[FRR/200] 00:05:35, from 20.20.1.1
                  > to 20.20.1.5 via ge-4/1/0.0
                  to 10.10.15.1 via ge-0/2/4.0, Push 16, Push 299792(top)
20.20.1.6/32      *[FRR/200] 00:05:37, from 20.20.1.1
                  > to 20.20.1.6 via ge-4/1/0.0
                  to 10.10.15.1 via ge-0/2/4.0, Push 16, Push 299792(top)
20.20.1.7/32      *[FRR/200] 00:05:38, from 20.20.1.1
                  > to 20.20.1.7 via ge-4/1/0.0
                  to 10.10.15.1 via ge-0/2/4.0, Push 16, Push 299792(top)
20.20.1.8/32      *[FRR/200] 00:05:38, from 20.20.1.1
                  > to 20.20.1.8 via ge-4/1/0.0
                  to 10.10.15.1 via ge-0/2/4.0, Push 16, Push 299792(top)
20.20.1.9/32      *[FRR/200] 00:05:38, from 20.20.1.1
                  > to 20.20.1.9 via ge-4/1/0.0
                  to 10.10.15.1 via ge-0/2/4.0, Push 16, Push 299792(top)
20.20.1.10/32     *[FRR/200] 00:05:38, from 20.20.1.1
...

```

show route protocol l2circuit detail

```

user@host> show route protocol l2circuit detail

mpls.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
100000 (1 entry, 1 announced)
    *L2CKT Preference: 7
      Next hop: via ge-2/0/0.0, selected
      Label operation: Pop      Offset: 4
      State: <Active Int>
      Local AS: 99
      Age: 9:52
      Task: Common L2 VC
      Announcement bits (1): 0-KRT
      AS path: I

```



```

ge-2/0/0.0 (1 entry, 1 announced)
  *L2CKT Preference: 7
    Next hop: via so-1/1/2.0 weight 1, selected
    Label-switched-path my-lsp
    Label operation: Push 100000, Push 100000(top)[0] Offset: -4
    Protocol next hop: 10.245.255.63
    Push 100000 Offset: -4
    Indirect next hop: 86af0c0 298
    State: <Active Int>
    Local AS: 99
    Age: 9:52
    Task: Common L2 VC
    Announcement bits (2): 0-KRT 1-Common L2 VC
    AS path: I

l2circuit.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

10.245.255.63:CtrlWord:4:3:Local/96 (1 entry, 1 announced)
  *L2CKT Preference: 7
    Next hop: via so-1/1/2.0 weight 1, selected
    Label-switched-path my-lsp
    Label operation: Push 100000[0]
    Protocol next hop: 10.245.255.63 Indirect next hop: 86af000 296
    State: <Active Int>
    Local AS: 99
    Age: 10:21
    Task: l2 circuit
    Announcement bits (1): 0-LDP
    AS path: I
    VC Label 100000, MTU 1500, VLAN ID 512

```

show route protocol l2vpn extensive

```

user@host> show route protocol l2vpn extensive

inet.0: 14 destinations, 15 routes (13 active, 0 holddown, 1 hidden)

inet.3: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

iso.0: 1 destinations, 1 routes (1 active, 0 holddown, 0 hidden)

mpls.0: 7 destinations, 7 routes (7 active, 0 holddown, 0 hidden)
800001 (1 entry, 1 announced)
TSI:
KRT in-kerne1 800001 /36 -> {so-0/0/0.0}
  *L2VPN Preference: 7
    Next hop: via so-0/0/0.0 weight 49087 balance 97%, selected
    Label operation: Pop Offset: 4
    State: <Active Int>
    Local AS: 69
    Age: 7:48
    Task: Common L2 VC
    Announcement bits (1): 0-KRT
    AS path: I

so-0/0/0.0 (1 entry, 1 announced)
TSI:
KRT in-kerne1 so-0/0/0.0 /16 -> {indirect(288)}
  *L2VPN Preference: 7

```

```

Next hop: via so-0/0/1.0, selected
Label operation: Push 800000 Offset: -4
Protocol next hop: 10.255.14.220
Push 800000 Offset: -4
  Indirect next hop: 85142a0 288
State: <Active Int>
Local AS: 69
Age: 7:48
Task: Common L2 VC
Announcement bits (2): 0-KRT 1-Common L2 VC
AS path: I
Communities: target:69:1 Layer2-info: encaps:PPP,
control flags:2, mtu: 0

```

show route protocol ldp

```

user@host> show route protocol ldp

inet.0: 12 destinations, 13 routes (12 active, 0 holddown, 0 hidden)

inet.3: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

192.168.16.1/32    *[LDP/9] 1d 23:03:35, metric 1
                  > via t1-4/0/0.0, Push 100000
192.168.17.1/32    *[LDP/9] 1d 23:03:35, metric 1
                  > via t1-4/0/0.0

private1__inet.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

mpls.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

100064            *[LDP/9] 1d 23:03:35, metric 1
                  > via t1-4/0/0.0, Pop
100064(S=0)        *[LDP/9] 1d 23:03:35, metric 1
                  > via t1-4/0/0.0, Pop
100080            *[LDP/9] 1d 23:03:35, metric 1
                  > via t1-4/0/0.0, Swap 100000

```

show route protocol ldp extensive

```

user@host> show route protocol ldp extensive

192.168.16.1/32 (1 entry, 1 announced)
  State: <FlashAll>
    *LDP    Preference: 9
            Next-hop reference count: 3
            Next hop: via t1-4/0/0.0, selected
            Label operation: Push 100000
            State: <Active Int>
            Local AS: 64500
            Age: 1d 23:03:58      Metric: 1
            Task: LDP
            Announcement bits (2): 0-Resolve tree 1 2-Resolve tree 2
            AS path: I

192.168.17.1/32 (1 entry, 1 announced)
  State: <FlashAll>

```

```

    *LDP      Preference: 9
              Next-hop reference count: 3
              Next hop: via t1-4/0/0.0, selected
              State: <Active Int>
              Local AS: 64500
              Age: 1d 23:03:58      Metric: 1
              Task: LDP
              Announcement bits (2): 0-Resolve tree 1 2-Resolve tree 2
              AS path: I

private1___.inet.0: 2 destinations, 2 routes (2 active, 0 holddown, 0 hidden)

mpls.0: 6 destinations, 6 routes (6 active, 0 holddown, 0 hidden)

100064 (1 entry, 1 announced)
TSI:
KRT in-kernel 100064 /36 -> {t1-4/0/0.0}
    *LDP      Preference: 9
              Next-hop reference count: 2
              Next hop: via t1-4/0/0.0, selected
              State: <Active Int>
              Local AS: 64500
              Age: 1d 23:03:58      Metric: 1
              Task: LDP
              Announcement bits (1): 0-KRT
              AS path: I
              Prefixes bound to route: 192.168.17.1/32

100064(S=0) (1 entry, 1 announced)
TSI:
KRT in-kernel 100064 /40 -> {t1-4/0/0.0}
    *LDP      Preference: 9
              Next-hop reference count: 2
              Next hop: via t1-4/0/0.0, selected
              Label operation: Pop
              State: <Active Int>
              Local AS: 64500
              Age: 1d 23:03:58      Metric: 1
              Task: LDP
              Announcement bits (1): 0-KRT
              AS path: I

100080 (1 entry, 1 announced)
TSI:
KRT in-kernel 100080 /36 -> {t1-4/0/0.0}
    *LDP      Preference: 9
              Next-hop reference count: 2
              Next hop: via t1-4/0/0.0, selected
              Label operation: Swap 100000
              State: <Active Int>
              Local AS: 64500
              Age: 1d 23:03:58      Metric: 1
              Task: LDP
              Announcement bits (1): 0-KRT
              AS path: I
              Prefixes bound to route: 192.168.16.1/32

```

show route protocol ospf (Layer 3 VPN)

```
user@host> show route protocol ospf
```

```

inet.0: 40 destinations, 40 routes (39 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

10.39.1.4/30      *[OSPF/10] 00:05:18, metric 4
                  > via t3-3/2/0.0
10.39.1.8/30      [OSPF/10] 00:05:18, metric 2
                  > via t3-3/2/0.0
10.255.14.171/32  *[OSPF/10] 00:05:18, metric 4
                  > via t3-3/2/0.0
10.255.14.179/32  *[OSPF/10] 00:05:18, metric 2
                  > via t3-3/2/0.0
172.16.233.5/32   *[OSPF/10] 20:25:55, metric 1

VPN-AB.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.39.1.16/30     [OSPF/10] 00:05:43, metric 1
                  > via so-0/2/2.0
10.255.14.173/32  *[OSPF/10] 00:05:43, metric 1
                  > via so-0/2/2.0
172.16.233.5/32   *[OSPF/10] 20:26:20, metric 1

```

show route protocol ospf detail

```

user@host> show route protocol ospf detail

VPN-AB.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

10.39.1.16/30 (2 entries, 0 announced)
    OSPF   Preference: 10
           Nexthop: via so-0/2/2.0, selected
           State: <Int>
           Inactive reason: Route Preference
           Age: 6:25      Metric: 1
           Area: 0.0.0.0
           Task: VPN-AB-OSPF
           AS path: I
           Communities: Route-Type:0.0.0.0:1:0

...

```

show route protocol rip

```

user@host> show route protocol rip

inet.0: 26 destinations, 27 routes (25 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

VPN-AB.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
10.255.14.177/32  *[RIP/100] 20:24:34, metric 2
                  > to 10.39.1.22 via t3-0/2/2.0
172.16.233.9/32   *[RIP/100] 00:03:59, metric 1

```

show route protocol rip detail

```

user@host> show route protocol rip detail

```

```

inet.0: 26 destinations, 27 routes (25 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

VPN-AB.inet.0: 5 destinations, 5 routes (5 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
10.255.14.177/32 (1 entry, 1 announced)
  *RIP    Preference: 100
          Nexthop: 10.39.1.22 via t3-0/2/2.0, selected
          State: <Active Int>
          Age: 20:25:02    Metric: 2
          Task: VPN-AB-RIPv2
          Announcement bits (2): 0-KRT 2-BGP.0.0.0.0+179
          AS path: I
          Route learned from 10.39.1.22 expires in 96 seconds

```

show route protocol ripng table inet6

```

user@host> show route protocol ripng table inet6

inet6.0: 4215 destinations, 4215 routes (4214 active, 0 holddown, 1 hidden)
+ = Active Route, - = Last Active, * = Both

1111::1/128      * [RIPng/100] 02:13:33, metric 2
                  > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
1111::2/128      * [RIPng/100] 02:13:33, metric 2
                  > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
1111::3/128      * [RIPng/100] 02:13:33, metric 2
                  > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
1111::4/128      * [RIPng/100] 02:13:33, metric 2
                  > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
1111::5/128      * [RIPng/100] 02:13:33, metric 2
                  > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0
1111::6/128      * [RIPng/100] 02:13:33, metric 2
                  > to fe80::2a0:a5ff:fe3d:56 via t3-0/2/0.0

```

show route protocol static detail

```

user@host> show route protocol static detail

inet.0: 3 destinations, 3 routes (3 active, 0 holddown, 0 hidden)
10.5.0.0/16 (1 entry, 1 announced)
  *Static Preference: 5
          Next hop type: Router, Next hop index: 324
          Address: 0x9274010
          Next-hop reference count: 27
          Next hop: 192.168.187.126 via fxp0.0, selected
          Session Id: 0x0
          State: <Active NoReadvrt Int Ext>
          Age: 7w3d 21:24:25
          Validation State: unverified
          Task: RT
          Announcement bits (1): 0-KRT
          AS path: I

10.10.0.0/16 (1 entry, 1 announced)
  *Static Preference: 5
          Next hop type: Router, Next hop index: 324
          Address: 0x9274010
          Next-hop reference count: 27

```

```
Next hop: 192.168.187.126 via fxp0.0, selected
Session Id: 0x0
State: <Active NoReadvrt Int Ext>
Age: 7w3d 21:24:25
Validation State: unverified
Task: RT
Announcement bits (1): 0-KRT
AS path: I
```

10.13.10.0/23 (1 entry, 1 announced)

*Static Preference: 5

```
Next hop type: Router, Next hop index: 324
Address: 0x9274010
Next-hop reference count: 27
Next hop: 192.168.187.126 via fxp0.0, selected
Session Id: 0x0
State: <Active NoReadvrt Int Ext>
Age: 7w3d 21:24:25
Validation State: unverified
Task: RT
Announcement bits (1): 0-KRT
AS path: I
```

show security tpm status

Syntax	show security tpm status
Release Information	Command introduced in Junos OS Release 15.1X49-D80. TPM Family and TPM Firmware version details are introduced in Junos OS Release 15.1X49-D120.
Description	Display the current status of the Trusted Platform Module (TPM). You can use this show security tpm status command to check the status of TPM ownership, master binding key, master encryption password, family version, and firmware version.
Options	This command has no options.
Required Privilege Level	security
Related Documentation	<ul style="list-style-type: none"> • Using Trusted Platform Module to Bind Secrets on SRX Series Devices on page 307 • request security tpm master-encryption-password set on page 1974
List of Sample Output	show security tpm status on page 2179

Sample Output

show security tpm status

```
user@host> show security tpm status
TPM Status:
  Enabled: yes
  Owned: yes
  Master Binding Key: not-created
  Master Encryption Key: not-configured
  TPM Family: 1.2
  TPM Firmware version: 4.40
```

Table 104 on page 2179 lists the output fields for the **show security tpm status** command.

Table 104: show security tpm status Output Fields

Field Name	Field Description
Enabled	Specifies whether TPM is enabled or disabled.
Owned	Specifies the TPM ownership. TPM can be owned even if the Master Encryption Key and Master Encryption Key are not created/configured.

Table 104: show security tpm status Output Fields (continued)

Field Name	Field Description
Master Binding Key	Displays the TPM's Master Binding Key status whether it is created or not created. TPM generates cryptographic keys and encrypts them so that those can only be decrypted by the TPM. This process is know as binding. Each TPM has a master binding key, which is also know as storage root key.
Master Encryption Key	Displays Master Encryption Password status whether it is set or not set. The encrypted data and the hash of the configuration is protected by the TPM module using the master encryption password.
TPM Family	Displays Trusted Computing Group's (TCG) TPM family version.
TPM Firmware version	Displays the firmware version loaded in TPM.

show security ssh key-pair-identity

Syntax `show security ssh key-pair-identity
(brief <identity-name> | public identity-name)`

Release Information Command introduced in Junos OS Release 15.1X49-D70.

Description Display the SSH key pair identity information.

- Options**
- **brief *identity-name***—Display the brief information for a specified identity. The *identity-name* variable is optional, if an identity is not specified, the command will list brief information of all identities.
 - **public *identity-name*** —Display the public key for a specified identity.



NOTE: The public and brief options are mutually exclusive

Required Privilege Level view

- Related Documentation**
- [request security ssh key-pair-identity generate on page 1973](#)
 - [clear security ssh key-pair-identity on page 1951](#)

List of Sample Output [show security ssh key-pair-identity brief on page 2181](#)
[show security ssh key-pair-identity brief sample on page 2181](#)

Output Fields When you enter this command, you are provided feedback on the status of your request.

Sample Output

show security ssh key-pair-identity brief

```
user@host> show security ssh key-pair-identity brief

SSH Key Pair Identity Information:
  Name           Create Time      Encrypted
  sample         Dec 28, 17:40    yes
  identity-name  Dec 28, 17:26    yes
```

show security ssh key-pair-identity brief sample

```
user@host> show security ssh key-pair-identity brief sample
```

SSH Key Pair Identity Information:

Name	Create Time	Encrypted
sample	Dec 28, 17:34	yes

show security pki local-certificate

Syntax show security pki local-certificate
<brief | detail>
<certificate-id *certificate-id-name*>
<system-generated>

Release Information Command introduced in Junos OS Release 11.1 for EX Series switches.

Description Display information about the local digital certificates and the corresponding public keys installed in the switch.

Options **none**—(Same as brief) Display information about all local digital certificates and corresponding public keys.

brief | detail—(Optional) Display information about local digital certificates and corresponding public keys for the specified level of output.

certificate-id *certificate-id-name*—(Optional) Display information about only the specified the local digital certificate and corresponding public keys.

system-generated—(Optional) Display information about the automatically generated self-signed certificate.

Required Privilege Level view

Related Documentation [Manually Generating Self-Signed Certificates on Switches \(CLI Procedure\) on page 335](#)

List of Sample Output [show security pki local-certificate on page 2185](#)
[show security pki local-certificate detail on page 2185](#)

Output Fields [Table 105 on page 2183](#) lists the output fields for the **show security pki local-certificate** command. Output fields are listed in the approximate order in which they appear.

Table 105: show security pki local-certificate Output Fields

Field Name	Field Description	Level of Output
Certificate identifier	Name of the digital certificate.	All levels
Certificate version	Revision number of the digital certificate.	detail
Serial number	Unique serial number of the digital certificate.	detail
Issued by	Authority that issued the digital certificate.	none brief

Table 105: show security pki local-certificate Output Fields (continued)

Field Name	Field Description	Level of Output
Issued to	Device that was issued the digital certificate.	none brief
Issuer	Authority that issued the digital certificate, including details of the authority organized using the distinguished name format. Possible subfields are: <ul style="list-style-type: none"> • Common name—Name of the authority. • Organization—Organization of origin. • Organizational unit—Department within an organization. • State—State of origin. • Country—Country of origin. 	detail
Subject	Details of the digital certificate holder organized using the distinguished name format. Possible subfields are: <ul style="list-style-type: none"> • Common name—Name of the authority. • Organization—Organization of origin. • Organizational unit—Department within an organization. • State—State of origin. • Country—Country of origin. 	detail
Alternate subject	Domain name or IP address of the device related to the digital certificate.	detail
Validity	Time period when the digital certificate is valid. Values are: <ul style="list-style-type: none"> • Not before—Start time when the digital certificate becomes valid. • Not after—End time when the digital certificate becomes invalid. 	All levels
Public key algorithm	Encryption algorithm used with the private key, such as rsaEncryption (1024 bits) .	All levels
Public key verification status	Public key verification status: Failed or Passed . The detail output also provides the verification hash.	All levels
Signature algorithm	Encryption algorithm that the CA used to sign the digital certificate, such as sha1WithRSAEncryption .	detail
Fingerprint	Secure Hash Algorithm (SHA1) and Message Digest 5 (MD5) hashes used to identify the digital certificate.	detail
Distribution CRL	Distinguished name information and URL for the certificate revocation list (CRL) server.	detail
Use for key	Use of the public key, such as Certificate signing , CRL signing , Digital signature , or Key encipherment .	detail

Sample Output

show security pki local-certificate

```
user@switch> show security pki local-certificate
Certificate identifier: local-entrust2
Issued to: router2.juniper.net, Issued by: juniper
Validity:
  Not before: 2005 Nov 21st, 23:28:22 GMT
  Not after: 2008 Nov 21st, 23:58:22 GMT
Public key algorithm: rsaEncryption(1024 bits)
Public key verification status: Passed
```

show security pki local-certificate detail

```
user@switch> show security pki local-certificate detail
Certificate identifier: local-entrust3
Certificate version: 3
Serial number: 4355 94f9
Issuer:
  Organization: juniper, Country: us
Subject:
  Organization: juniper, Country: us, Common name: switch1.juniper.net
Alternate subject: switch1.juniper.net
Validity:
  Not before: 2005 Nov 21st, 23:33:58 GMT
  Not after: 2008 Nov 22nd, 00:03:58 GMT
Public key algorithm: rsaEncryption(1024 bits)
Public key verification status: Passed
fb:79:df:d4:a9:03:0f:d3:69:7e:c1:e4:27:35:9c:d9:b1:a2:47:78
d2:6d:f3:e5:f4:68:4f:b3:04:45:88:57:99:82:39:a6:51:9e:5f:42
23:3f:d7:6e:3d:a5:54:a9:b1:2d:6e:90:dd:12:8a:bf:ef:2b:20:50
ba:f0:da:d9:0c:ad:5e:d6:c6:98:3a:ae:3f:90:dd:94:78:c1:ea:2e
7c:f0:2d:d4:79:d4:cd:f0:52:df:5e:72:f2:e7:ae:66:f7:61:f4:bc
72:57:3e:6c:6d:d3:24:58:8b:f4:ef:da:2a:6a:fa:eb:98:f8:34:84
79:54:da:4f:d3:6f:52:1f
Signature algorithm: sha1WithRSAEncryption
Fingerprint:
  61:3a:d0:b4:7a:16:9b:39:ba:81:3f:9d:ab:34:e5:c8:be:3b:a1:6d (sha1)
  60:a0:ff:58:05:4a:65:73:9d:74:3a:e1:83:6f:1b:c8 (md5)
Distribution CRL:
  C=us, O=juniper, CN=CRL1
  http://CA-1/CRL/juniper_us_crlfile.crl
Use for key: Digital signature
```

[show services unified-access-control authentication-table](#)

Syntax	<code>show services unified-access-control authentication-table</code>
Release Information	Command introduced in Junos OS Release 9.4. Options updated in Junos OS Release 12.1.
Description	<p>Display a summary of the authentication table entries configured from the IC Series UAC Appliance. Authentication tables store mappings between traffic sessions and Unified Access Control (UAC) roles. The IC Series appliance uses the roles specified in the mappings to help determine which UAC policies to apply to a session.</p> <p>Use this command when you have configured the SRX Series device to act as a Junos OS Enforcer in a UAC deployment. When deployed as a Junos OS Enforcer, the SRX Series device enforces the policies that are defined on the UAC's IC Series appliance.</p> <p>You can also use this command to display the content of the authentication table in a user role firewall implementation. The table, pushed from a supporting UAC device, provides the user roles associated with incoming traffic.</p>
Options	<ul style="list-style-type: none">• detail—Display a detailed view of all authentication table entries.• extended—Display a view of all authentication table entries with the user roles listed.• identifier <i>id</i>—Display all authentication table entries with the specified identifier number.• ip <i>source-ip-address</i>—Display any authentication table entry for the specified IP address.• role <i>role-name</i>—Display all authentication table entries for the specified role name.• user <i>username</i>—Display all authentication table entries for the specified user.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• <i>Firewall User Authentication Overview</i>
List of Sample Output	<p>show services unified-access-control authentication-table on page 2187 show services unified-access-control authentication-table detail on page 2187 show services unified-access-control authentication-table extended on page 2187 show services unified-access-control authentication-table identifier id on page 2187 show services unified-access-control authentication-table ip on page 2187 show services unified-access-control authentication-table role on page 2188 show services unified-access-control authentication-table user username on page 2188</p>

Sample Output

show services unified-access-control authentication-table

```
user@host>show services unified-access-control authentication-table
```

Id	Source IP	Username	Age	Role identifier
1	198.51.100.22	user1	0	0000000001.000005.0

Total: 1

show services unified-access-control authentication-table detail

```
user@host>show services unified-access-control authentication-table detail
```

Identifier: 1
 Source IP: 198.51.100.22
 Username: john
 Age: 0
 Role identifier Role name
 0000000001.000005.0 Users
 1113249951.100616.0 PersonalFirewall
 1183670148.427197.0 UAC
 Total: 1

show services unified-access-control authentication-table extended

```
user@host>show services unified-access-control authentication-table extended
```

Id	Source IP	Username	Age	Role name
3	10.214.161.195	johna	60	Users, PersonalFirewall
6	10.214.161.183	mayb	60	role-1

Total: 2

show services unified-access-control authentication-table identifier id

```
user@host>show services unified-access-control authentication-table identifier 1
```

Identifier: 1
 Source IP: 10.214.161.195
 Username: johna
 Age: 0
 Role identifier Role name
 0000000001.000005.0 Users
 1113249951.100616.0 PersonalFirewall
 1183670148.427197.0 UAC
 Total: 1

show services unified-access-control authentication-table ip

```
user@host>show services unified-access-control authentication-table ip 10.214.161.183
```

Id	Source IP	Username	Age	Role identifier
8	10.214.161.183	mayb	0	1420298444.225667.0

Total: 1

show services unified-access-control authentication-table role

```
user@host>show services unified-access-control authentication-table role role-1
```

Id	Source IP	Username	Age	Role identifier
6	10.214.161.183	maybe	60	1420298444.225667.0
Total: 1				

show services unified-access-control authentication-table user username

```
user@host>show services unified-access-control authentication-table user prasanta
```

Id	Source IP	Username	Age	Role identifier
7	10.214.161.195	paul1	0	0000000001.000005.0
Total: 1				

show services unified-access-control policies

Syntax	show services unified-access-control policies
Release Information	Command introduced in Junos OS Release 9.4.
Description	<p>Display a summary of resource access policies configured from the IC Series UAC Appliance.</p> <p>Use this command when you have configured the SRX Series device to act as a Junos OS Enforcer in a Unified Access Control (UAC) deployment. When deployed as a Junos OS Enforcer, the SRX Series device enforces the policies that are defined on the UAC's IC Series appliance.</p>
Options	<ul style="list-style-type: none"> detail—Display a detailed view of all policies. identifier <i>id</i>—Display information about a specific policy by identification number.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> <i>Firewall User Authentication Overview</i>
List of Sample Output	show services unified-access-control policies on page 2189 show services unified-access-control policies detail on page 2189 show services unified-access-control policies identifier 1 on page 2190

Sample Output

show services unified-access-control policies

```
user@host> services unified-access-control policies
```

Id	Resource	Action	Apply	Role identifier
1	10.100.15.0/24:*	allow	selected	1113249951.100616.0
2	10.100.17.0/24:*	deny	all	

Sample Output

show services unified-access-control policies detail

```
user@host> services unified-access-control policies detail
```

```
Identifier: 1
Resource: 10.100.15.0/24:*
Resource: 10.100.16.23-10.100.16.60:*
Action: allow
Apply: selected
Role identifier      Role name
1113249951.100616.0 Personal Firewall
```

```
1112927873.881659.0 Antivirus
1183670148.427197.0 UAC
Identifier: 2
Resource: 10.100.17.0/24:*
Resource: 10.100.16.23-10.100.16.60:*
Resource: 10.100.18.0/24:*
Action: deny
Apply: all
```

Sample Output

show services unified-access-control policies identifier 1

```
user@host> show services unified-access-control policies identifier 1
```

```
Identifier: 1
Resource: 10.100.15.0/24:*
Resource: 10.100.16.23-10.100.16.60:*
Action: allow
Apply: selected
Role identifier      Role name
1113249951.100616.0 Personal Firewall
1112927873.881659.0 Antivirus
1183670148.427197.0 UAC
```

show services unified-access-control status

Syntax `show services unified-access-control status`

Release Information Command introduced in Junos OS Release 9.4.

Description Display the status of the connection between the SRX Series device and the IC Series UAC Appliance as well as statistics to help debug connections to the IC Series appliance.

Use this command when you have configured the SRX Series device to act as a Junos OS Enforcer in a Unified Access Control (UAC) deployment. When deployed as a Junos OS Enforcer, the SRX Series device enforces the policies that are defined on the UAC's IC Series appliance.

Required Privilege Level view

Related Documentation

- *Firewall User Authentication Overview*

List of Sample Output [show services unified-access-control status on page 2191](#)

Sample Output

`show services unified-access-control status`

```
user@host> show services unified-access-control status
```

Host	Address	Port	Interface	State
dev106vm26	10.64.11.106	11123	ge-0/0/0.0	connected
dev107vm26	10.64.11.106	11123	ge-0/0/0.0	closed

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
List of Sample Output	show snmp statistics on page 2197 show snmp statistics subagents on page 2197
Output Fields	Table 106 on page 2193 describes the output fields for the show snmp statistics command. Output fields are listed in the approximate order in which they appear.

Table 106: *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 106: *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 106: *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 106: *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 107 on page 2196 describes the output fields for the **show snmp statistics subagents** command. Output fields are listed in the approximate order in which they appear.

Table 107: *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/apsd-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 ssl-certificates

Syntax	<code>show ssl certificates</code>
Release Information	Command introduced in Junos OS Release 17.2R1 for EX Series switches.
Description	Display information about the Secure Sockets Layer (SSL) certificates installed on the switch. When you configure PEAP as the authentication protocol for MAC RADIUS authentication, you must load the server-side Secure Sockets Layer (SSL) certificate on the switch. PEAP requires an SSL certificate to create a secure TLS tunnel to protect user authentication, and uses server-side public key certificates to authenticate the server. It then creates an encrypted TLS tunnel between the client and the authentication server. The key for this encryption are transported using the server's public key. The ensuing exchange of authentication information inside the tunnel to authenticate the client is then encrypted and user credentials are safe from eavesdropping.
Options	<p>none—Display information about all SSL certificates.</p> <p>detail—Display information about SSL certificates for the specified level of output.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> Configuring PEAP for MAC RADIUS Authentication on page 217
List of Sample Output	<p>show ssl-certificates on page 2201</p> <p>show ssl-certificates detail on page 2201</p>
Output Fields	Table 105 on page 2183 lists the output fields for the show ssl-certificates command. Output fields are listed in the approximate order in which they appear.

Table 108: show ssl-certificates Output Fields

Field Name	Field Description	Level of Output
Issuer	<p>Authority that issued the digital certificate, including details of the authority organized using the distinguished name format. Possible subfields are:</p> <ul style="list-style-type: none"> C—Country of origin. ST—State or province name. L—Locality. O—Organization of origin. OU—Organizational unit. CN—Common name of the authority. 	All levels
Valid from	Start time when the digital certificate becomes valid.	detail

Table 108: show ssl-certificates Output Fields (continued)

Field Name	Field Description	Level of Output
Valid from	End time when the digital certificate becomes invalid.	detail
Serial number	Unique serial number of the digital certificate.	detail
Subject	<p>Details of the digital certificate holder organized using the distinguished name format. Possible subfields are:</p> <ul style="list-style-type: none"> • C—Country of origin. • ST—State or province name. • L—Locality. • O—Organization of origin. • OU—Organizational unit. • CN—Common name of the authority. 	detail

Sample Output

show ssl-certificates

```
user@root> show ssl-certificates
```

```
  Issuer:
/C=IN/ST=KA/L=B1r/O=JNPR/OU=CP/CN=User-Radius/emailAddress=user@juniper.net
```

show ssl-certificates detail

```
user@root> show ssl-certificates detail
```

```
  Issuer:
/C=IN/ST=KA/L=B1r/O=JNPR/OU=CP/CN=User-Radius/emailAddress=user@juniper.net
  Valid From:    May 30 17:41:04 2016 GMT
  Valid Till:    May 29 17:41:04 2026 GMT
  Serial Number: 0
  Subject:
/C=IN/ST=KA/L=B1r/O=JNPR/OU=CP/CN=User-Radius/emailAddress=user@juniper.net
```

show subscribers

Syntax

```
show subscribers
<detail | extensive | terse>
<aci-interface-set-name aci-interface-set-name>
<address address>
<agent-circuit-identifier agent-circuit-identifier>
<agent-remote-identifier agent-remote-identifier>
<aggregation-interface-set-name interface-set-name>
<client-type client-type>
<count>
<id session-id <accounting-statistics>>
<interface interface <accounting-statistics>>
<logical-system logical-system>
<mac-address mac-address>
<physical-interface physical-interface-name>
<profile-name profile-name>
<routing-instance routing-instance>
<stacked-vlan-id stacked-vlan-id>
<subscriber-state subscriber-state>
<user-name user-name>
<vci vci-identifier>
<vpi vpi-identifier>
<vlan-id vlan-id>
```

Release Information

Command introduced in Junos OS Release 9.3.

Command introduced in Junos OS Release 9.3 for EX Series switches.

client-type, **mac-address**, **subscriber-state**, and **extensive** options introduced in Junos OS Release 10.2.

count option usage with other options introduced in Junos OS Release 10.2.

Command introduced in Junos OS Release 11.1 for the QFX Series.

Options **aci-interface-set-name** and **agent-circuit-identifier** introduced in Junos OS Release 12.2.

The **physical-interface** and **user-name** options introduced in Junos OS Release 12.3.

Options **vci** and **vpi** introduced in Junos OS Release 12.3R3 and supported in later 12.3Rx releases.

Options **vci** and **vpi** supported in Junos OS Release 13.2 and later releases. (Not supported in Junos OS Release 13.1.)

Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

Enhanced subscriber management supported in Junos OS Release 15.1R3 on MX Series routers.

accounting-statistics option added in Junos OS Release 15.1R3 and 17.4R1 on MX Series routers.

aggregation-interface-set-name option added in Junos OS Release 18.4R1 on MX Series routers.

Description Display information for active subscribers.

Options **detail | extensive | terse**—(Optional) Display the specified level of output.

aci-interface-set-name—(Optional) Display all dynamic subscriber sessions that use the specified agent circuit identifier (ACI) interface set. Use the ACI interface set name generated by the router, such as aci-1003-ge-1/0/0.4001, and not the actual ACI value found in the DHCP or PPPoE control packets.

address—(Optional) Display subscribers whose IP address matches the specified address. You must specify the IPv4 or IPv6 address prefix without a netmask (for example, 192.0.2.0). If you specify the IP address as a prefix with a netmask (for example, 192.0.2.0/32), the router displays a message that the IP address is invalid, and rejects the command.

agent-circuit-identifier—(Optional) Display all dynamic subscriber sessions whose ACI value matches the specified string. You can specify either the complete ACI string or a substring. To specify a substring, you must enter characters that form the beginning of the string, followed by an asterisk (*) as a wildcard to substitute for the remainder of the string. The wildcard can be used only at the end of the specified substring; for example:

```
user@host1> show subscribers agent-circuit-identifier substring*
```

Junos OS Release	Substring Support
Junos OS Release 13.3R1	You can specify a substring without a wildcard.
Starting in Junos OS Release 14.1R1	You must specify the complete ACI string; you cannot specify a wildcard.
Starting in Junos OS Release 15.1R7, 16.1R7, 16.2R3, 17.1R3, 17.2R3, 17.3R3, 17.4R2, 18.1R2, 18.2R1	You can specify a substring, but you must include the wildcard character at the end of the substring.

agent-remote-identifier—(Optional) Display all dynamic subscriber sessions whose ARI value matches the specified string. You must specify the complete ACI string; you cannot specify a wildcard.

aggregation-interface-set-name *interface-set-name*—(Optional) Display summary information for the specified aggregation node interface set, including interface, VLAN ID, username and LS:RI.

client-type—(Optional) Display subscribers whose client type matches one of the following client types:

- **dhcp**—DHCP clients only.
- **dotlx**—DotLx clients only.
- **essm**—ESSM clients only.
- **fwauth**—FwAuth (authenticated across a firewall) clients only.
- **l2tp**—L2TP clients only.
- **mlppp**—MLPPP clients only.

- **ppp**—PPP clients only.
- **pppoe**—PPPoE clients only.
- **static**—Static clients only.
- **vlan**—VLAN clients only.
- **vlan-oob**—VLAN out-of-band (ANCP-triggered) clients only.
- **vpls-pw**—VPLS pseudowire clients only.
- **xauth**—Xauth clients only.

count—(Optional) Display the count of total subscribers and active subscribers for any specified option. You can use the **count** option alone or with the **address**, **client-type**, **interface**, **logical-system**, **mac-address**, **profile-name**, **routing-instance**, **stacked-vlan-id**, **subscriber-state**, or **vlan-id** options.

id session-id—(Optional) Display a specific subscriber session whose session ID matches the specified subscriber ID. You can display subscriber IDs by using the **show subscribers extensive** or the **show subscribers interface extensive** commands.

id session-id accounting-statistics—(Optional) Display accurate subscriber accounting statistics for a subscriber session with the specified ID. Requires the **actual-transmit-statistics** statement to be configured in the dynamic profile for the dynamic logical interface. If the statement is not configured, a value of 0 is displayed for accounting statistics.

interface—(Optional) Display subscribers whose interface matches the specified interface.

interface accounting-statistics—(Optional) Display subscriber accounting statistics for the specified interface. Requires the **actual-transmit-statistics** statement to be configured in the dynamic profile for the dynamic logical interface.

logical-system—(Optional) Display subscribers whose logical system matches the specified logical system.

mac-address—(Optional) Display subscribers whose MAC address matches the specified MAC address.

physical-interface-name—(M120, M320, and MX Series routers only) (Optional) Display subscribers whose physical interface matches the specified physical interface.

profile-name—(Optional) Display subscribers whose dynamic profile matches the specified profile name.

routing-instance—(Optional) Display subscribers whose routing instance matches the specified routing instance.

stacked-vlan-id—(Optional) Display subscribers whose stacked VLAN ID matches the specified stacked VLAN ID.

subscriber-state—(Optional) Display subscribers whose subscriber state matches the specified subscriber state (ACTIVE, CONFIGURED, INIT, TERMINATED, or TERMINATING).

user-name—(M120, M320, and MX Series routers only) (Optional) Display subscribers whose username matches the specified subscriber name.

vci-identifier—(MX Series routers with MPCs and ATM MICs with SFP only) (Optional) Display active ATM subscribers whose ATM virtual circuit identifier (VCI) matches the specified VCI identifier. The range of values is 0 through 255.

vpi-identifier—(MX Series routers with MPCs and ATM MICs with SFP only) (Optional) Display active ATM subscribers whose ATM virtual path identifier (VPI) matches the specified VPI identifier. The range of values is 0 through 65,535.

vlan-id—(Optional) Display subscribers whose VLAN ID matches the specified VLAN ID, regardless of whether the subscriber uses a single-tagged or double-tagged VLAN. For subscribers using a double-tagged VLAN, this option displays subscribers where the inner VLAN tag matches the specified VLAN ID. To display only subscribers where the specified value matches only double-tagged VLANs, use the **stacked-vlan-id** option to match the outer VLAN tag.



NOTE: Because of display limitations, logical system and routing instance output values are truncated when necessary.

Required Privilege Level

view

Related Documentation

- [show subscribers summary](#)
- [Verifying and Managing Agent Circuit Identifier-Based Dynamic VLAN Configuration](#)
- [Verifying and Managing Configurations for Dynamic VLANs Based on Access-Line Identifiers](#)
- [Verifying and Managing Junos OS Enhanced Subscriber Management](#)

List of Sample Output

[show subscribers \(IPv4\) on page 2213](#)
[show subscribers \(IPv6\) on page 2213](#)
[show subscribers \(IPv4 and IPv6 Dual Stack\) on page 2213](#)
[show subscribers \(Single Session DHCP Dual Stack\) on page 2214](#)
[show subscribers \(Single Session DHCP Dual Stack detail\) on page 2214](#)
[show subscribers \(LNS on MX Series Routers\) on page 2214](#)
[show subscribers \(L2TP Switched Tunnels\) on page 2214](#)
[show subscribers aggregation-interface-set-name on page 2215](#)
[show subscribers client-type dhcp detail on page 2215](#)
[show subscribers client-type dhcp detail \(DHCPv6\) on page 2215](#)
[show subscribers client-type dhcp extensive on page 2216](#)

[show subscribers client-type vlan-oob detail on page 2216](#)
[show subscribers count on page 2217](#)
[show subscribers address detail \(IPv6\) on page 2217](#)
[show subscribers detail \(IPv4\) on page 2217](#)
[show subscribers detail \(IPv6\) on page 2218](#)
[show subscribers detail \(pseudowire Interface for GRE Tunnel\) on page 2218](#)
[show subscribers detail \(IPv6 Static Demux Interface\) on page 2219](#)
[show subscribers detail \(L2TP LNS Subscribers on MX Series Routers\) on page 2219](#)
[show subscribers detail \(L2TP Switched Tunnels\) on page 2219](#)
[show subscribers detail \(Tunneled Subscriber\) on page 2220](#)
[show subscribers detail \(IPv4 and IPv6 Dual Stack\) on page 2220](#)
[show subscribers detail \(ACI Interface Set Session\) on page 2221](#)
[show subscribers detail \(PPPoE Subscriber Session with ACI Interface Set\) on page 2221](#)
[show subscribers extensive on page 2221](#)
[show subscribers extensive \(Aggregation Node Interface Set and DSL Forum Attributes\) on page 2222](#)
[show subscribers extensive \(Passive Optical Network Circuit Interface Set\) on page 2223](#)
[show subscribers extensive \(DNS Addresses from Access Profile or Global Configuration\) on page 2224](#)
[show subscribers extensive \(DNS Addresses from RADIUS\) on page 2224](#)
[show subscribers extensive \(IPv4 DNS Addresses from RADIUS, IPv6 from Access Profile or Global Configuration\) on page 2225](#)
[show subscribers extensive \(RPF Check Fail Filter\) on page 2225](#)
[show subscribers extensive \(L2TP LNS Subscribers on MX Series Routers\) on page 2225](#)
[show subscribers extensive \(IPv4 and IPv6 Dual Stack\) on page 2226](#)
[show subscribers extensive \(ADF Rules \) on page 2227](#)
[show subscribers extensive \(Effective Shaping-Rate\) on page 2227](#)
[show subscribers extensive \(PPPoE Subscriber Access Line Rates on page 2227](#)
[show subscribers extensive \(Subscriber Session Using PCEF Profile\) on page 2228](#)
[show subscribers aci-interface-set-name detail \(Subscriber Sessions Using Specified ACI Interface Set\) on page 2230](#)
[show subscribers agent-circuit-identifier detail \(Subscriber Sessions Using Specified ACI Substring\) on page 2230](#)
[show subscribers id accounting-statistics on page 2231](#)
[show subscribers interface accounting-statistics on page 2231](#)
[show subscribers interface extensive on page 2232](#)
[show subscribers logical-system terse on page 2233](#)
[show subscribers physical-interface count on page 2233](#)
[show subscribers routing-instance inst1 count on page 2233](#)
[show subscribers stacked-vlan-id detail on page 2233](#)
[show subscribers stacked-vlan-id vlan-id detail \(Combined Output\) on page 2233](#)
[show subscribers stacked-vlan-id vlan-id interface detail \(Combined Output for a Specific Interface\) on page 2233](#)
[show subscribers user-name detail on page 2234](#)
[show subscribers vlan-id on page 2234](#)
[show subscribers vlan-id detail on page 2234](#)
[show subscribers vpi vci extensive \(PPPoE-over-ATM Subscriber Session\) on page 2234](#)
[show subscribers address detail \(Enhanced Subscriber Management\) on page 2235](#)

Output Fields Table 109 on page 2207 lists the output fields for the **show subscribers** command. Output fields are listed in the approximate order in which they appear.

Table 109: show subscribers Output Fields

Field Name	Field Description
Interface	Interface associated with the subscriber. The router or switch displays subscribers whose interface matches or begins with the specified interface. The * character indicates a continuation of addresses for the same session.
IP Address/VLAN ID	Subscriber IP address or VLAN ID associated with the subscriber in the form <i>tpid.vlan-id</i> No IP address or VLAN ID is assigned to an L2TP tunnel-switched session. For these subscriber sessions the value is Tunnel-switched .
User Name	Name of subscriber.
LS:RI	Logical system and routing instance associated with the subscriber.
Type	Subscriber client type (DHCP, GRE, L2TP, PPP, PPPoE, STATIC-INTERFACE, VLAN).
IP Address	Subscriber IPv4 address.
IP Netmask	Subscriber IP netmask. (MX Series) This field displays 255.255.255.255 by default. For tunneled or terminated PPP subscribers only, this field displays the actual value of Framed-IP-Netmask when the SDB_FRAMED_PROTOCOL attribute in the session database is equal to AUTHD_FRAMED_PROTOCOL_PPP. This occurs in the use case where the LNS generates access-internal routes when it receives Framed-IP-Netmask from RADIUS during authorization. When it receives Framed-Pool from RADIUS, the pool mask is ignored and the default /32 mask is used.
Primary DNS Address	IP address of primary DNS server. This field is displayed with the extensive option only when the address is provided by RADIUS.
Secondary DNS Address	IP address of secondary DNS server. This field is displayed with the extensive option only when the address is provided by RADIUS.
IPv6 Primary DNS Address	IPv6 address of primary DNS server. This field is displayed with the extensive option only when the address is provided by RADIUS.
IPv6 Secondary DNS Address	IPv6 address of secondary DNS server. This field is displayed with the extensive option only when the address is provided by RADIUS.
Domain name server inet	IP addresses for the DNS server, displayed in order of configuration. This field is displayed with the extensive option only when the addresses are derived from the access profile or the global access configuration.

Table 109: show subscribers Output Fields (continued)

Field Name	Field Description
Domain name server inet6	IPv6 addresses for the DNS server, displayed in order of configuration. This field is displayed with the extensive option only when the addresses are derived from the access profile or the global access configuration.
Primary WINS Address	IP address of primary WINS server.
Secondary WINS Address	IP address of secondary WINS server.
IPv6 Address	Subscriber IPv6 address, or multiple addresses.
IPv6 Prefix	Subscriber IPv6 prefix. If you are using DHCPv6 prefix delegation, this is the delegated prefix.
IPv6 User Prefix	IPv6 prefix obtained through NDRA.
IPv6 Address Pool	Subscriber IPv6 address pool. The IPv6 address pool is used to allocate IPv6 prefixes to the DHCPv6 clients.
IPv6 Network Prefix Length	Length of the network portion of the IPv6 address.
IPv6 Prefix Length	Length of the subscriber IPv6 prefix.
Logical System	Logical system associated with the subscriber.
Routing Instance	Routing instance associated with the subscriber.
Interface	(Enhanced subscriber management for MX Series routers) Name of the enhanced subscriber management logical interface, in the form demux0.nnnn (for example, demux0.3221225472), to which access-internal and framed subscriber routes are mapped.
Interface Type	Whether the subscriber interface is Static or Dynamic .

Table 109: show subscribers Output Fields (continued)

Field Name	Field Description
Interface Set	<p>Internally generated name of the dynamic ACI or ALI interface set used by the subscriber session. The prefix of the name indicates the string received in DHCP or PPPoE control packets on which the interface set is based. For ALI interface sets, the prefix indicates that the value is configured as a trusted option to identify the subscriber line.</p> <p>The name of the interface set uses one of the following prefixes:</p> <ul style="list-style-type: none"> • aci—ACI; for example, aci-1033-demux0.3221225524. This is the only prefix allowed for ACI interface sets. • ari—ARI; for example, ari-1033-demux0.3221225524. • aci+ari—Both the ACI and ARI; for example, aci+ari-1033-demux0.3221225524. • noids—Neither the ACI nor the ARI were received; for example, noids-1033-demux0.3221225524. <p>NOTE: ACI interface sets are configured with the agent-circuit-identifier autoconfiguration stanza. ALI interface sets are configured with the line-identity autoconfiguration stanza.</p> <p>Besides dynamic ACI and ALI interface sets, this field can be an interface set based on a substring of the ARI string. This occurs when the dynamic profile includes the predefined variable \$junos-pon-id-interface-set-name, and the profile is applied for a passive optical network (PON). The ARI string is inserted by the optical line terminal (OLT). The final substring in the string, unique for the PON, identifies individual subscriber circuits, and is used as the name of the interface set.</p>
Interface Set Type	Interface type of the ACI interface set: Dynamic . This is the only ACI interface set type currently supported.
Interface Set Session ID	Identifier of the dynamic ACI interface set entry in the session database.
Underlying Interface	Name of the underlying interface for the subscriber session.
Dynamic Profile Name	Dynamic profile used for the subscriber.
Dynamic Profile Version	Version number of the dynamic profile used for the subscriber.
MAC Address	MAC address associated with the subscriber.
State	Current state of the subscriber session (Init , Configured , Active , Terminating , Tunneled).
L2TP State	Current state of the L2TP session, Tunneled or Tunnel-switched . When the value is Tunnel-switched , two entries are displayed for the subscriber; the first entry is at the LNS interface on the LTS and the second entry is at the LAC interface on the LTS.
Tunnel switch Profile Name	Name of the L2TP tunnel switch profile that initiates tunnel switching.
Local IP Address	IP address of the local gateway (LAC).
Remote IP Address	IP address of the remote peer (LNS).
VLAN Id	VLAN ID associated with the subscriber in the form <i>tpid.vlan-id</i> .

Table 109: show subscribers Output Fields (continued)

Field Name	Field Description
Stacked VLAN Id	Stacked VLAN ID associated with the subscriber in the form <i>tpid.vlan-id</i> .
RADIUS Accounting ID	RADIUS accounting ID associated with the subscriber.
Agent Circuit ID	<p>For the dhcp client type, option 82 agent circuit ID associated with the subscriber. The ID is displayed as an ASCII string unless the value has nonprintable characters, in which case it is displayed in hexadecimal format.</p> <p>For the vlan-oob client type, the agent circuit ID or access-loop circuit identifier that identifies the subscriber line based on the subscriber-facing DSLAM interface on which the subscriber request originates.</p>
Agent Remote ID	<p>For the dhcp client type, option 82 agent remote ID associated with the subscriber. The ID is displayed as an ASCII string unless the value has nonprintable characters, in which case it is displayed in hexadecimal format.</p> <p>For the vlan-oob client type, the agent remote ID or access-loop remote identifier that identifies the subscriber line based on the NAS-facing DSLAM interface on which the subscriber request originates.</p>
Aggregation Interface-set Name	<p>Value of the \$junos-aggregation-interface-set-name predefined variable; one of the following:</p> <ul style="list-style-type: none"> When the hierarchical-access-network-detection option is configured for the access lines and the value of the Access-Aggregation-Circuit-ID-ASCII attribute (TLV 0x0003) received either in the ANCP Port Up message or PPPoE PADR IA tags begins with a # character, then the variable takes the value of the remainder of the string after the # character. When the hierarchical-access-network-detection option is not configured, or if the string does not begin with the # character, then the variable takes the value specified with the predefined-variable-defaults statement.
Accounting Statistics	Actual transmitted subscriber accounting statistics by session ID or interface. Service accounting statistics are not included. These statistics do not include overhead bytes or dropped packets; they are the accurate statistics used by RADIUS. The statistics are counted when the actual-transmit-statistics statement is included in the dynamic profile.
DHCP Relay IP Address	IP address used by the DHCP relay agent.
ATM VPI	(MX Series routers with MPCs and ATM MICs with SFP only) ATM virtual path identifier (VPI) on the subscriber's physical interface.
ATM VCI	(MX Series routers with MPCs and ATM MICs with SFP only) ATM virtual circuit identifier (VCI) for each VPI configured on the subscriber interface.
Login Time	Date and time at which the subscriber logged in.
DHCPV6 Options	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for DHCPv6 options.
Server DHCP Options	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for DHCP options.
Server DHCPV6 Options	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for DHCPv6 options.

Table 109: show subscribers Output Fields (continued)

Field Name	Field Description
DHCPV6 Header	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for DHCPv6 options.
Effective shaping-rate	Actual downstream traffic shaping rate for the subscriber, in kilobits per second.
IPv4 Input Service Set	Input service set in access dynamic profile.
IPv4 Output Service Set	Output service set in access dynamic profile.
PCEF Profile	PCEF profile in access dynamic profile.
PCEF Rule/Rulebase	PCC rule or rulebase used in dynamic profile.
Dynamic configuration	Values for variables that are passed into the dynamic profile from RADIUS.
Service activation time	Time at which the first family in this service became active.
IPv4 rpf-check Fail Filter Name	Name of the filter applied by the dynamic profile to IPv4 packets that fail the RPF check.
IPv6 rpf-check Fail Filter Name	Name of the filter applied by the dynamic profile to IPv6 packets that fail the RPF check.
DHCP Options	len = number of hex values in the message. The hex values specify the type, length, value (TLV) for DHCP options, as defined in RFC 2132.
Session ID	ID number for a subscriber session.
Underlying Session ID	For DHCPv6 subscribers on a PPPoE network, displays the session ID of the underlying PPPoE interface.
Service Sessions	Number of service sessions (that is, a service activated using RADIUS CoA) associated with the subscribers.
Service Session ID	ID number for a subscriber service session.
Service Session Name	Service session profile name.
Session Timeout (seconds)	Number of seconds of access provided to the subscriber before the session is automatically terminated.
Idle Timeout (seconds)	Number of seconds subscriber can be idle before the session is automatically terminated.
IPv6 Delegated Address Pool	Name of the pool used for DHCPv6 prefix delegation.
IPv6 Delegated Network Prefix Length	Length of the prefix configured for the IPv6 delegated address pool.

Table 109: show subscribers Output Fields (continued)

Field Name	Field Description
IPv6 Interface Address	Address assigned by the Framed-Ipv6-Prefix AAA attribute. This field is displayed only when the predefined variable \$junos-ipv6-address is used in the dynamic profile.
IPv6 Framed Interface Id	Interface ID assigned by the Framed-Interface-Id AAA attribute.
ADF IPv4 Input Filter Name	Name assigned to the Ascend-Data-Filter (ADF) interface IPv4 input filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
ADF IPv4 Output Filter Name	Name assigned to the Ascend-Data-Filter (ADF) interface IPv4 output filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
ADF IPv6 Input Filter Name	Name assigned to the Ascend-Data-Filter (ADF) interface IPv6 input filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
ADF IPv6 Output Filter Name	Name assigned to the Ascend-Data-Filter (ADF) interface IPv6 output filter (client or service session). The filter name is followed by the rules (in hexadecimal format) associated with the ADF filter and the decoded rule in Junos OS filter style.
IPv4 Input Filter Name	Name assigned to the IPv4 input filter (client or service session).
IPv4 Output Filter Name	Name assigned to the IPv4 output filter (client or service session).
IPv6 Input Filter Name	Name assigned to the IPv6 input filter (client or service session).
IPv6 Output Filter Name	Name assigned to the IPv6 output filter (client or service session).
IFL Input Filter Name	Name assigned to the logical interface input filter (client or service session).
IFL Output Filter Name	Name assigned to the logical interface output filter (client or service session).
DSL type	PPPoE subscriber's access line type reported by the PPPoE intermediate agent in a PADI or PADO packet in the Vendor-Specific-Tags TLV in subattribute DSL-Type (0x0091). The DSL type is one of the following types: ADSL , ADSL2 , ADSL2+ , OTHER , SDSL , VDSL , or VDSL2 .
Frame/Cell Mode	<p>Mode type of the PPPoE subscriber's access line determined by the PPPoE daemon based on the received subattribute DSL-Type (0x0091):</p> <ul style="list-style-type: none"> • Cell—When the DSL line type is one of the following: ADSL, ADSL2, or ADSL2+. • Frame—When the DSL line type is one of the following: OTHER, SDSL, VDSL, or VDSL2. <p>The value is stored in the subscriber session database.</p>
Overhead accounting bytes	Number of bytes added to or subtracted from the actual downstream cell or frame overhead to account for the technology overhead of the DSL line type. The value is determined by the PPPoE daemon based on the received subattribute DSL-Type (0x0091). The value is stored in the subscriber session database.

Table 109: show subscribers Output Fields (continued)

Field Name	Field Description
Actual upstream data rate	Unadjusted upstream data rate for the PPPoE subscriber's access line reported by the PPPoE intermediate agent in a PADI or PADO packet in the Vendor-Specific-Tags TLV in subattribute Actual-Net-Data-Rate-Upstream (0x0081).
Actual downstream data rate	Unadjusted downstream data rate for the PPPoE subscriber's access line reported by the PPPoE intermediate agent in a PADI or PADO packet in the Vendor-Specific-Tags TLV in subattribute Actual-Net-Data-Rate-Downstream (0x0082).
Adjusted downstream data rate	Adjusted downstream data rate for the PPPoE subscriber's access line, calculated by the PPPoE daemon and stored in the subscriber session database.
Adjusted upstream data rate	Adjusted upstream data rate for the PPPoE subscriber's access line, calculated by the PPPoE daemon and stored in the subscriber session database.

Sample Output

show subscribers (IPv4)

```
user@host> show subscribers
```

Interface	IP Address/VLAN ID	User Name	LS:RI
ge-1/3/0.1073741824	10		default:default
demux0.1073741824	203.0.113.10	WHOLESALE-CLIENT	default:default
demux0.1073741825	203.0.113.3	RETAILER1-CLIENT	test1:retailer1
demux0.1073741826	203.0.113.3	RETAILER2-CLIENT	test1:retailer2

show subscribers (IPv6)

```
user@host> show subscribers
```

Interface	IP Address/VLAN ID	User Name	LS:RI
ge-1/0/0.0	2001:db8:c0:0:0:0/74	WHOLESALE-CLIENT	default:default
*	2001:db8:1/128	subscriber-25	default:default

show subscribers (IPv4 and IPv6 Dual Stack)

```
user@host> show subscribers
```

Interface	IP Address/VLAN ID	User Name
LS:RI		
demux0.1073741834	0x8100.1002 0x8100.1	
default:default		
demux0.1073741835	0x8100.1001 0x8100.1	
default:default		
pp0.1073741836	203.0.113.13	dualstackuser1@example1.com
default:ASP-1		
*	2001:db8:1::/48	
*	2001:db8:1:1::/64	
pp0.1073741837	203.0.113.33	dualstackuser2@example1.com
default:ASP-1		
*	2001:db8:1:2:5::/64	

show subscribers (Single Session DHCP Dual Stack)

```
user@host> show subscribers
```

Interface	IP Address/VLAN ID	User Name	LS:RI
demux0.1073741364	192.168.10.10	dual-stack-retail35	default:default
	2001:db8::100:0:0:0/74		default:default
	2001:db8:3ffe:0:4::/64		

show subscribers (Single Session DHCP Dual Stack detail)

```
user@host> show subscribers id 27 detail
```

```
Type: DHCP
User Name: dual-stack-retail33
IP Address: 10.10.0.53
IPv6 Address: 2001:db8:3000:0:0:8003::2
IPv6 Prefix: 2001:db8:3ffe:0:4::/64
Logical System: default
Routing Instance: default
Interface: ae0.3221225472
Interface type: Static
Underlying Interface: ae0.3221225472
Dynamic Profile Name: dhcp-retail-18
MAC Address: 00:00:5E:00:53:02
State: Active
DHCP Relay IP Address: 10.10.0.1
Radius Accounting ID: 27
Session ID: 27
PFE Flow ID: 2
Stacked VLAN Id: 2000
VLAN Id: 1
Login Time: 2014-05-15 10:12:10 PDT
DHCP Options: len 60
00 08 00 02 00 00 00 01 00 0a 00 03 00 01 00 00 64 01 01 02
00 06 00 04 00 03 00 19 00 03 00 0c 00 00 00 00 00 00 00 00
00 00 00 00 00 19 00 0c 00 00 00 00 00 00 00 00 00 00 00 00
```

show subscribers (LNS on MX Series Routers)

```
user@host> show subscribers
```

Interface	IP Address/VLAN ID	User Name	LS:RI
si-4/0/0.1	192.0.2.0	user@example.com	default:default

show subscribers (L2TP Switched Tunnels)

```
user@host> show subscribers
```

Interface	IP Address/VLAN ID	User Name	LS:RI
si-2/1/0.1073741842	Tunnel-switched	user@example.com	default:default
si-2/1/0.1073741843	Tunnel-switched	user@example.com	default:default

show subscribers aggregation-interface-set-name

```
user@host> show subscribers aggregation-interface-set-name FRA*
```

Interface	IP Address/VLAN ID	User Name	LS:RI
ge-1/0/0.3221225472	50	ancp	default:isp1-subscriber

show subscribers client-type dhcp detail

```
user@host> show subscribers client-type dhcp detail
```

```
Type: DHCP
IP Address: 203.0.113.29
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: demux0.1073744127
Interface type: Dynamic
Dynamic Profile Name: dhcp-demux
MAC Address: 00:00:5e:00:53:98
State: Active
Radius Accounting ID: user :2304
Login Time: 2009-08-25 14:43:52 PDT

Type: DHCP
IP Address: 203.0.113.27
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: demux0.1073744383
Interface type: Dynamic
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:00:5e:00:53:f3
State: Active
Radius Accounting ID: 1234 :2560
Login Time: 2009-08-25 14:43:56 PDT
```

show subscribers client-type dhcp detail (DHCPv6)

```
user@host> show subscribers client-type dhcp detail
```

```
Type: DHCP
User Name: DEFAULTUSER
IPv6 Address: 2001:db8::2
IPv6 Prefix: 2001:db8:1::/64
Logical System: default
Routing Instance: default
Interface: demux0.3221225602
Interface type: Static
Underlying Interface: demux0.3221225602
Dynamic Profile Name: client-profile
MAC Address: 00:00:5E:00:53:01
State: Active
Radius Accounting ID: 142
Session ID: 142
PFE Flow ID: 148
Stacked VLAN Id: 1
VLAN Id: 1
```

```

Login Time: 2018-03-29 12:27:38 EDT
DHCP Options: len 56
00 08 00 02 00 00 00 01 00 0e 00 01 00 01 22 4f d0 33 00 11
01 00 00 01 00 03 00 0c 00 00 00 0a 00 04 9d 40 00 07 62 00
00 19 00 0c 00 00 00 0b 00 04 9d 40 00 07 62 00
Server DHCPV6 Options: len 94
00 0a 00 06 11 22 33 44 55 66 00 11 00 09 00 00 0c 4c 00 02
00 01 aa 00 11 00 20 00 00 0a 4c 00 02 00 02 32 33 00 03 00
03 34 35 36 00 05 00 06 31 32 33 34 35 36 00 06 00 01 31 00
11 00 09 00 00 0b 4c 00 02 00 01 bb 00 11 00 12 00 00 0d e9
00 01 00 03 aa bb cc 00 02 00 03 dd ee cc
DHCPV6 Header: len 4
01 fc e4 96

```

show subscribers client-type dhcp extensive

```
user@host> show subscribers client-type dhcp extensive
```

```

Type: DHCP
User Name: user
IP Address: 192.0.2.4
IP Netmask: 255.0.0.0
IPv6 Address: 2001:db8:3::103
IPv6 Prefix: 2001:db8::/68
Domain name server inet6: 2001:db8:1 abcd::2
Logical System: default
Routing Instance: default
Interface: ge-0/0/0.0
Interface type: Static
Underlying Interface: ge-0/0/0.0
MAC Address: 00:00:5e:00:53:01
State: Configured
Radius Accounting ID: 10
Session ID: 10
PFE Flow ID: 2
VLAN Id: 100
Agent Circuit ID: ge-0/0/0:100
Agent Remote ID: ge-0/0/0:100
Login Time: 2017-05-23 12:52:22 IST
DHCPV6 Options: len 69
00 01 00 0e 00 01 00 01 59 23 e3 31 00 10 94 00 00 01 00 08
00 02 00 00 00 19 00 29 00 00 00 00 04 9d 40 00 07 62 00
00 1a 00 19 00 09 3a 80 00 27 8d 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00
Server DHCP Options: len 13
3a 04 00 00 00 ff 00 3b 04 00 00 0f 00
Server DHCPV6 Options: len 8
00 0a 00 04 ab cd ef ab
DHCPV6 Header: len 4
01 00 00 04
IP Address Pool: al_pool30
IPv6 Address Pool: ia_na_pool
IPv6 Delegated Address Pool: prefix_delegate_pool

```

show subscribers client-type vlan-oob detail

```
user@host> show subscribers client-type vlan-oob detail
```

```
Type: VLAN-00B
User Name: L2WS.line-aci-1.line-ari-1
Logical System: default
Routing Instance: ISP1
Interface: demux0.1073744127
Interface type: Dynamic
Underlying Interface: ge-1/0/0
Dynamic Profile Name: Prof_L2WS
Dynamic Profile Version: 1
State: Active
Radius Accounting ID: 1234
Session ID: 77
VLAN Id: 126
Core-Facing Interface: ge-2/1/1
VLAN Map Id: 6
Inner VLAN Map Id: 2001
Agent Circuit ID: line-aci-1
Agent Remote ID: line-ari-1
Login Time: 2013-10-29 14:43:52 EDT
```

show subscribers count

```
user@host> show subscribers count

Total Subscribers: 188, Active Subscribers: 188
```

show subscribers address detail (IPv6)

```
user@host> show subscribers address 203.0.113.137 detail

Type: PPPoE
User Name: pppoeTerV6User1Svc
IP Address: 203.0.113.137
IP Netmask: 255.0.0.0
IPv6 User Prefix: 2001:db8:0:c88::/32
Logical System: default
Routing Instance: default
Interface: pp0.1073745151
Interface type: Dynamic
Underlying Interface: demux0.8201
Dynamic Profile Name: pppoe-client-profile
MAC Address: 00:00:5e:00:53:53
Session Timeout (seconds): 31622400
Idle Timeout (seconds): 86400
State: Active
Radius Accounting ID: example demux0.8201:6544
Session ID: 6544
Agent Circuit ID: if13720
Agent Remote ID: if13720
Login Time: 2012-05-21 13:37:27 PDT
Service Sessions: 1
```

show subscribers detail (IPv4)

```
user@host> show subscribers detail

Type: DHCP
IP Address: 203.0.113.29
IP Netmask: 255.255.0.0
```

```

Primary DNS Address: 192.0.2.0
Secondary DNS Address: 192.0.2.1
Primary WINS Address: 192.0.2.3
Secondary WINS Address: 192.0.2.4
Logical System: default
Routing Instance: default
Interface: demux0.1073744127
Interface type: Dynamic
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:00:5e:00:53:98
State: Active
Radius Accounting ID: example :2304
Idle Timeout (seconds): 600
Login Time: 2009-08-25 14:43:52 PDT
DHCP Options: len 52
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 08 33 04 00 00
00 3c 0c 15 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 36 2f
33 2d 37 2d 30 37 05 01 06 0f 21 2c
Service Sessions: 2

```

show subscribers detail (IPv6)

```

user@host> show subscribers detail

Type: DHCP
User Name: pd-user1
IPv6 Prefix: 2001:db8:ffff:1::/32
Logical System: default
Routing Instance: default
Interface: ge-3/1/3.2
Interface type: Static
MAC Address: 00:00:5e:00:53:03
State: Active
Radius Accounting ID: 1
Session ID: 1
Login Time: 2011-08-25 12:12:26 PDT
DHCP Options: len 42
00 08 00 02 00 00 00 01 00 0a 00 03 00 01 00 51 ff ff 00 03
00 06 00 02 00 19 00 19 00 0c 00 00 00 00 00 00 00 00 00
00 00

```

show subscribers detail (pseudowire Interface for GRE Tunnel)

```

user@host> show subscribers detail

```

Interface	IP Address/VLAN ID	User Name	LS:RI
ps0.3221225484	192.0.2.2		
ps0.3221225485	192.0.2.3		
demux0.3221225486	1		default:default
demux0.3221225487	1		default:default
demux0.3221225488	198.51.0.1		default:default
demux0.3221225489	198.51.0.2		default:default

show subscribers detail (IPv6 Static Demux Interface)

```

user@host> show subscribers detail

Type: STATIC-INTERFACE
User Name: user@example.com
IPv6 Prefix: 2001:db8:3:4:5:6:7:aa/32
Logical System: default
Routing Instance: default
Interface: demux0.1
Interface type: Static
Dynamic Profile Name: junos-default-profile
State: Active
Radius Accounting ID: 185
Login Time: 2010-05-18 14:33:56 EDT

```

show subscribers detail (L2TP LNS Subscribers on MX Series Routers)

```

user@host> show subscribers detail

Type: L2TP
User Name: user@example.com
IP Address: 203.0.113.58
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: si-5/2/0.1073749824
Interface type: Dynamic
Dynamic Profile Name: dyn-lns-profile2
Dynamic Profile Version: 1
State: Active
Radius Accounting ID: 8001
Session ID: 8001
Login Time: 2011-04-25 20:27:50 IST

```

show subscribers detail (L2TP Switched Tunnels)

```

user@host> show subscribers detail

Type: L2TP
User Name: user@example.com
Logical System: default
Routing Instance: default
Interface: si-2/1/0.1073741842
Interface type: Dynamic
Dynamic Profile Name: dyn-lts-profile
State: Active
L2TP State: Tunnel-switched
Tunnel switch Profile Name: ce-lts-profile
Local IP Address: 203.0.113.51
Remote IP Address: 192.0.2.0
Radius Accounting ID: 21
Session ID: 21
Login Time: 2013-01-18 03:01:11 PST

Type: L2TP
User Name: user@example.com
Logical System: default
Routing Instance: default
Interface: si-2/1/0.1073741843

```

```
Interface type: Dynamic
Dynamic Profile Name: dyn-lts-profile
State: Active
L2TP State: Tunnel-switched
Tunnel switch Profile Name: ce-lts-profile
Local IP Address: 203.0.113.31
Remote IP Address: 192.0.2.1
Session ID: 22
Login Time: 2013-01-18 03:01:14 PST
```

show subscribers detail (Tunneled Subscriber)

```
user@host> show subscribers detail
```

```
Type: PPPoE
User Name: user1@example.com
Logical System: default
Routing Instance: default
Interface: pp0.1
State: Active, Tunneled
Radius Accounting ID: 512
```

show subscribers detail (IPv4 and IPv6 Dual Stack)

```
user@host> show subscribers detail
```

```
Type: VLAN
Logical System: default
Routing Instance: default
Interface: demux0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlanProfile
State: Active
Session ID: 1
Stacked VLAN Id: 0x8100.1001
VLAN Id: 0x8100.1
Login Time: 2011-11-30 00:18:04 PST
```

```
Type: PPPoE
User Name: dualstackuser1@example1.com
IP Address: 203.0.113.13
IPv6 Prefix: 2001:db8:1::/32
IPv6 User Prefix: 2001:db8:1:1::/32
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
Interface type: Dynamic
Dynamic Profile Name: dualStack-Profile1
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: 2
Session ID: 2
Login Time: 2011-11-30 00:18:05 PST
```

```
Type: DHCP
IPv6 Prefix: 2001:db8:1::/32
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
```



```

Interface type: Static
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: test :3
Session ID: 3
Underlying Session ID: 2
Login Time: 2011-11-30 00:18:35 PST
DHCP Options: len 42
00 08 00 02 0b b8 00 01 00 0a 00 03 00 01 00 00 64 03 01 02
00 06 00 02 00 19 00 19 00 0c 00 00 00 00 00 00 00 00 00 00
00 00

```

show subscribers detail (ACI Interface Set Session)

```

user@host> show subscribers detail

Type: VLAN
Logical System: default
Routing Instance: default
Interface: ge-1/0/0
Interface Set: aci-1001-ge-1/0/0.2800
Interface Set Session ID: 0
Underlying Interface: ge-1/0/0.2800
Dynamic Profile Name: aci-vlan-set-profile-2
Dynamic Profile Version: 1
State: Active
Session ID: 1
Agent Circuit ID: aci-ppp-dhcp-20
Login Time: 2012-05-26 01:54:08 PDT

```

show subscribers detail (PPPoE Subscriber Session with ACI Interface Set)

```

user@host> show subscribers detail

Type: PPPoE
User Name: ppphint2
IP Address: 203.0.113.15
Logical System: default
Routing Instance: default
Interface: pp0.1073741825
Interface type: Dynamic
Interface Set: aci-1001-demux0.1073741824
Interface Set Type: Dynamic
Interface Set Session ID: 2
Underlying Interface: demux0.1073741824
Dynamic Profile Name: aci-vlan-pppoe-profile
Dynamic Profile Version: 1
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: 3
Session ID: 3
Agent Circuit ID: aci-ppp-dhcp-dvlan-50
Login Time: 2012-03-07 13:46:53 PST

```

show subscribers extensive

```

user@host> show subscribers extensive

```

```

Type: DHCP
User Name: pd-user1
IPv6 Prefix: 2001:db8:ffff:1::/32
Logical System: default
Routing Instance: default
Interface: ge-3/1/3.2
Interface type: Static
MAC Address: 00:00:5e:00:53:03
State: Active
Radius Accounting ID: 1
Session ID: 1
Login Time: 2011-08-25 12:12:26 PDT
DHCP Options: len 42
00 08 00 02 00 00 00 01 00 0a 00 03 00 01 00 51 ff ff 00 03
00 06 00 02 00 19 00 19 00 0c 00 00 00 00 00 00 00 00 00
00 00
IPv6 Address Pool: pd_pool
IPv6 Network Prefix Length: 48

```

show subscribers extensive (Aggregation Node Interface Set and DSL Forum Attributes)

```

user@host> show subscribers extensive

Type: VLAN-00B
User Name: ancp
Logical System: default
Routing Instance: ispl-subscriber
Interface: ge-1/0/0.3221225472
Interface type: Dynamic
Interface Set: FRA-DPU-C-100
Underlying Interface: ge-1/0/0
Core IFL Name: ge-1/0/4.0
Dynamic Profile Name: Prof_L2BSA
State: Active
Radius Accounting ID: 1
Session ID: 1
PFE Flow ID: 13
VLAN Id: 50
VLAN Map Id: 20
Inner VLAN Map Id: 1
Inner VLAN Tag Protocol Id: 0x88a8
Agent Circuit ID: circuit 201
Agent Remote ID: remote-id
Aggregation Interface-set Name: FRA-DPU-C-100
Login Time: 2018-05-29 08:43:42 EDT
Accounting interval: 72000
Dynamic configuration:
  junos-cos-scheduler-map: 100m
  junos-inner-vlan-tag-protocol-id: 0x88a8
  junos-vlan-map-id: 20

Type: PPPoE
IP Address: 192.85.128.1
IP Netmask: 255.255.255.255
Logical System: default
Routing Instance: default
Interface: pp0.3221225474
Interface type: Dynamic
Interface Set: ge-1/0/0
Underlying Interface: demux0.3221225473

```

```

Dynamic Profile Name: pppoe-client-profile-with-cos
MAC Address: 00:10:94:00:00:03
State: Active
Radius Accounting ID: 3
Session ID: 3
PFE Flow ID: 16
Stacked VLAN Id: 50
VLAN Id: 7
Agent Circuit ID: circuit 201
Agent Remote ID: remote-id
Aggregation Interface-set Name: FRA-DPU-C-100
Login Time: 2018-05-29 08:43:45 EDT
IP Address Pool: pool-1
Accounting interval: 72000
DSL type: G.fast
Frame/cell mode: Frame
Overhead accounting bytes: 10
Actual upstream data rate: 100000 kbps
Actual downstream data rate: 200000 kbps
Calculated downstream data rate: 180000 kbps
Calculated upstream data rate: 90000 kbps
Adjusted upstream data rate: 80000 kbps
Adjusted downstream data rate: 160000 kbps
DSL Line Attributes
  Agent Circuit ID: circuit 201
  Agent Remote ID: remote-id
  Actual upstream data rate: 100000
  Actual downstream data rate: 200000
  DSL type: G.fast
  Access Aggregation Circuit ID: #FRA-DPU-C-100
  Attribute type: 0xAA, Attribute length: 4
  198 51 100 78

```

show subscribers extensive (Passive Optical Network Circuit Interface Set)

```

user@host> show subscribers client-type dhcp extensive

Type: DHCP
IP Address: 192.0.2.136
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: demux0.1073741842
Interface type: Dynamic
Interface Set: ot101.xyz101-202
Underlying Interface: demux0.1073741841
Dynamic Profile Name: dhcp-profile
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: user :19
Session ID: 19
VLAN Id: 1100
Agent Remote ID: ABCD01234|100M|AAAA01234|ot101.xyz101-202

Login Time: 2017-03-29 10:30:46 PDT
DHCP Options: len 97
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 02 33 04 00 00
17 70 0c 15 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 32 2f
32 2d 31 2d 31 37 05 01 06 0f 21 2c 52 2b 02 29 41 42 43 44
30 31 32 33 34 7c 31 30 30 4d 7c 41 41 41 41 30 31 32 33 34

```

```
7c 6f 74 6c 30 31 2e 78 79 7a 31 30 31 2d 32 30 32
IP Address Pool: POOL-V4
```

show subscribers extensive (DNS Addresses from Access Profile or Global Configuration)

```
user@host> show subscribers extensive

Type: DHCP
User Name: test-user@example-com
IP Address: 192.0.2.119
IP Netmask: 255.255.255.255
Domain name server inet: 198.51.100.1 198.51.100.2
IPv6 Address: 2001:db8::1:11
Domain name server inet6: 2001:db8:5001::12 2001:db8:3001::12
Logical System: default
Routing Instance: default
Interface: ge-2/0/3.0
Interface type: Static
Underlying Interface: ge-2/0/3.0
MAC Address: 00:00:5E:00:53:00
State: Active
Radius Accounting ID: 5
Session ID: 5
Login Time: 2017-01-31 11:16:21 IST
DHCP Options: len 53
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 03 33 04 00 00
00 3c 0c 16 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 35 2f
31 32 2d 30 2d 30 37 05 01 06 0f 21 2c
IP Address Pool: v4-pool
```

show subscribers extensive (DNS Addresses from RADIUS)

```
user@host> show subscribers extensive

Type: DHCP
User Name: test-user@example-com
IP Address: 192.0.2.119
IP Netmask: 255.255.255.255
Primary DNS Address: 198.51.100.1
Secondary DNS Address: 198.51.100.2
IPv6 Address: 2001:db8::1:11
IPv6 Primary DNS Address: 2001:db8:5001::12
IPv6 Secondary DNS Address: 2001:db8:3001::12
Logical System: default
Routing Instance: default
Interface: ge-2/0/3.0
Interface type: Static
Underlying Interface: ge-2/0/3.0
MAC Address: 00:00:5E:00:53:00
State: Active
Radius Accounting ID: 5
Session ID: 5
Login Time: 2017-01-31 11:16:21 IST
DHCP Options: len 53
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 03 33 04 00 00
00 3c 0c 16 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 35 2f
31 32 2d 30 2d 30 37 05 01 06 0f 21 2c
IP Address Pool: v4-pool
```

show subscribers extensive (IPv4 DNS Addresses from RADIUS, IPv6 from Access Profile or Global Configuration)

```

user@host> show subscribers extensive

Type: DHCP
User Name: test-user@example-com
IP Address: 192.0.2.119
IP Netmask: 255.255.255.255
Primary DNS Address: 198.51.100.1
Secondary DNS Address: 198.51.100.2
IPv6 Address: 2001:db8::1:11
Domain name server inet6: 2001:db8:5001::12 2001:db8:3001::12
Logical System: default
Routing Instance: default
Interface: ge-2/0/3.0
Interface type: Static
Underlying Interface: ge-2/0/3.0
MAC Address: 00:00:5E:00:53:00
State: Active
Radius Accounting ID: 5
Session ID: 5
Login Time: 2017-01-31 11:16:21 IST
DHCP Options: len 53
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 03 33 04 00 00
00 3c 0c 16 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 35 2f
31 32 2d 30 2d 30 37 05 01 06 0f 21 2c
IP Address Pool: v4-pool

```

show subscribers extensive (RPF Check Fail Filter)

```

user@host> show subscribers extensive

...
Type: VLAN
Logical System: default
Routing Instance: default
Interface: ae0.1073741824
Interface type: Dynamic
Dynamic Profile Name: vlan-prof
State: Active
Session ID: 9
VLAN Id: 100
Login Time: 2011-08-26 08:17:00 PDT
IPv4 rpf-check Fail Filter Name: rpf-allow-dhcp
IPv6 rpf-check Fail Filter Name: rpf-allow-dhcpv6
...

```

show subscribers extensive (L2TP LNS Subscribers on MX Series Routers)

```

user@host> show subscribers extensive

Type: L2TP
User Name: user@example.com
IP Address: 203.0.113.58
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: si-5/2/0.1073749824
Interface type: Dynamic
Dynamic Profile Name: dyn-lns-profile2

```

```

Dynamic Profile Version: 1
State: Active
Radius Accounting ID: 8001
Session ID: 8001
Login Time: 2011-04-25 20:27:50 IST
IPv4 Input Filter Name: classify-si-5/2/0.1073749824-in
IPv4 Output Filter Name: classify-si-5/2/0.1073749824-out

```

show subscribers extensive (IPv4 and IPv6 Dual Stack)

```
user@host> show subscribers extensive
```

```

Type: VLAN
Logical System: default
Routing Instance: default
Interface: demux0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlanProfile
State: Active
Session ID: 1
Stacked VLAN Id: 0x8100.1001
VLAN Id: 0x8100.1
Login Time: 2011-11-30 00:18:04 PST

Type: PPPoE
User Name: dualstackuser1@example1.com
IP Address: 203.0.113.13
IPv6 Prefix: 2001:db8:1::/32
IPv6 User Prefix: 2001:db8:1:1::/32
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
Interface type: Dynamic
Dynamic Profile Name: dualStack-Profile1
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: 2
Session ID: 2
Login Time: 2011-11-30 00:18:05 PST
IPv6 Delegated Network Prefix Length: 48
IPv6 Interface Address: 2001:db8:2016:1:1::1/64
IPv6 Framed Interface Id: 1:1:2:2
IPv4 Input Filter Name: FILTER-IN-pp0.1073741825-in
IPv4 Output Filter Name: FILTER-OUT-pp0.1073741825-out
IPv6 Input Filter Name: FILTER-IN6-pp0.1073741825-in
IPv6 Output Filter Name: FILTER-OUT6-pp0.1073741825-out

Type: DHCP
IPv6 Prefix: 2001:db8:1::/32
Logical System: default
Routing Instance: ASP-1
Interface: pp0.1073741825
Interface type: Static
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: test :3
Session ID: 3
Underlying Session ID: 2
Login Time: 2011-11-30 00:18:35 PST
DHCP Options: len 42

```

```
00 08 00 02 0b b8 00 01 00 0a 00 03 00 01 00 00 64 03 01 02
00 06 00 02 00 19 00 19 00 0c 00 00 00 00 00 00 00 00 00
00 00
IPv6 Delegated Network Prefix Length: 48
```

show subscribers extensive (ADF Rules)

```
user@host> show subscribers extensive

...
Service Session ID: 12
Service Session Name: SERVICE-PROFILE
State: Active
Family: inet
  ADF IPv4 Input Filter Name: __junos_adf_12-demux0.3221225474-inet-in
    Rule 0: 010101000b0101020b020200201811
      from {
        source-address 203.0.113.232;
        destination-address 198.51.100.0/24;
        protocol 17;
      }
      then {
        accept;
      }
```

show subscribers extensive (Effective Shaping-Rate)

```
user@host> show subscribers extensive

Type: VLAN
Logical System: default
Routing Instance: default
Interface: demux0.1073741837
Interface type: Dynamic
Interface Set: ifset-1
Underlying Interface: ae1
Dynamic Profile Name: svlan-dhcp-test
State: Active
Session ID: 1
Stacked VLAN Id: 0x8100.201
VLAN Id: 0x8100.201
Login Time: 2011-11-30 00:18:04 PST
Effective shaping-rate: 31000000k
...
```

show subscribers extensive (PPPoE Subscriber Access Line Rates)

```
user@host> show subscribers extensive

Type: PPPoE
IP Address: 198.51.100.1
IP Netmask: 255.255.255.255
Logical System: default
Routing Instance: default
Interface: pp0.3221225475
Interface type: Dynamic
Underlying Interface: demux0.3221225474
Dynamic Profile Name: pppoe-client-profile-with-cos
```

```
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: 4
Session ID: 4
PFE Flow ID: 14
Stacked VLAN Id: 40
VLAN Id: 1
Agent Circuit ID: circuit0
Agent Remote ID: remote0
Login Time: 2017-04-06 15:52:32 PDT

User Name: DAVE-L2BSA-SERVICE
Logical System: default
Routing Instance: isp-1-subscriber
Interface: ge-1/2/4.3221225472
Interface type: Dynamic
Interface Set: ge-1/2/4
Underlying Interface: ge-1/2/4
Core IFL Name: ge-1/3/4.0
Dynamic Profile Name: L2BSA-88a8-400LL1300V0
State: Active
Radius Accounting ID: 1
Session ID: 1
PFE Flow ID: 14
VLAN Id: 13
VLAN Map Id: 102
Inner VLAN Map Id: 1
Agent Circuit ID: circuit-aci-3
Agent Remote ID: remote49-3
Login Time: 2017-04-05 16:59:29 EDT
Service Sessions: 4
IFL Input Filter Name: L2BSA-CP-400LL1300V0-ge-1/2/4.3221225472-in
IFL Output Filter Name: L2BSA-CP-400LL1300V0-ge-1/2/4.3221225472-out
Accounting interval: 900
DSL type: VDSL
Frame/Cell Mode: Frame
Overhead accounting bytes: -10
Actual upstream data rate: 1024 kbps
Actual downstream data rate: 4096 kbps
Adjusted downstream data rate: 3686 kbps
Adjusted upstream data rate: 922 kbps
Dynamic configuration:
  junos-vlan-map-id: 102
  Service Session ID: 5
  Service Session Name: SRL-L1
  State: Active
  Family: inet, inet6
  IFL Input Filter Name: L2BSA-FWF-in-10048-ge-1/2/4.3221225472-in
  IFL Output Filter Name: L2BSA-FWF-out-25088-ge-1/2/4.3221225472-out
  Service Activation time: 2017-04-05 16:59:30 EDT
Dynamic configuration:
  l2bsa-fwf-in: L2BSA-FWF-in-10048
  l2bsa-fwf-out: L2BSA-FWF-out-25088
  rldown: 25088
  rlup: 10048
```

show subscribers extensive (Subscriber Session Using PCEF Profile)

```
user@host> show subscribers extensive
```



```
Type: VLAN
Logical System: default
Routing Instance: default
Interface: demux0.3221225517
Interface type: Dynamic
Underlying Interface: ge-1/0/3
Dynamic Profile Name: svlan-dhcp
State: Active
Session ID: 59
PFE Flow ID: 71
Stacked VLAN Id: 0x8100.1
VLAN Id: 0x8100.2
Login Time: 2017-03-28 08:23:08 PDT
```

```
Type: DHCP
User Name: pcefuser
IP Address: 192.0.2.26
IP Netmask: 255.0.0.0
Logical System: default
Routing Instance: default
Interface: demux0.3221225518
Interface type: Dynamic
Underlying Interface: demux0.3221225517
Dynamic Profile Name: dhcp-client-prof
MAC Address: 00:00:5e:00:53:01
State: Active
Radius Accounting ID: 60
Session ID: 60
PFE Flow ID: 73
Stacked VLAN Id: 1
VLAN Id: 2
Login Time: 2017-03-28 08:23:08 PDT
Service Sessions: 1
DHCP Options: len 9
35 01 01 37 04 01 03 3a 3b
IP Address Pool: pool-ipv4
IPv4 Input Service Set: tdf-service-set
IPv4 Output Service Set: tdf-service-set
PCEF Profile: pcef-prof-1
PCEF Rule/Rulebase: default
Dynamic configuration:
  junos-input-service-filter: svc-filt-1
  junos-input-service-set: tdf-service-set
  junos-output-service-filter: svc-filt-1
  junos-output-service-set: tdf-service-set
  junos-pcef-profile: pcef-prof-1
  junos-pcef-rule: default
```

```
Service Session ID: 61
Service Session Name: pcef-serv-prof
State: Active
Family: inet
IPv4 Input Service Set: tdf-service-set
IPv4 Output Service Set: tdf-service-set
PCEF Profile: pcef-prof-1
PCEF Rule/Rulebase: limit-fb
Service Activation time: 2017-03-28 08:31:19 PDT
Dynamic configuration:
  pcef-prof: pcef-prof-1
  pcef-rule1: limit-fb
```

```

svc-filt: svc-filt-1
svc-set: tdf-service-set

```

show subscribers aci-interface-set-name detail (Subscriber Sessions Using Specified ACI Interface Set)

```
user@host> show subscribers aci-interface-set-name aci-1003-ge-1/0/0.4001 detail
```

```

Type: VLAN
Logical System: default
Routing Instance: default
Interface: ge-1/0/0.
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-set-profile
Dynamic Profile Version: 1
State: Active
Session ID: 13
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:56 PDT

Type: PPPoE
User Name: ppphint2
IP Address: 203.0.113.17
Logical System: default
Routing Instance: default
Interface: pp0.1073741834
Interface type: Dynamic
Interface Set: aci-1003-ge-1/0/0.4001
Interface Set Type: Dynamic
Interface Set Session ID: 13
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-pppoe-profile
Dynamic Profile Version: 1
MAC Address:
State: Active
Radius Accounting ID: 14
Session ID: 14
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:57 PDT

```

show subscribers agent-circuit-identifier detail (Subscriber Sessions Using Specified ACI Substring)

```
user@host> show subscribers agent-circuit-identifier aci-ppp-vlan detail
```

```

Type: VLAN
Logical System: default
Routing Instance: default
Interface: ge-1/0/0.
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-set-profile
Dynamic Profile Version: 1
State: Active
Session ID: 13
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:56 PDT

Type: PPPoE
User Name: ppphint2
IP Address: 203.0.113.17
Logical System: default

```

```

Routing Instance: default
Interface: pp0.1073741834
Interface type: Dynamic
Interface Set: aci-1003-ge-1/0/0.4001
Interface Set Type: Dynamic
Interface Set Session ID: 13
Underlying Interface: ge-1/0/0.4001
Dynamic Profile Name: aci-vlan-pppoe-profile
Dynamic Profile Version: 1
MAC Address: 00:00:5e:00:53:52
State: Active
Radius Accounting ID: 14
Session ID: 14
Agent Circuit ID: aci-ppp-vlan-10
Login Time: 2012-03-12 10:41:57 PDT

```

show subscribers id accounting-statistics

```
user@host> show subscribers id 601 accounting-statistics
```

```

Session ID: 601
Accounting Statistics:
Input bytes : 199994
Output bytes : 121034
Input packets: 5263
Output packets: 5263
IPv6:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0

```

show subscribers interface accounting-statistics

```
user@host> show subscribers interface pp0.3221226949 accounting-statistics
```

```

Session ID: 501
Accounting Statistics:
Input bytes : 199994
Output bytes : 121034
Input packets: 5263
Output packets: 5263
IPv6:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0

Session ID: 502
Accounting Statistics:
Input bytes : 87654
Output bytes : 72108
Input packets: 3322
Output packets: 3322
IPv6:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0

```

```
Session ID: 503
Accounting Statistics:
Input bytes : 156528
Output bytes : 123865
Input packets: 7448
Output packets: 7448
IPv6:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
```

show subscribers interface extensive

```
user@host> show subscribers interface demux0.1073741826 extensive
```

```
Type: VLAN
User Name: user@test.example.com
Logical System: default
Routing Instance: testnet
Interface: demux0.1073741826
Interface type: Dynamic
Dynamic Profile Name: profile-vdemux-relay-23qos
MAC Address: 00:00:5e:00:53:04
State: Active
Radius Accounting ID: 12
Session ID: 12
Stacked VLAN Id: 0x8100.1500
VLAN Id: 0x8100.2902
Login Time: 2011-10-20 16:21:59 EST

Type: DHCP
User Name: user@test.example.com
IP Address: 192.0.2.0
IP Netmask: 255.255.255.0
Logical System: default
Routing Instance: testnet
Interface: demux0.1073741826
Interface type: Static
MAC Address: 00:00:5e:00:53:04
State: Active
Radius Accounting ID: 21
Session ID: 21
Login Time: 2011-10-20 16:24:33 EST
Service Sessions: 2

Service Session ID: 25
Service Session Name: SUB-QOS
State: Active

Service Session ID: 26
Service Session Name: service-cb-content
State: Active
IPv4 Input Filter Name: content-cb-in-demux0.1073741826-in
IPv4 Output Filter Name: content-cb-out-demux0.1073741826-out
```

show subscribers logical-system terse

```
user@host> show subscribers logical-system test1 terse
```

Interface	IP Address/VLAN ID	User Name	LS:RI
demux0.1073741825	203.0.113.3	RETAILER1-CLIENT	test1:retailer1
demux0.1073741826	203.0.113.4	RETAILER2-CLIENT	test1:retailer2

show subscribers physical-interface count

```
user@host> show subscribers physical-interface ge-1/0/0 count
```

```
Total subscribers: 3998, Active Subscribers: 3998
```

show subscribers routing-instance inst1 count

```
user@host> show subscribers routing-instance inst1 count
```

```
Total Subscribers: 188, Active Subscribers: 183
```

show subscribers stacked-vlan-id detail

```
user@host> show subscribers stacked-vlan-id 101 detail
```

```
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT
```

show subscribers stacked-vlan-id vlan-id detail (Combined Output)

```
user@host> show subscribers stacked-vlan-id 101 vlan-id 100 detail
```

```
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT
```

show subscribers stacked-vlan-id vlan-id interface detail (Combined Output for a Specific Interface)

```
user@host> show subscribers stacked-vlan-id 101 vlan-id 100 interface ge-1/2/0.* detail
```

```
Type: VLAN
Interface: ge-1/2/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: svlan-prof
State: Active
Stacked VLAN Id: 0x8100.101
VLAN Id: 0x8100.100
Login Time: 2009-03-27 11:57:19 PDT
```

show subscribers user-name detail

```
user@host> show subscribers user-name larry1 detail
Type: DHCP
User Name: larry1
IP Address: 203.0.113.37
IP Netmask: 255.255.0.0
Logical System: default
Routing Instance: default
Interface: ge-1/0/0.1
Interface type: Static
Dynamic Profile Name: foo
MAC Address: 00:00:5e:00:53:01
State: Active
Radius Accounting ID: 1
Session ID: 1
Login Time: 2011-11-07 08:25:59 PST
DHCP Options: len 52
35 01 01 39 02 02 40 3d 07 01 00 10 94 00 00 01 33 04 00 00
00 3c 0c 15 63 6c 69 65 6e 74 5f 50 6f 72 74 20 2f 2f 32 2f
37 2d 30 2d 30 37 05 01 06 0f 21 2c
```

show subscribers vlan-id

```
user@host> show subscribers vlan-id 100

Interface          IP Address          User Name
ge-1/0/0.1073741824
ge-1/2/0.1073741825
```

show subscribers vlan-id detail

```
user@host> show subscribers vlan-id 100 detail

Type: VLAN
Interface: ge-1/0/0.1073741824
Interface type: Dynamic
Dynamic Profile Name: vlan-prof-tpid
State: Active
VLAN Id: 100
Login Time: 2009-03-11 06:48:54 PDT

Type: VLAN
Interface: ge-1/2/0.1073741825
Interface type: Dynamic
Dynamic Profile Name: vlan-prof-tpid
State: Active
VLAN Id: 100
Login Time: 2009-03-11 06:48:54 PDT
```

show subscribers vpi vci extensive (PPPoE-over-ATM Subscriber Session)

```
user@host> show subscribers vpi 40 vci 50 extensive

Type: PPPoE
User Name: testuser
IP Address: 203.0.113.2
IP Netmask: 255.255.0.0
```

```

Logical System: default
Routing Instance: default
Interface: pp0.0
Interface type: Static
MAC Address: 00:00:5e:00:53:02
State: Active
Radius Accounting ID: 2
Session ID: 2
ATM VPI: 40
ATM VCI: 50
Login Time: 2012-12-03 07:49:26 PST
IP Address Pool: pool_1
IPv6 Framed Interface Id: 200:65ff:fe23:102

```

show subscribers address detail (Enhanced Subscriber Management)

```

user@host> show subscribers address 203.0.113.111 detail

Type: DHCP
User Name: simple_filters_service
IP Address: 203.0.113.111
IP Netmask: 255.0.0.0
Logical System: default
Routing Instance: default
Interface: demux0.3221225482
Interface type: Dynamic
Underlying Interface: demux0.3221225472
Dynamic Profile Name: dhcp-demux-prof
MAC Address: 00:00:5e:00:53:0f
State: Active
Radius Accounting ID: 11
Session ID: 11
PFE Flow ID: 15
Stacked VLAN Id: 210
VLAN Id: 209
Login Time: 2014-03-24 12:53:48 PDT
Service Sessions: 1
DHCP Options: len 3
35 01 01

```

show system autorecovery state

Syntax	show system autorecovery state
Release Information	Command introduced in Junos OS Release 11.2 for SRX300, SRX320, SRX340, SRX345, and SRX550M devices.
Description	Perform checks and show status of all autorecovered items.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> request system autorecovery state on page 1975
List of Sample Output	show system autorecovery state on page 2236
Output Fields	Table 110 on page 2236 lists the output fields for the show system autorecovery state command. Output fields are listed in the approximate order in which they appear.

Table 110: show system autorecovery state Output Fields

Field Name	Field Description
File	The name of the file on which autorecovery checks are performed.
Slice	The disk partition on which autorecovery checks are performed.
Recovery Information	Indicates whether autorecovery information for the file or slice has been saved.
Integrity Check	Displays the status of the file's integrity check (passed or failed).
Action / Status	Displays the status of the item, or the action required to be taken for that item.

Sample Output

show system autorecovery state

```
user@host> show system autorecovery state
```

```
Configuration:
File          Recovery Information Integrity Check Action / Status
rescue.conf.gz Saved          Passed          None
Licenses:
File          Recovery Information Integrity Check Action / Status
JUNOS282736.lic Saved          Passed          None
JUNOS282737.lic Not Saved      Not checked     Requires save
BSD Labels:
Slice         Recovery Information Integrity Check Action / Status
```


s1	Saved	Passed	None
s2	Saved	Passed	None
s3	Saved	Passed	None
s4	Saved	Passed	None

show system license (View)

Syntax	<code>show system license</code> <code><installed keys status usage></code>
Release Information	Command introduced in Junos OS Release 9.5. Logical system status option added in Junos OS Release 11.2.
Description	Display licenses and information about how licenses are used.
Options	<p>none—Display all license information.</p> <p>installed—(Optional) Display installed licenses only.</p> <p>keys—(Optional) Display a list of license keys. Use this information to verify that each expected license key is present.</p> <p>status—(Optional) Display license status for a specified logical system or for all logical systems.</p> <p>usage—(Optional) Display the state of licensed features.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • Adding New Licenses (CLI Procedure)
List of Sample Output	show system license on page 2239 show system license installed on page 2239 show system license keys on page 2240 show system license usage on page 2240 show system license status logical-system all on page 2240
Output Fields	Table 111 on page 2238 lists the output fields for the show system license command. Output fields are listed in the approximate order in which they appear.

Table 111: show system license Output Fields

Field Name	Field Description
Feature name	Name assigned to the configured feature. You use this information to verify that all the features for which you installed licenses are present.
Licenses used	Number of licenses used by the device. You use this information to verify that the number of licenses used matches the number configured. If a licensed feature is configured, the feature is considered used.

Table 111: show system license Output Fields (continued)

Field Name	Field Description
Licenses installed	Information about the installed license key: <ul style="list-style-type: none"> • License identifier—Identifier associated with a license key. • License version—Version of a license. The version indicates how the license is validated, the type of signature, and the signer of the license key. • Valid for device—Device that can use a license key. • Features—Feature associated with a license.
Licenses needed	Number of licenses required for features being used but not yet properly licensed.
Expiry	Time remaining in the grace period before a license is required for a feature being used.
Logical system license status	Displays whether a license is enabled for a logical system.

Sample Output

show system license

```
user@host> show system license
```

```
License usage:
      Feature name           Licenses  Licenses  Licenses  Expiry
                        used    installed needed
av_key_kaspersky_engine      1           1         0  2012-03-30
01:00:00 IST
wf_key_surfcontrol_cpa       0           1         0  2012-03-30
01:00:00 IST
dynamic-vpn                  0           1         0  permanent
ax411-wlan-ap                0           2         0  permanent

Licenses installed:
License identifier: JUNOS301998
License version: 2
Valid for device: AG4909AA0080
Features:
  av_key_kaspersky_engine - Kaspersky AV
    date-based, 2011-03-30 01:00:00 IST - 2012-03-30 01:00:00 IST

License identifier: JUNOS302000
License version: 2
Valid for device: AG4909AA0080
Features:
  wf_key_surfcontrol_cpa - Web Filtering
    date-based, 2011-03-30 01:00:00 IST - 2012-03-30 01:00:00 IST
```

show system license installed

```
user@host> show system license installed
```

```
License identifier: JUNOS301998
```

```

License version: 2
Valid for device: AG4909AA0080
Features:
  av_key_kaspersky_engine - Kaspersky AV
    date-based, 2011-03-30 01:00:00 IST - 2012-03-30 01:00:00 IST

License identifier: JUNOS302000
License version: 2
Valid for device: AG4909AA0080
Features:
  wf_key_surfcontrol_cpa - Web Filtering
    date-based, 2011-03-30 01:00:00 IST - 2012-03-30 01:00:00 IST

```

show system license keys

```
user@host> show system license keys
```

```

XXXXXXXXXX xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
          xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
          xxxxxx xxxxxx xxx

```

show system license usage

```
user@host> show system license usage
```

Feature name	Licenses used	Licenses installed	Licenses needed	Expiry
av_key_kaspersky_engine 01:00:00 IST	1	1	0	2012-03-30
wf_key_surfcontrol_cpa 01:00:00 IST	0	1	0	2012-03-30
dynamic-vpn	0	1	0	permanent
ax411-wlan-ap	0	2	0	permanent

show system license status logical-system all

```
user@host> show system license status logical-system all
```

```
Logical system license status:
```

logical system name	license status
root-logical-system	enabled
LSYS0	enabled
LSYS1	enabled
LSYS2	enabled

show system login logout

Syntax `show system login logout`

Release Information Command introduced in Junos OS Release 11.2.

Description Display the usernames locked after unsuccessful login attempts.

Required Privilege Level view and system

Related Documentation

- [lockout-period on page 1503](#)
- [clear system login logout on page 1952](#)

List of Sample Output [show system login logout on page 2241](#)

Output Fields [Table 112 on page 2241](#) lists the output fields for the **show system login logout** command. Output fields are listed in the approximate order in which they appear.

Table 112: show system login logout

Field Name	Field Description	Level of Output
User	Username	All levels
Lockout start	Date and time the username was locked	All levels
Lockout end	Date and time the username was unlocked	All levels

Sample Output

show system login logout

```
user@host> show system login logout
```

```
User          Lockout start      Lockout end
root          2011-05-11 09:11:15 UTC 2011-05-11 09:13:15 UTC
```

show system download

Syntax	<code>show system download <download-id></code>
Release Information	Command introduced in Junos OS Release 11.2 for SRX300, SRX320, SRX340, SRX345, and SRX550M devices.
Description	Display a brief summary of all the download instances along with their current state and extent of progress. If a download-id is provided, the command displays a detailed report of the particular download instance.
Options	<ul style="list-style-type: none"> download-id—(Optional) The ID number of the download instance.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> request system download start on page 1982
List of Sample Output	show system download on page 2242 show system download 1 on page 2243
Output Fields	Table 113 on page 2242 lists the output fields for the show system download command. Output fields are listed in the approximate order in which they appear.

Table 113: show system download Output Fields

Field Name	Field Description
ID	Displays the download identification number.
Status	Displays the state of a particular download.
Start Time	Displays the start time of a particular download.
Progress	Displays the percentage of a download that has been completed.
URL	Displays the URL from which the file was downloaded.

Sample Output

show system download

```
user@host> show system download
Download Status Information:
ID  Status      Start Time      Progress  URL
```

1	Active	May 4 06:28:36	5%	ftp://ftp-server//tftpboot/1m_file
2	Active	May 4 06:29:07	3%	ftp://ftp-server//tftpboot/5m_file
3	Error	May 4 06:29:22	Unknown	ftp://ftp-server//tftpboot/badfile
4	Completed	May 4 06:29:40	100%	ftp://ftp-server//tftpboot/smallfile

show system download 1

```
user@host> show system download 1
```

```
Download ID      : 1
Status           : Active
Progress         : 6%
URL              : ftp://ftp-server//tftpboot/1m_file
Local Path       : /var/tmp/1m_file
Maximum Rate     : 1k
Creation Time    : May 4 06:28:36
Scheduled Time   : May 4 06:28:36
Start Time       : May 4 06:28:37
Error Count      : 0
```

show system services dhcp binding

Syntax	show system services dhcp binding <detail> <address>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	(EX Series switches only) Display Dynamic Host Configuration Protocol (DHCP) server client binding information.
Options	none —Display brief information about all active client bindings. detail —(Optional) Display detailed information about all active client bindings. address —(Optional) Display detailed client binding information for the specified IP address only.
Required Privilege Level	view and system
Related Documentation	<ul style="list-style-type: none"> clear system services dhcp binding on page 1953
List of Sample Output	show system services dhcp binding on page 2245 show system services dhcp binding address on page 2245 show system services dhcp binding address detail on page 2245
Output Fields	Table 114 on page 2244 describes the output fields for the show system services dhcp binding command. Output fields are listed in the approximate order in which they appear.

Table 114: show system services dhcp binding Output Fields

Field Name	Field Description	Level of Output
Allocated address	List of IP addresses the DHCP server has assigned to clients.	All levels
MAC address	Corresponding media access control (MAC) hardware address of the client.	All levels
Client identifier	(address option only) Client's unique identifier (represented by an ASCII string or hexadecimal digits). This identifier is used by the DHCP server to index its database of address bindings.	All levels
Binding Type	Type of binding assigned to the client. DHCP servers can assign a dynamic binding from a pool of IP addresses or a static binding to one or more specific IP addresses.	All levels
Lease Expires at	Time the lease expires or never for leases that do not expire.	All levels

Table 114: show system services dhcp binding Output Fields (continued)

Field Name	Field Description	Level of Output
Lease Obtained at	(<i>address</i> option only) Time the client obtained the lease from the DHCP server.	detail
State	Status of the binding. Bindings can be active or expired.	detail
Pool	Address pool that contains the IP address assigned to the client.	detail
Request received on	Interface on which the DHCP message exchange occurs. The IP address pool is configured based on the interface's IP address. If a relay agent is used, its IP address is also displayed.	detail
DHCP options	User-defined options created for the DHCP server. If no options have been defined, this field is blank.	detail

Sample Output

show system services dhcp binding

```
user@host> show system services dhcp binding
```

```

Allocated address  MAC address      Binding Type  Lease expires at
192.168.1.2        00:a0:12:00:12:ab  static       never
192.168.1.3        00:a0:12:00:13:02  dynamic      2004-05-03 13:01:42 PDT

```

show system services dhcp binding address

```
user@host> show system services dhcp binding 192.168.1.3
```

```

DHCP binding information:
Allocated address: 192.168.1.3
Mac address: 00:a0:12:00:12:ab
Client identifier
61 63 65 64 2d 30 30 3a 61 30 3a 31 32 3a 30 30aced-00:a0:12:00
3a 31 33 3a 30 32:13:02

Lease information:
  Binding Type dynamic
  Obtained at 2004-05-02 13:01:42 PDT
  Expires at 2004-05-03 13:01:42 PDT

```

show system services dhcp binding address detail

```
user@host> show system services dhcp binding 192.168.1.3 detail
```

```

DHCP binding information:
Allocated address      192.168.1.3
MAC address 00:a0:12:00:12:ab
Pool                  192.168.1.0/24
Request received on fe-0/0/0, relayed by 192.168.4.254

Lease information:

```

```
Type                DHCP
Obtained at         2004-05-02 13:01:42 PDT
Expires at         2004-05-03 13:01:42 PDT
State active

DHCP options:
Name: name-server, Value: { 6.6.6.6, 6.6.6.7 }
Name: domain-name, Value: mydomain.tld
Code: 19, Type: flag, Value: off
Code: 40, Type: string, Value: domain.tld
Code: 32, Type: ip-address, Value: 3.3.3.33
```

show system services dhcp client

Syntax	<code>show system services dhcp client</code> <code>< interface-name ></code> <code><statistics></code>
Release Information	Command introduced in Junos OS Release 8.5. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Display information about DHCP clients.
Options	<ul style="list-style-type: none"> • <code>none</code>—Display DHCP information for all interfaces. • <code>interface-name</code>—(Optional) Display DHCP information for the specified interface. • <code>statistics</code>—(Optional) Display DHCP client statistics.
Required Privilege Level	view and system
Related Documentation	<ul style="list-style-type: none"> • dhcp (Interfaces) • request system services dhcp on page 1997
List of Sample Output	show system services dhcp client on page 2248 show system services dhcp client ge-0/0/34.0 on page 2249 show system services dhcp client statistics on page 2249
Output Fields	Table 115 on page 2247 lists the output fields for the <code>show system services dhcp client</code> command. Output fields are listed in the approximate order in which they appear.

Table 115: show system services dhcp client Output Fields

Field Name	Field Description
Logical Interface Name	Name of the logical interface.
Client Status	State of the client binding.
Vendor Identifier	Vendor ID.
Server Address	IP address of the DHCP server.
Address obtained	IP address obtained from the DHCP server.
Lease Obtained at	Date and time the lease was obtained.
Lease Expires in	(EX Series switches only) Time the current lease expires in (seconds).

Table 115: show system services dhcp client Output Fields (continued)

Field Name	Field Description
Lease Expires at	Date and time the lease expires.
DHCP Options	<ul style="list-style-type: none"> • Name: server-identifier, Value: IP address of the name server. • Name: device, Value: IP address of the name device. • Name: domain-name, Value: Name of the domain.
Packets dropped	Total packets dropped.
Messages received	<p>Number of the following DHCP messages received:</p> <ul style="list-style-type: none"> • DHCP OFFER—First packet received on a logical interface when DHCP is enabled. • DHCP ACK—When received from the server, the client sends an ARP request for that address and adds a (ARP response) timer for 4 seconds and stops the earlier timer added for DHCP ACK. • DHCP NAK—When a DHCP NAK is received instead of DHCP ACK, the logical interface sends a DHCP DISCOVER packet.
Messages sent	<p>Number of the following DHCP messages sent:</p> <ul style="list-style-type: none"> • DHCP DECLINE—Packet sent when ARP response is received and there is a conflict. The logical interface sends a new DHCP DISCOVER packet. • DHCP DISCOVER—Packet sent on the interface for which the DHCP client is enabled. • DHCP REQUEST—Packet sent to the DHCP server after accepting the DHCP OFFER. After sending the DHCP REQUEST, the device adds a retransmission-interval timer. • DHCP INFORM—Packet sent to the DHCP server for local configuration parameters. • DHCP RELEASE—Packet sent to the DHCP server to relinquish network address and cancel remaining lease. • DHCP RENEW—Packet sent to the DHCP server to renew the address. The next message to be sent will be a DHCP REQUEST message, which will be unicast directly to the server. • DHCP REBIND—Packet sent to any server to renew the address. The next message to be sent will be a DHCP REQUEST message, which will be broadcast.

Sample Output

show system services dhcp client

```
user@host> show system services dhcp client
```

```
Logical Interface name      ge-0/0/34.0
Hardware address           00:1f:12:38:5f:e5
Client status              bound
Address obtained           10.0.0.2
Update server              disabled
Lease obtained at          2013-12-23 08:11:40 UTC
Lease expires in           93
Lease expires at           2013-12-23 08:13:20 UTC
```

DHCP options:

```
Name: server-identifier, Value: 10.0.0.1
Code: 1, Type: ip-address, Value: 255.255.255.0
```

Sample Output

show system services dhcp client ge-0/0/34.0

```
user@host> show system services dhcp client ge-0/0/34.0
```

```
Logical Interface name      ge-0/0/34.0
Hardware address           00:1f:12:38:5f:e5
Client status              bound
Address obtained           10.0.0.2
Update server              disabled
Lease obtained at          2013-12-23 08:11:40 UTC
Lease expires in           87
Lease expires at           2013-12-23 08:13:20 UTC
```

DHCP options:

```
Name: server-identifier, Value: 10.0.0.1
Code: 1, Type: ip-address, Value: 255.255.255.0
```

Sample Output

show system services dhcp client statistics

```
user@host> show system services dhcp client statistics
```

```
Packets dropped:
  Total                0
Messages received:
  DHCPPOFFER           0
  DHCPACK              8
  DHCPNAK              0
Messages sent:
  DHCPDECLINE          0
  DHCPDISCOVER         0
  DHCPREQUEST          1
  DHCPINFORM           0
  DHCPRELEASE          0
  DHCPRENEW            7
  DHCPREBIND           0
```

show system services dhcp conflict

Syntax	show system services dhcp conflict
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	(J Series routers only and EX Series switches) Display Dynamic Host Configuration Protocol (DHCP) client-detected conflicts for IP addresses. When a conflict is detected, the DHCP server removes the address from the address pool.
Options	This command has no options.
Required Privilege Level	view and system
Related Documentation	<ul style="list-style-type: none"> clear system services dhcp conflict on page 1954
List of Sample Output	show system services dhcp conflict on page 2250
Output Fields	Table 116 on page 2250 describes the output fields for the show system services dhcp conflict command. Output fields are listed in the approximate order in which they appear.

Table 116: show system services dhcp conflict Output Fields

Field Name	Field Description
Detection time	Date and time the client detected the conflict.
Detection method	How the conflict was detected.
Address	IP address where the conflict occurs. The addresses in the conflicts list remain excluded from the pool until you use a clear system services dhcp conflict command to manually clear the list.

Sample Output

show system services dhcp conflict

```
user@host> show system services dhcp conflict
```

Detection time	Detection method	Address
2004-08-03 19:04:00 PDT	ARP	10.0.0.1
2004-08-04 04:23:12 PDT	Ping	10.0.0.2
2004-08-05 21:06:44 PDT	Client	10.0.0.3

show system services dhcp global

Syntax	show system services dhcp global
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	(J Series routers and EX Series switches only) Display Dynamic Host Configuration Protocol (DHCP) global configuration options. Global options apply to all scopes and clients served by the DHCP server. Global options are overridden if specified otherwise in scope or client options. Scope options apply to specific subnets or ranges of addresses. Client options apply to specific clients.
Options	This command has no options.
Required Privilege Level	view and system
List of Sample Output	show system services dhcp global on page 2252
Output Fields	Table 117 on page 2251 describes the output fields for the show system services dhcp global command. Output fields are listed in the approximate order in which they appear.

Table 117: show system services dhcp global Output Fields

Field Name	Field Description
BOOTP lease length	Length of lease time assigned to BOOTP clients.
Default lease time	Lease time assigned to clients that do not request a specific lease time.
Minimum lease time	Minimum time a client retains an IP address lease on the server.
Maximum lease time	Maximum time a client can retain an IP address lease on the server.
DHCP options	User-defined options created for the DHCP server. If no options have been defined, this field is blank.

Sample Output

show system services dhcp global

```
user@host> show system services dhcp global

Global settings:
  BOOTP lease length      infinite

DHCP lease times:
  Default lease time      1 hour
  Minimum lease time      2 hours
  Maximum lease time      infinite

DHCP options:
  Name: name-server, Value: { 6.6.6.6, 6.6.6.7 }
  Name: domain-name, Value: mydomain.tld
  Code: 19, Type: flag, Value: off
  Code: 40, Type: string, Value: domain.tld
  Code: 32, Type: ip-address, Value: 3.3.3.33
```


show system services dhcp pool

Syntax	show system services dhcp pool <detail> <subnet-address>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	(J Series routers and EX Series switches only) Display Dynamic Host Configuration Protocol (DHCP) server IP address pools.
Options	none —Display brief information about all IP address pools. detail —(Optional) Display detailed information. subnet-address —(Optional) Display information for the specified subnet address.
Required Privilege Level	view and system
List of Sample Output	show system services dhcp pool on page 2254 show system services dhcp pool subnet-address on page 2254 show system services dhcp pool subnet-address detail on page 2254
Output Fields	Table 118 on page 2253 describes the output fields for the show system services dhcp pool command. Output fields are listed in the approximate order in which they appear.

Table 118: show system services dhcp pool Output Fields

Field Name	Field Description	Level of Output
Pool name	Subnet on which the IP address pool is defined.	None specified
Low address	Lowest address in the IP address pool.	None specified
High address	Highest address in the IP address pool.	None specified
Excluded addresses	Addresses excluded from the address pool.	None specified
Subnet	(<i>subnet-address</i> option only) Subnet to which the specified address pool belongs.	None specified
Address range	(<i>subnet-address</i> option only) Range of IP addresses in the address pool.	None specified
Addresses assigned	Number of IP addresses in the pool that are assigned to DHCP clients and the total number of IP addresses in the pool.	detail
Active	Number of assigned IP addresses in the pool that are active.	detail

Table 118: show system services dhcp pool Output Fields (continued)

Field Name	Field Description	Level of Output
Excluded	Number of assigned IP addresses in the pool that are excluded.	detail
Default lease time	Lease time assigned to clients that do not request a specific lease time.	detail
Minimum lease time	Minimum time a client can retain an IP address lease on the server.	detail
Maximum lease time	Maximum time a client can retain an IP address lease on the server.	detail
DHCP options	User-defined options created for the DHCP server. If no options have been defined, this field is blank.	detail

Sample Output

show system services dhcp pool

```
user@host> show system services dhcp pool
```

```
Pool name      Low address    High address    Excluded addresses
192.0.2.0/24  192.0.2.2      192.0.2.254     192.0.2.1
```

show system services dhcp pool subnet-address

```
user@host> show system services dhcp pool 192.0.2.0/24
```

```
Pool information:
  Subnet                192.0.2.0/24
  Address range          192.0.2.2 - 192.0.2.254
  Addresses assigned      2/253
```

show system services dhcp pool subnet-address detail

```
user@host> show system services dhcp pool 192.0.2.0/24 detail
```

```
Pool information:
  Subnet                192.0.2.0/24
  Address range          192.0.2.2 - 192.0.2.254
  Addresses assigned      2/253
  Active: 1, Excluded: 1

DHCP lease times:
  Default lease time     1 hour
  Minimum lease time     2 hours
  Maximum lease time     infinite

DHCP options:
  Name: name-server, Value: { 6.6.6.6, 6.6.6.7 }
  Name: domain-name, Value: mydomain.tld
```

```
Name: router, Value: { 192.0.2.1 }  
Name: server-identifier, Value: 192.0.2.1  
Code: 19, Type: flag, Value: off  
Code: 40, Type: string, Value: domain.tld  
Code: 32, Type: ip-address, Value: 192.0.2.1
```

show system services dhcp relay-statistics

Syntax	<code>show system services dhcp relay-statistics</code>
Release Information	Command introduced in Junos OS Release 8.5 .
Description	Display information about the DHCP relay.
Required Privilege Level	view and system
Related Documentation	<ul style="list-style-type: none"> <i>dhcp</i>
List of Sample Output	show system services dhcp relay-statistics on page 2257
Output Fields	Table 119 on page 2256 lists the output fields for the show system services dhcp relay-statistics command. Output fields are listed in the approximate order in which they appear.

Table 119: show system services dhcp relay-statistics Output Fields

Field Name	Field Description
Received packets	Total DHCP packets received.
Forwarded packets	Total DHCP packet forwarded.
Dropped packets	<p>Total DHCP packets dropped for the following reasons:</p> <ul style="list-style-type: none"> Due to a missing interface in the relay database—Number of packets discarded because they did not belong to a configured interface. Due to a missing matching routing instance—Number of packets discarded because they did not belong to a configured routing instance. Due to an error during packet read—Number of packets discarded because of a system read error. Due to an error during packet send—Number of packets that the DHCP relay application could not send. Due to an invalid server address—Number of packets discarded because an invalid server address was specified. Due to a missing valid local address—Number of packets discarded because there was no valid local address. Due to a missing route to the server or client—Number of packets discarded because there were no addresses available for assignment.

Sample Output

show system services dhcp relay-statistics

```
user@host> show system services dhcp relay-statistics
Received packets: 4
Forwarded packets: 4
Dropped packets: 4
  Due to missing interface in relay database: 4
  Due to missing matching routing instance: 0
  Due to an error during packet read: 0
  Due to an error during packet send: 0
  Due to invalid server address: 0
  Due to missing valid local address: 0
  Due to missing route to server/client: 0
```

show system services dhcp statistics

Syntax	show system services dhcp statistics
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	(J Series routers and EX Series switches only) Display Dynamic Host Configuration Protocol (DHCP) server statistics.
Options	This command has no options.
Required Privilege Level	view and system
Related Documentation	<ul style="list-style-type: none"> clear system services dhcp statistics on page 1955
List of Sample Output	show system services dhcp statistics on page 2259
Output Fields	Table 120 on page 2258 describes the output fields for the show system services dhcp statistics command. Output fields are listed in the approximate order in which they appear.

Table 120: show system services dhcp statistics Output Fields

Field Name	Field Description
Default lease time	Lease time assigned to clients that do not request a specific lease time.
Minimum lease time	Minimum time a client can retain an IP address lease on the server.
Maximum lease time	Maximum time a client can retain an IP address lease on the server.
Packets dropped	Total number of packets dropped and number of packets dropped because of: <ul style="list-style-type: none"> Invalid hardware address Invalid opcode Invalid server address No available address No interface match No routing instance match No valid local addresses Packet too short Read error Send error

Table 120: show system services dhcp statistics Output Fields (continued)

Field Name	Field Description
Messages received	<p>Number of the following message types sent from DHCP clients and received by the DHCP server:</p> <ul style="list-style-type: none"> • BOOTREQUEST • DHCPDECLINE • DHCPDISCOVER • DHCPINFORM • DHCPRELEASE • DHCPREQUEST
Messages sent	<p>Number of the following message types sent from the DHCP server to DHCP clients:</p> <ul style="list-style-type: none"> • BOOTREPLY • DHCPACK • DHCPOFFER • DHCPNAK

Sample Output

show system services dhcp statistics

```
user@host> show system services dhcp statistics
```

```
DHCP lease times:
  Default lease time      1 hour
  Minimum lease time     2 hours
  Maximum lease time     infinite
```

```
Packets dropped:
  Total                  0
  Bad hardware address   0
  Bad opcode             0
  Invalid server address 0
  No available addresses 0
  No interface match     0
  No routing instance match 0
  No valid local address 0
  Packet too short       0
  Read error             0
  Send error             0
```

```
Messages received:
  BOOTREQUEST           0
  DHCPDECLINE           0
  DHCPDISCOVER          0
  DHCPINFORM            0
  DHCPRELEASE           0
  DHCPREQUEST           0
```

```
Messages sent:
  BOOTREPLY             0
  DHCPACK               0
```

DHCPOFFER	0
DHCPNAK	0

show system services service-deployment

Syntax	show system services service-deployment
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 a Session and Resource Control (SRC) client.
Options	This command has no options.
Required Privilege Level	<p>system</p> <p>view</p>
List of Sample Output	show system services service-deployment on page 2261
Output Fields	Table 121 on page 2261 lists the output fields for the show system services service-deployment command. Output fields are listed in the approximate order in which they appear.

Table 121: show system services service-deployment Output Fields

Field Name	Field Description
PDT Keepalive settings	Configured PDT keepalive interval, in seconds.
Keepalives sent	Number of keepalives sent.
Notifications sent	Number of notifications sent.
Last update from peer	Time at which the last update from a peer was received.

Sample Output

show system services service-deployment

```

user@host> show system services service-deployment

Connected to 192.0.2.0 port 10288 since 2004-05-03 11:04:34 PDT Keepalive settings:
Interval 15 seconds Keepalives sent: 750 Notifications sent: 0 Last update from
peer: 00:00:06 ago

```

show system snapshot media

Syntax	<code>show system snapshot < media (compact-flash external harddisk internal usb) ></code>
Release Information	Command introduced in Junos OS Release 10.2 .
Description	Display information about the partitioning scheme present on the media. Information for only one root is displayed for single-root partitioning, whereas information for both roots is displayed for dual-root partitioning.
Options	<ul style="list-style-type: none"> compact-flash— Show snapshot information from the CompactFlash card. (Supported on SRX5400, SRX5600, SRX5800) external— Show snapshot information from the external CompactFlash card. (Not supported on SRX5000 Series devices) hard-disk— Show snapshot information from the Hard Disk. (Supported on SRX5400, SRX5600, SRX5800) internal— Show snapshot information from internal media. (Not supported on SRX5000 Series devices) usb— Show snapshot information from device connected to USB port.
Required Privilege Level	View
Related Documentation	<ul style="list-style-type: none"> <i>Example: Creating a Snapshot and Using It to Boot an SRX Series Device</i>
List of Sample Output	show system snapshot media compact-flash on page 2263 show system snapshot media external on page 2263 show system snapshot media internal on page 2263 show system snapshot media usb on page 2263 show system snapshot media hard-disk on page 2263
Output Fields	<p>Table 122 on page 2262 lists the output fields for the show system snapshot media command. Output fields are listed in the approximate order in which they appear.</p>

Table 122: show system snapshot media Output Fields

Field Name	Field Description
Creation date	Date and time of the last snapshot.
JUNOS version on snapshot	Junos OS release number of individual software packages.

Sample Output

show system snapshot media compact-flash

```
show system snapshot media compact-flash
```

```
Information for snapshot on compact-flash (ad0s1)
Creation date: Aug 21 11:58:14 2017
JUNOS version on snapshot:
  junos   : 12.3X48-D40.5-domestic
```

show system snapshot media external

```
show system snapshot media external
```

```
Information for snapshot on      external (/dev/dals2a) (primary)
Creation date: Apr 9 09:41:16 2018
JUNOS version on snapshot:
  junos   : 12.3X48-D40.5-domestic
Information for snapshot on      external (/dev/dals1a) (backup)
Creation date: Apr 9 09:41:16 2018
JUNOS version on snapshot:
  junos   : 12.3X48-D40.5-domestic
```

show system snapshot media internal

```
show system snapshot media internal
```

```
Information for snapshot on      internal (/dev/da0s1a) (primary)
Creation date: Jan 15 10:43:26 2010
JUNOS version on snapshot:
  junos   : 10.1B3-domestic
Information for snapshot on      internal (/dev/da0s2a) (backup)
Creation date: Jan 15 10:15:32 2010
JUNOS version on snapshot:
  junos   : 10.2-20100112.0-domestic
```

show system snapshot media usb

```
show system snapshot media usb
```

```
Information for snapshot on usb (da0s1)
Creation date: Apr 9 08:44:46 2018
JUNOS version on snapshot:
  junos   : 12.3X48-D40.5-domestic
```

show system snapshot media hard-disk

```
show system snapshot media hard-disk
```

```
Information for snapshot on hard-disk (ad2s1)
Creation date: Apr 9 16:40:18 2018
JUNOS version on snapshot:
  junos   : 12.3X48-D40.5-domestic
```

show system storage partitions

List of Syntax	Syntax (EX Series) on page 2264 Syntax (SRX Series) on page 2264
Syntax (EX Series)	<pre>show system storage partitions <all-members> <local> <member <i>member-id</i>></pre>
Syntax (SRX Series)	<pre>show system storage partitions</pre>
Release Information	Command introduced in Junos OS Release 10.2 for SRX300, SRX320, SRX340, SRX345, and SRX550HM devices. Command introduced in Junos OS Release 11.1 for EX Series switches.
Description	Display information about the disk partitioning scheme.
Options	<p>none—Display partition information.</p> <p>all-members—(Virtual Chassis systems only) (Optional) Display partition information for all members of the Virtual Chassis.</p> <p>local—(Virtual Chassis systems only) (Optional) Display partition information for the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(Virtual Chassis systems only) (Optional) Display partition information for the specified member of the Virtual Chassis configuration.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• Verifying Junos OS and Boot Loader Software Versions on an EX Series Switch• Example: Installing Junos OS on SRX Series Devices Using the Partition Option
List of Sample Output	show system storage partitions (EX Series) on page 2265 show system storage partitions (SRX Series, Dual Root Partitioning) on page 2265 show system storage partitions (SRX Series, Single Root Partitioning) on page 2266 show system storage partitions (SRX Series, USB) on page 2266
Output Fields	Table 123 on page 2265 describes the output fields for the show system storage partitions command. Output fields are listed in the approximate order in which they appear.

Table 123: show system storage partitions Output Fields

Field Name	Field Description
Boot Media	Media (internal or external) from which the switch was booted.
Active Partition	Name of the active root partition.
Backup Partition	Name of the backup (alternate) root partition.
Currently booted from	Partition from which the switch was last booted.
Partitions information	Information about partitions on the boot media: <ul style="list-style-type: none"> • Partition—Partition identifier. • Size—Size of partition. • Mountpoint—Directory on which the partition is mounted.

Sample Output

show system storage partitions (EX Series)

```
user@switch> show system storage partitions
```

```
fpc0:
```

```
-----
Boot Media: internal (da0)
Active Partition: da0s1a
Backup Partition: da0s2a
Currently booted from: active (da0s1a)
```

```
Partitions information:
```

Partition	Size	Mountpoint
s1a	184M	/
s2a	184M	altroot
s3d	369M	/var/tmp
s3e	123M	/var
s4d	62M	/config
s4e		unused (backup config)

show system storage partitions (SRX Series, Dual Root Partitioning)

```
show system storage partitions
```

```
Boot Media: internal (da0)
Active Partition: da0s2a
Backup Partition: da0s1a
Currently booted from: active (da0s2a)
```

```
Partitions Information:
```

Partition	Size	Mountpoint
s1a	293M	altroot
s2a	293M	/
s3e	24M	/config
s3f	342M	/var
s4a	30M	recovery

show system storage partitions (SRX Series, Single Root Partitioning)**show system storage partitions**

Boot Media: internal (da0)

Partitions Information:

Partition	Size	Mountpoint
s1a	898M	/
s1e	24M	/config
s1f	61M	/var

show system storage partitions (SRX Series, USB)**show system storage partitions**

Boot Media: usb (da1)

Active Partition: da1s1a

Backup Partition: da1s2a

Currently booted from: active (da1s1a)

Partitions Information:

Partition	Size	Mountpoint
s1a	293M	/
s2a	293M	altroot
s3e	24M	/config
s3f	342M	/var
s4a	30M	recovery

show system users

List of Syntax [Syntax on page 2267](#)
 [Syntax \(TX Matrix Router\) on page 2267](#)
 [Syntax \(TX Matrix Plus Router\) on page 2267](#)
 [Syntax \(MX Series Router\) on page 2267](#)

Syntax `show system users`
 `<no-resolve>`

Syntax (TX Matrix Router) `show system users`
 `<all-chassis | all-lcc | lccnumber | scc>`
 `<no-resolve>`

Syntax (TX Matrix Plus Router) `show system users`
 `<detail>`
 `<all-chassis | all-lcc | lcc number | sfc number> <no-resolve>`

Syntax (MX Series Router) `show system users`
 `<all-members>`
 `<local>`
 `<member member-id>`
 `<no-resolve>`

Release Information Command introduced before Junos OS Release 7.4.
 Command introduced in Junos OS Release 9.0 for EX Series switches.
 sfc option introduced for the TX Matrix Plus router in JUNOS OS Release 9.6.
 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 List information about the users who are currently logged in to the router or switch.



NOTE: The `show system users` command lists the information about administrative users that are logged in to a router or switch using the CLI, J-Web, or an SSH client. The output does not list information about web users or automated users that are logged in from a remote client application using Junos XML APIs, such as NETCONF.

Options **none**—List information about the users who are currently logged in to the router or switch.

all-chassis—(TX Matrix routers and TX Matrix Plus routers only) (Optional) Show users currently logged in to all the routers in the chassis.

all-lcc—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, show users currently logged in to all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, show users currently logged in to all connected T1600 or T4000 LCCs.

all-members—(MX Series routers only) (Optional) Display users currently logged in to all members of the Virtual Chassis configuration.

lcc *number*—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, show users currently logged in to a specific T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, show users currently logged in to 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—(MX Series routers only) (Optional) Display users currently logged in to the local Virtual Chassis member.

member *member-id*—(MX Series routers only) (Optional) Display users currently logged in to the specified member of the Virtual Chassis configuration. Replace ***member-id*** with a value of 0 or 1.

no-resolve—(Optional) Do not attempt to resolve IP addresses to hostnames.

scc—(TX Matrix routers only) (Optional) Show users currently logged in to the TX Matrix router (or switch-card chassis).

sfc *number*—(TX Matrix Plus routers only) (Optional) Show users currently logged in to the TX Matrix Plus router. Replace ***number*** with 0.

Additional Information By default, when you issue the **show system users** command on the master Routing Engine of a TX Matrix router or a TX Matrix Plus router, the command is broadcast to all the master Routing Engines of the LCCs connected to it in the routing matrix. Likewise, if you issue the same command on the backup Routing Engine of a TX Matrix or a TX Matrix Plus router, the command is broadcast to all backup Routing Engines of the LCCs that are connected to it in the routing matrix.

Required Privilege Level view

Related Documentation

- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

List of Sample Output

[show system users on page 2269](#)
[show system users lcc no-resolve \(TX Matrix, TX Matrix Plus Router\) on page 2269](#)
[show system users \(TX Matrix Plus Router\) on page 2270](#)
[show system users \(QFX Series\) on page 2271](#)
[show system users no-resolve \(QFX Series\) on page 2271](#)

Output Fields

Table 124 on page 2269 describes the output fields for the **show system users** command. Output fields are listed in the approximate order in which they appear.

Table 124: *show system users* Output Fields

Field Name	Field Description
time and up	Current time, in the local time zone, and how long the router or switch has been operational.
users	Number of users logged in to the router or switch.
load averages	Load averages for the last 1 minute, 5 minutes, and 15 minutes.
USER	Username.
TTY	Terminal through which the user is logged in.
FROM	System from which the user has logged in. A hyphen indicates that the user is logged in through the console.
LOGIN@	Time when the user logged in.
IDLE	How long the user has been idle.
WHAT	Processes that the user is running.

Sample Output

show system users

```

user@host> show system users
 7:30PM up 4 days, 2:26, 2 users, load averages: 0.07, 0.02, 0.01
USER   TTY FROM          LOGIN@  IDLE WHAT
root   d0  -              Fri05PM 4days -csh (csh)
blue   p0  level5.company.net 7:30PM  - cli

```

show system users lcc no-resolve (TX Matrix, TX Matrix Plus Router)

```

user@host> show system users lcc 2 no-resolve

lcc2-re0:

```

```

-----
10:34AM PDT up 1 day, 7:11, 5 users, load averages: 0.03, 0.01, 0.00
USER      TTY      FROM              LOGIN@   IDLE   WHAT
root      d0        -                 3:21AM   7:12   /bin/csh
user1     p0        scc-re0           10:15AM   -      telnet hostA
user1     p1        scc-re0           10:16AM   -      telnet hostA
user1     p2        scc-re0           10:19AM   -      telnet hostA
user1     p3        scc-re0           10:24AM   -      telnet hostA

```

show system users (TX Matrix Plus Router)

```
user@host> show system users
```

```
sfc0-re0:
```

```

-----
1:41AM up 26 mins, 3 users, load averages: 0.08, 0.04, 0.03
USER      TTY      FROM              LOGIN@   IDLE   WHAT
user2     p0        10.209.208.123    1:18AM   21     cli
user2     p1        192.0.2.207       1:37AM   2      cli
user2     p2        192.0.2.19        1:40AM   -      cli

```

```
lcc0-re0:
```

```

-----
1:41AM up 26 mins, 0 users, load averages: 0.00, 0.00, 0.03

```

```
lcc1-re0:
```

```

-----
1:41AM up 26 mins, 0 users, load averages: 0.00, 0.02, 0.03

```

```
lcc2-re0:
```

```

-----
1:41AM up 26 mins, 0 users, load averages: 0.16, 0.06, 0.02

```

```
lcc3-re0:
```

```

-----
1:41AM up 26 mins, 0 users, load averages: 0.12, 0.04, 0.04

```

```
user3@aj> show system users
```

```
sfc0-re0:
```

```

-----
1:42AM up 28 mins, 4 users, load averages: 0.02, 0.03, 0.02
USER      TTY      FROM              LOGIN@   IDLE   WHAT
user      p0        device1.example.com 1:18AM   22     cli
user      p1        device2.example.com 1:37AM   -      cli
user      p2        device3.example.com 1:40AM   -      cli
user      p3        device4.example.com 1:42AM   -      -csh (csh)

```

```
lcc0-re0:
```

```

-----
1:42AM up 28 mins, 0 users, load averages: 0.02, 0.01, 0.03

```

```
lcc1-re0:
```

```

-----
1:42AM up 28 mins, 0 users, load averages: 0.07, 0.04, 0.03

```

```
lcc2-re0:
```

```

-----
1:42AM up 27 mins, 0 users, load averages: 0.07, 0.06, 0.02

```

```
lcc3-re0:
```

```
-----
1:42AM up 28 mins, 0 users, load averages: 0.05, 0.04, 0.04
```

show system users (QFX Series)

```
user@switch> show system users
```

USER	TTY	FROM	LOGIN@	IDLE	WHAT
user1	p0	192.0.2.117	2:54AM	39	-cli (cli)
user2	p1	192.0.2.116	3:01AM	-	-cli (cli)
user3	p2	192.0.2.97	3:08AM	11	-cli (cli)

show system users no-resolve (QFX Series)

```
user@switch> show system users no-resolve
```

USER	TTY	FROM	LOGIN@	IDLE	WHAT
user1	p0	192.0.2.117	2:54AM	39	-cli (cli)
user2	p1	192.0.2.116	3:01AM	-	-cli (cli)
user3	p2	192.0.2.97	3:08AM	11	-cli (cli)

test access profile

Syntax	<code>test access profile <i>profile-name</i> user <i>username</i> password <i>password</i> <detail></code>
Release Information	Command introduced in Junos OS Release 9.1.
Description	Specify a profile to use to get information from a RADIUS server, which includes all the information from the test access radius-server command.
Options	<p>detail—(Optional) Show the RADIUS attributes returned by the server.</p> <p>profile-name—Access profile name configured.</p> <p>password—Password for the username.</p> <p>username—User name to be authenticated to the RADIUS server.</p>
Required Privilege Level	view
List of Sample Output	<p>test access profile on page 2273</p> <p>test access profile detail on page 2273</p>
Output Fields	Table 125 on page 2272 lists the output fields for the test access profile command. Output fields are listed in the approximate order in which they appear.

Table 125: test access profile Output Fields

Field Name	Field Description
Profile Name	Name of the configured access profile.
Client Username	The user name authenticated by the RADIUS server.
Client Password	The user password authenticated by the RADIUS server.
Num Servers	Number of RADIUS servers in the configured access profile.
Server List	List of RADIUS servers in the configure access profile.
IP Address	The IP address of the RADIUS server authenticated.
UDP Port	The RADIUS server port utilized during the authentication test.
Source Address	The source IP address of the client making the RADIUS request. If no address is shown, it defaults to the address of the outgoing interface.
Timeout	The RADIUS server timeout period.

Table 125: test access profile Output Fields (continued)

Field Name	Field Description
Retry Count	The number of authentication attempts allowed by the RADIUS server.
Secret	The shared secret used for authentication with the RADIUS server.
Status	The test result status (Accepted or Rejected) and the number of retransmits utilized during authentication.
Attempts	The number of authentication attempts on the RADIUS server.
Attribute List	The list of returned RADIUS attributes, sorted by the attribute name, and including parameter length and value. See your RADIUS server documentation for attribute descriptions.
(Attribute) Name	The name of the attribute.
(Attribute) Length	The attribute length in bytes.
(Attribute) Value	The attribute value.

Sample Output

test access profile

The following example uses the **test access profile** command to access and display basic information about the RADIUS server(s) shown in the resulting output:

```

user@host> test access profile alpha user TEST password TEST

user@host> test access profile alpha user TEST password TEST
Test Radius Profile Access
  Profile Name       : alpha
  Client Username    : TEST
  Client Password    : TEST
  Num Servers        : 5
    Server List
      IP Address      UDP    Source      Timeout  Retry  Secret  Status
      Attempts
1.1.1.1             1812    10.10.10.10    2         1     TEST    Timeout
2
1.2.3.4             1812    Default        1         2     TEST    Timeout
3
192.168.10.10       1812    Default        3         3     TEST    Accepted
1

```

test access profile detail

The following example uses the **test access profile detail** command to access and display detailed information about the RADIUS server(s) shown in the resulting output:

```
user@host> test access profile alpha user TEST password TEST detail
```

```
user@host> test access profile alpha user TEST password TEST detail
Test Radius Profile Access Detailed
```

```
Profile Name       : alpha
Client Username    : TEST
Client Password    : TEST
Num Servers        : 5
```

Radius Server List

```
IP Address         : 1.2.3.4
UDP Port           : 1812
Source Address     : 192.168.10.10
Timeout            : 2
Retry Count        : 1
Secret             : TEST
Status             : Timeout
Attempts           : 2
```

```
IP Address         : 1.2.3.5
UDP Port           : 1812
Source Address     : Default
Timeout            : 1
Retry Count        : 2
Secret             : TEST
Status             : Timeout
Attempts           : 3
```

```
IP Address         : 192.168.10.10
UDP Port           : 1812
Source Address     : Default
Timeout            : 3
Retry Count        : 3
Secret             : TEST
Status             : Accepted
Attempts           : 1
```

Attribute List

Name	Length	Value
Class	52	SBR2CLÍ%¿ð0%¿
Acct-Interim-Interval	4	5
Callback-Id	12	123-456-789
Callback-Number	13	555-555-1212
Class	15	Class information
Filter-Id	4	999
Filter-Id	6	12345
Framed-Compression	4	0
Framed-IP-Address	4	1:2:3:4
Framed-IP-Netmask	4	255:255:255:255
Framed-IPv6-Route	15	1:2:3:4:5:6:7:8
Framed-MTU	4	1024
Framed-Pool	9	pool sbr
Framed-Protocol	4	1
Framed-Route	8	iproute
Framed-Routing	4	0
Vendor-Specific	11	583
Idle-Timeout	4	3
Vendor-Specific	10	a4c
Vendor-Specific	14	a4c
Login-IP-Host	4	10:1:1:1

Login-LAT-Group	10	lat group
Login-LAT-Node	9	lat node
Login-LAT-Port	9	lat port
Login-LAT-Service	12	lat service
Login-Service	4	0
Login-TCP-Port	4	1812
Vendor-Specific	10	137
Vendor-Specific	38	137
Vendor-Specific	10	137
Vendor-Specific	9	137
Vendor-Specific	16	137
Vendor-Specific	10	137
Vendor-Specific	10	137
Vendor-Specific	10	137
Vendor-Specific	9	137
Vendor-Specific	10	137
Vendor-Specific	10	137
Vendor-Specific	10	137
Vendor-Specific	10	137
Password-Retry	4	3
Port-Limit	4	100
Prompt	4	
Reply-Message	18	Radius Server SB
Service-Type	4	2
Session-Timeout	4	10
Termination-Action	4	1
Tunnel-Assignment-ID	4	
Tunnel-Client-Auth-ID	6	
Tunnel-Client-Endpoint	4	
Tunnel-Password	19	
Tunnel-Type	4	12
MS BAP Usage	4	0
MS-CHAP MPPE-Keys	32	-1234567890
MS-CHAP2 Success	3	123456789
MS Filter	10	ms-filter
MS Link Drop Time Limit	4	5
MS Link Utilization Threshold	4	6
MS MPPE Encryption Policy	4	1
MS MPPE Encryption Types	3	-556677889
MS Primary DNS Server	4	1:1:1:1
MS Primary NBNS Server	4	2:2:2:2
MS Secondary DNS Server	4	3:3:3:3
MS Secondary NBNS Server	4	4:4:4:4

test access radius-server

Syntax `test access radius-server address user username password password secret secret
<authentication-port port>
<retry number>
<source-address address>
<timeout number>`

Release Information Command introduced in Junos OS Release 9.1.

Description Verify RADIUS server authentication parameters.

Options ***address***—RADIUS server under test IP address.

password—Password for the user.

secret—Secret shared with the RADIUS server.

user—User name to be authenticated to the RADIUS server.

authentication-port—(Optional) RADIUS server authentication port number (1through 65535).

retry—(Optional) Retry attempts (1through 10).

source-address—(Optional) Use an alternate address as the source address.

timeout—(Optional) Request timeout period (1through 90 seconds).

Required Privilege Level view

List of Sample Output [test access radius-server user password secret on page 2277](#)

Output Fields [Table 126 on page 2276](#) lists the output fields for the **test access radius-server** command. Output fields are listed in the approximate order in which they appear.

Table 126: test access radius-server Output Fields

Field Name	Field Description
Server	The IP address of the RADIUS server authenticated.
UDP port	The RADIUS server port utilized during the authentication test.
Source IP Address	“Default” is shown if the IP address is the same as that of the RADIUS server. Alternatively, an IP address specified for authentication is shown.
Server timeout	The RADIUS server timeout period.

Table 126: test access radius-server Output Fields (continued)

Field Name	Field Description
Sever retry count	The number of authentication attempts allowed by the RADIUS server.
Secret	The shared secret used for authentication with the RADIUS server.
Client Username	The user name authenticated by the RADIUS server.
Client Password	The user password authenticated by the RADIUS server.
Status	The test result status (Accepted or Rejected) and the number of retransmits utilized during authentication.

Sample Output

test access radius-server user password secret

The following example command tests RADIUS authentication with a specific server (172.28.30.95), user (JOHNDOE), secret (No1Knows), and password (JohnPass); and displays the resulting output:

```
user@host> test access radius-server 172.28.30.95 user JOHNDOE password JohnPass secret No1Knows
```

```
Test Radius Server Access
  Server           : 172.28.30.95
  UDP port         : 1812
  Source IP Address : Default
  Server timeout   : 3
  Sever retry count : 3
  Secret           : No1Knows
  Client Username   : JOHNDOE
  Client Password   : JohnPass
  Status            : Accepted, retransmits: 0
```

